

MEETING ABSTRACTS

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## A1

### A randomized control trial evaluating the effect of acupuncture on glycemic control in dm2 using the freestyle libre® glucose monitoring system

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**Introduction:** Acupuncture is a widely used technique for the treatment of diabetes in Asian countries. Nevertheless, there are few studies with appropriate methodological rigor evaluating its effectiveness and promoting a standardized procedure in the western world. The FreeStyle libre glucose monitoring system has specific characteristics, being diverse from the traditional monitoring methods. It does not require finger prick and identifies glucose variations, especially nocturnal hypoglycemia.

**Objectives:** Evaluate the short-term effect of acupuncture in the treatment of type 2 diabetes mellitus (DM2) using the FreeStyle libre system.

**Method:** In a randomized, controlled, prospective, open-label trial, we randomly assigned 20 insulin independent DM2 patients to undergo acupuncture (group 1) or in the control group (group 2). Participants should be between 20 and 75 years old, diagnosed with DM2 for at least 3 years, and with stable glycemic control (evaluated through glycated hemoglobin). Patients should not be in use of glucocorticoids or insulin, be pregnant or have record of nephrotic syndrome, hepatic insufficiency, hyperthyroidism, acromegaly or renal insufficiency. Demographic data, baseline characteristics, biochemical and metabolic profiles were analyzed before the intervention. Participants underwent continuous glucose monitoring for 14 days, period in which they did not change diet, exercise or medication. Group 1 received acupuncture 4, 8 and 12 days after installation of the monitoring system. The acupuncture treatment promotes energetic balance and, in this study, diabetes-specific treatment points were used in all patients (B38, IG4, R24, E36 e BP9). This trial was approved by the ethics committee (CAAE—60576616.6.0000.5572) and registered at Brazilian Registry of Clinical Trials (UTN) is U1111-1199-9630.

**Results:** There were no statistically significant differences in the baseline characteristics (Table 1). In group 1, mean glucose level obtained through 14 days monitoring after acupuncture treatment was  $143 \pm 28,8$  mg/dl, whilst in group 2, who did not undergo acupuncture, the mean level was  $165,8 \pm 30,2$  mg/dl ( $p=0,015$ ) (Fig. 1).

Table 1 - Patient baseline data (before sensor installation)				
	Variable	Acupuncture Group	Group control	p value
Demographics	Age	63,5 ± 10 y	64,2 ± 13,4 y	0,85
	Gender (% men)	50%	60%	0,73
	Body mass index	28,1 ± 3 Kg/m <sup>2</sup>	27,9 ± 2,8 Kg/m <sup>2</sup>	0,97
Diabetes control	Glycated hemoglobin (A1c)	7,1 ± 1,1 %	7,3 ± 0,6 %	0,63
	Fasting glycemia	137 ± 39 mg/dl	139 ± 34 mg/dl	0,97
	Fasting insulin	322 ± 61 µmol/L	327 ± 31 µmol/L	0,73
	Diabetes duration	8 ± 4 y	7 ± 6 y	0,28
	Classes of hypoglycemic agents	2,3 ± 0,8	2,4 ± 0,7	0,63
Presence of comorbidities	Previous Retinopathy	10%	10%	1
	Previous Nephropathy	10%	20%	0,48
	Previous Neuropathy	10%	20%	0,48
	Previous myocardial infarction	20%	20%	1
	Cerebrovascular Accident	0%	10%	0,73
Lab data	Total cholesterol	159,5 ± 42 mg/dl	157,7 ± 34 mg/dl	0,98
	HDL - Cholesterol	39 ± 7 mg/dl	42 ± 11 mg/dl	0,63
	LDL - Cholesterol	91,1 ± 43 mg/dl	78,3 ± 29 mg/dl	0,42
	Triglycerides	178 ± 43 mg/dl	197 ± 70 mg/dl	0,37
	Albuminuria	18,8 ± 29 mg/g	36,3 ± 77 mg/g	0,57
	Serum Creatinine	1,1 ± 0,2 mg/dl	1,0 ± 0,8 mg/dl	0,21
	TSH	1,6 ± 0,5	1,5 ± 0,9	0,28

Figure 1 - Glycemic average during sensor use

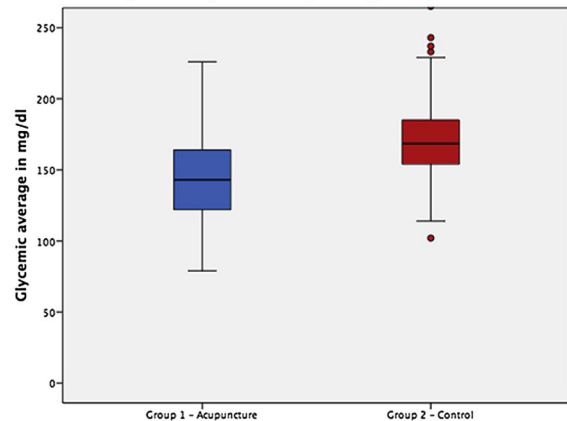


Fig. 1 See text for description

**Conclusion:** In this randomized pilot trial, there was an improvement in global glycemic control during the 14 days of monitoring in the acupuncture group. Despite the small sample of this trial, there were no significant differences in baseline characteristics. Further studies with larger cohorts should be performed.

**A2****A real world overview of diabetes mellitus profile and management in Brazil**

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**Introduction:** Real-world data on diabetes mellitus (DM) in Brazil is scarce. Given the complexity of current DM management, an understanding of the disease profile is essential to inform clinical and public health decisions.

**Objective:** We aimed to describe the proportion of T1DM and T2DM patients with HbA1c < 7.0%, the socio demographic and clinical characteristics of DM patients and the therapeutic strategies adopted in Brazil.

**Methods:** This was an observational, cross-sectional study, conducted between January and June 2016 in 250 public and private healthcare centers, randomly selected across Brazil.

**Results:** Overall, 2590 patients (51.8% male) were included, of which 244 (9.4%) had T1DM and 2 346 (90.6%) had T2DM. Most T1DM patients (43.4%) were in the 18-30 age group and most T2DM patients (51.5%) were in the 5170 age group. BMI  $\geq$  30 kg/m<sup>2</sup> was found for 14.6% of T1DM patients and 36.6% of T2DM patients. Mean age at diagnosis was 25.1 (SD 15.8) years for T1DM and 50.8 (SD 12.6) years for T2DM. Most patients (76.9%) are followed in the private health-care sector. The most frequent comorbidity was dyslipidemia (46.7%; n = 1209), both for T1DM patients (20.1%; n = 49) and T2DM patients (49.4%; n = 1160). HbA1c < 7.0% was found for 41.8% (95% CI [34.7%; 49.0%]) of T1DM patients and for 52.3% (95% CI [50.1%; 54.5%]) of T2DM patients. Among T2DM patients, 14.4% (n = 338) were insulin-treated, of which 55.6% (n = 188) with NPH, 23.7% (n = 80) with fast-acting insulin analogues, 22.8% (n = 77) with long-acting insulin analogues, 13.6% (n = 46) with regular insulin and 3.6% (n = 12) with premixed insulin. The oral antidiabetics most commonly used by T2DM patients were metformin (n = 1538; 65.6%), followed by DDP-4 inhibitors (n = 774; 33.0%) and sulfonylureas (n = 644; 27.5%). On average, patients attend 3.7 appointments per year for diabetes management (T1DM: 4.3; T2DM: 3.6).

**Conclusion:** A high proportion of patients in this cohort did not meet the glycemic control target of HbA1c < 7.0%, even though most were under pharmacological treatment. Given the risk of diabetic complications posed by uncontrolled disease, further action should be taken to address this issue. Globally, this study offers valuable insight into DM's epidemiology and management in Brazil. Funding: This study was funded by Sanofi.

**A3****A retrospective epidemiological study of the disability benefits caused by diabetes mellitus**

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**Introduction:** Diabetes mellitus (DM) is a disease that has a high prevalence around the world. In 2014, the World Health Organization estimated that 422 million adults had the disease, worldwide. The DM is one of the main causes of disability, which can negatively affect productivity in active workers. In Brazil, the National Institute of Social Security (INSS) is responsible for granting benefits and salaries in cases of absenteeism due to illness.

**Objective:** The objective of this study was to evaluate the epidemiological profile of INSS beneficiaries receiving disability benefits due to DM.

**Methods:** A retrospective study based on analysis of 184 patients who requested disability benefits due to diabetes mellitus from the INSS, in a city located in the south of Minas Gerais- Brazil. The analyzed data were characterized by age, gender and employment situation through the ICD-10 (E10, E11 and E14) from January 2014 to February 2016.

**Results:** The results showed that diabetes mellitus represented 34.2% of all disability benefits requests associated with endocrine diseases (n = 538). Considering just the diabetes ICDs, Insulin-dependent diabetes mellitus (E10) represented 63.6%, followed by non-insulin-dependent Diabetes (E11) with 24.4% and unspecified diabetes mellitus (E14) with 12%. The majority of beneficiaries were male (71.7%), associated with urban jobs (53.3%) especially administrative posts, ranging from 50 to 64 years old (63%).

**Conclusion:** The profile of workers who have requested benefits due to diabetes mellitus showed that the majority of beneficiaries were male adults, working in urban jobs ranging from 50 to 64 years old, mainly affected by Insulin-dependent diabetes mellitus disease. In addition, these beneficiaries can be more susceptible to workplace thermal conditions, stress and other issues inherent to the disease, such as hypo or hyperglycemia. These data should help in the implementation of strategies and measures to prevent the work disability caused by diabetes involving Brazilian workers. As consequence, it is expected that there will be a reduction in costs related to the absence of these workers.

**A4****Ability of the pedersen method to stratify hypoglycemia awareness and assess the risk of hypoglycemia**

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**Introduction:** The Pedersen method is a simple method to assess impairment of hypoglycemia awareness, which is a major risk factor for severe hypoglycemia.

**Objective:** To assess hypoglycemia awareness in consecutive type 1 diabetes patients using the Pedersen method and evaluate their glycemic profile and frequency of hypoglycemia.

**Method:** The Pedersen consists in confronting patients with the question: "Do you recognize symptoms, when you have a hypoglycemia?" and gives the possibility of one of four answers: (1) "Always"; (2) "Usually"; (3) "Occasionally"; (4) "Never". The population is then stratified in three groups: Normal awareness of hypoglycemia (NAH)—patients who answered "always"; Impaired awareness (IAH)—patients who answered "usually"; Unawareness of hypoglycemia (UAH)—patients who answered "occasionally" or "never". For all subjects, glycemic profile and hypoglycemia frequency were prospectively evaluated in detail in a 1 month period.

**Results:** In total, 98 patients with a mean age of 26 years and 13 years of diabetes duration were classified as UAH = 28.6%, IAH = 22.4%, and NAH = 49%. Patients with hypoglycemia unawareness (UAH) were older and had longer diabetes duration. The proportion of patients who reported at least one episode of severe hypoglycemia in the last year was significantly lower in patients with NAH (p < 0.001). When asked what level of blood glucose triggered their symptoms of hypoglycemia, significantly more patients with UAH reported levels < 40 mg/L (NAH = 4.2%, IAH = 4.5%, UAH = 57.0%, p < 0.001). In the analyses of the 4 weeks period of prospective data collection we observed a progressive increase in the average number of episodes of hypoglycemia as hypoglycemia perception decreased (NAH = 6.5  $\pm$  5.3, IAH = 8.8  $\pm$  4.4, UAH = 11.5  $\pm$  8.4; p = 0.004). The proportion of patients with at least one episode of hypoglycemia with no warning symptoms (i.e. no symptoms and capillary glucose < 52 mg/L) was highest in those with UAH (p < 0.001 vs. NAH and p = 0.011 vs. IAH). On univariable analysis, age (OR = 1.07; p = 0.002),

diabetes duration (OR = 1.07; p = 0.027), and creatinine clearance (OR = 0.81; p = 0.014) were associated with unawareness of hypoglycemia. On multivariable analysis, there was no factor independently associated with unawareness of hypoglycemia.

**Conclusion:** The Pedersen method is a simple and feasible clinical tool that correctly identified patients with high risk for severe hypoglycemia.

**A5**

**Accession to medicinal therapeutics of patients with diabetes mellitus**

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**Introduction:** Diabetes Mellitus is a chronic non-communicable disease that occurs due to hereditary and/or environmental factors. Adherence to drug therapy is essential to avoid complications.

**Objective:** To identify adherence and drug therapy and the difficulty that these individuals with type 2 DM have in relation to treatment adherence through the Morisky-Green Test (MGT) and Brief Medication Questionnaire (BMQ).

**Method:** Quantitative, descriptive, exploratory cross-sectional study. Study conducted with patients diagnosed with Type II Diabetes Mellitus. The results were analyzed by the Statistical Package for the Social Science (SPSS) 17, using Chi square tests and Fisher's exact test, was considered significant p < 0.05. All participants signed the informed consent form—TCLE. This research was approved by the Research Ethics Committee of the Health Sciences Teaching and Research Foundation of the health secretariat—FEPECS/SES, CAAE 45288915.6.0000.5553.

**Results:** Among the 99 patients interviewed, the majority were female (71.7%), aged 60.4 ± 1.0 years, married (54.5%), household 36 (36.4%), whose family income was constituted up to a minimum wage (34.3%). Regarding adherence to medication therapy, it was found to be moderate for both sexes, 48% (Female) and 50% (Male), through the MGT evaluation. The BMQ showed women with a likely adherence to treatment (55%) with a higher incidence and men focused on a low adherence rate (36%). Regarding the limitations for adherence, 45.5% of the individuals reported having difficulty reading what is written on the medication packages and 24.2% reported having difficulty remembering the time to take the medications.

**Conclusion:** Through MGT there was similar adherence to medication therapy between men and women, whereas in the BMQ women showed a more likely adherence to higher incidence. The limitation in reading what is written on the packages and remembering the time-tables for their ingestion were some of the difficulties to adherence to drug therapy referred by the patients (Figs. 1, 2, 3, 4, 5).

Tabela 1 – Classificação de domínios do Brief Questionnaire Medication, Brasília, 2017.

Domínios	Adere	Provável adesão	Provável baixa adesão	Baixa adesão
Regime	Não	Sim	Não	Sim
Crenças	Não	Não	Sim	Sim
Recordações	Não	Não	Sim	Sim

FONTE: Ben AJ, Neumann CR, Mengue SS. The Brief Medication Questionnaire and Morisky-Green test to evaluate medication adherence. *Rev Saude Publica.* 2012;46(2):279-89.

**Fig. 1** See text for description

Tabela 2 – Distribuição de pacientes diabéticos através das características sócio demográficas, Brasília, 2017.

Características demográficas		N (±DP/%)
Idade <sup>(1)</sup>		60,4 ± 1,0
Sexo	Masculino	28 (28,3)
	Feminino	71 (71,7)
Peso <sup>(1)</sup>		
Altura <sup>(1)</sup>		
Raça	Branca	47 (47,5)
	Preta	14 (14,1)
	Parda	37 (37,4)
	Amarela	0 (0,0)
	Indígena	1 (1,0)
Escolaridade <sup>(1)</sup>		6,2 ± 0,4
Estado civil	Casado/união estável	54 (54,5)
	Divorciado/separado(a)	16 (16,2)
	Solteiro(a)	14 (14,1)
	Viúvo(a)	15 (15,2)
Ocupação	Empregado	24 (24,2)
	Desempregado	2 (2,0)
	Dona de casa	36 (36,4)
	Pensionista	7 (7,1)
	Aposentado	30 (30,3)
Religião	Católico	56 (56,6)
	Evangélico	35 (35,4)
	Espírita	1 (1,0)
	Umbanda/candomblé	0 (0,0)
	Sem religião	5 (5,1)
	Outras	2 (2,0)
Tipo de família	Nuclear	86 (86,9)
	Extensa	5 (5,1)
	Monoparental	1 (1,0)
	Unitária	6 (6,1)
	Reconstruída	0 (0,0)
	Outra	1 (1,0)
Vive	Sozinho	13 (13,1)
	Acompanhado	86 (86,9)
Renda familiar	Menos que um salário mínimo	3 (3,0)
	1 Salário mínimo	34 (34,3)
	1 Salário mínimo e meio	11 (11,1)
	2 salários mínimos	24 (24,2)
	3 ou mais salários mínimos	25 (25,2)
	Não sabe informar	2 (2,0)

(1) Dados expressos em média ± desvio padrão.

**Fig. 2** See text for description

Tabela 3 - Distribuição de avaliação da dificuldade de adesão do tratamento medicamentoso dos pacientes diabéticos através do Brief Medication Questionnaire, Brasília, 2017.

	Muito difícil	Um pouco difícil	Não muito difícil
	n (%)	n (%)	n (%)
ABRIR OU FECHAR AS EMBALAGENS	1 (1,0)	5 (5,1)	93 (93,9)
LER O QUE ESTÁ ESCRITO NA EMBALAGEM	19 (19,2)	26 (26,3)	54 (54,5)
LEMBRAR-SE DE TOMAR REMÉDIOS	3 (3,0)	21 (21,2)	75 (75,8)
CONSEGUIR O MEDICAMENTO	16 (16,2)	29 (29,3)	54 (54,5)
TOMAR TODOS OS COMPRIMIDOS AO MESMO TEMPO	6 (6,1)	8 (8,1)	85 (85,9)

Fig. 3 See text for description

Tabela 4 - Distribuição de pacientes diabéticos de acordo com as variáveis de adesão à terapia medicamentosa em relação ao Brief Medication Questionnaire, Brasília, 2017.

Escore BMQ	n	(%)
<b>Regime (Escore)</b>		
0	66	66,7
≥ 1	33	33,3
<b>Crenças (Escore)</b>		
0	92	92,9
≥ 1	7	7,1
<b>Escore BMQ</b>		
Adesão	16	16
Provável adesão	47	47
Provável baixa adesão	30	30
Baixa adesão	6	6

Fig. 4 See text for description

Gráfico 1 - Distribuição de pacientes diabéticos de acordo com o sexo e tipo de adesão de tratamento do Brief Medication Questionnaire, Brasília, 2017.

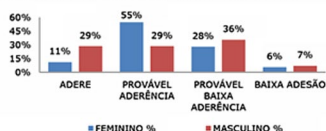


Gráfico 2 - Distribuição de pacientes diabéticos quanto à adesão do tratamento farmacológico através do Teste de Morisky-Green, Brasília, DF, 2017.



Gráfico 3 - Distribuição de pacientes diabéticos do sexo feminino e masculino quanto à adesão do tratamento farmacológico através do Teste de Morisky-Green, Brasília, DF, 2017.

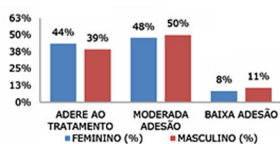


Fig. 5 See text for description

A6

**Achievement of HBA1C targets in the diabetes unmet need with basal insulin evaluation (dune) real-world study**

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The association between achievement of individualized glycemic targets and hypoglycemia risk in the real-world setting is unknown. DUNE was a 12-week, prospective, observational, multinational, real-world study (conducted Feb 2015–Jul 2016) in adults with T2DM newly (at time of enrollment) or recently (< 12 months) initiated on basal insulin (BI) therapy. The study aimed to assess individualized HbA1c target achievement and its association with symptomatic hypoglycemia (occurrence/frequency). Of 3139 evaluable participants, 99.7% were set individual HbA1c targets by their physicians (57% set at 7.0–7.4%). At week 12 both insulin-naïve and prior BI participants showed a mean HbA1c decrease from baseline with limited up-titration of insulin dose (Table); only 28 and 27%, respectively, achieved individual HbA1c targets (Table), with an average insulin dose of 0.31 U/kg/day at week 12. Overall, symptomatic hypoglycemia was reported by 16% of participants. Univariate logistic regression analysis showed a positive association between the occurrence and frequency of symptomatic hypoglycemia and HbA1c target achievement (Table). To conclude, results from this real-world study show that while HbA1c levels fell substantially, most participants did not achieve individual HbA1c targets; participants who reached target were more likely to experience symptomatic hypoglycemia. Study code: OBS13780. This is an ENCORE abstract previously presented at ADA2017. Funding and editorial support provided by Sanofi (Fig. 1).

**Table 1.** HbA<sub>1c</sub> target achievement, and the occurrence of symptomatic hypoglycemia (evaluable population)

	Insulin-naïve, n (%) N=1716	Prior BI, n (%) N=1423
Daily insulin dose (U/kg), mean (SD)		
Baseline	0.17 (0.09)	0.29 (0.17)
Week 12	0.27 (0.16)	0.34 (0.20)
Change	+0.10 (0.13)	+0.06 (0.10)
HbA <sub>1c</sub> (%), mean (SD)		
Baseline	9.1 (1.0)	8.6 (0.8)
Week 12	7.8 (1.2)	7.7 (1.2)
Change	-1.4 (1.3)	-0.8 (1.1)
Individual HbA <sub>1c</sub> target achievement at week 12, n (%)		
Yes	479 (27.9)	382 (26.8)
Yes, without any symptomatic hypoglycemia <sup>a</sup>	403 (23.5)	288 (20.2)
No	1237 (72.1)	1041 (73.2)
General HbA <sub>1c</sub> target (<7.0%) at week 12, n (%)		
Yes	433 (25.2)	331 (23.3)
No	1283 (74.8)	1092 (76.7)
Symptomatic hypoglycemia, n (%)		
No	1473 (85.8)	1161 (81.7)
Yes	243 (14.2)	260 (18.3)
Severe	8 (0.5)	18 (1.3)
	Association with achievement of HbA <sub>1c</sub> target at week 12 <sup>1</sup>	
	Odds ratio	95% CI
Symptomatic hypoglycemia		
Yes (reference) (n=170)		
No (n=691)	0.697	0.568 to 0.854
Frequency of symptomatic hypoglycemia (12-week study period)		
0 or 1 (reference) (n=756)		
2 to 5 (n=84)	1.318	1.003 to 1.732
>5 (n=21)	2.307	1.284 to 4.146
Symptomatic hypoglycemia severity <sup>b</sup>		
No (reference) (n=691)		
Non-severe (n=161)	1.433	1.163 to 1.765
Severe (n=9)	1.489	0.661 to 3.355

<sup>a</sup>Symptomatic hypoglycemia: any event associated with typical hypoglycemic symptoms, regardless of blood glucose measurement; <sup>b</sup>Non-severe symptomatic hypoglycemia: any event with typical hypoglycemic symptoms that does not require third party assistance; severe hypoglycemia: any event with typical hypoglycemic symptoms requiring third party assistance; <sup>1</sup>Univariate logistic regression analysis. BI, basal insulin; CI, confidence interval; SD, standard deviation.

**Fig. 1** See text for description**A7****Action ear acupuncture on glycemic control in people with type 2 diabetes mellitus: systematic review**

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**Introduction:** Diabetes Mellitus (DM) is a global health problem of the century. It is observed that 90 to 95% of DM cases are of people with Type 2 Diabetes Mellitus (DM2). Complications resulting from this morbidity can be systemic as peripheral. Therapeutic resources such as ear acupuncture have been used for the purpose of maintaining physiological balance and reducing the risks of complications from Diabetes.

**Objective:** To evaluate the evidence found in the literature on the action ear acupuncture on glycemic control in people with T2DM.

**Methods:** Systematic review in the databases: PubMed, Web of Science, Cinahl, Cochrane, Scopus, PEDRo, Science Direct, with keywords: Type 2 Diabetes Mellitus · Auriculotherapy/Type 2 Diabetes Mellitus · Acupressure/Type 2 Diabetes Mellitus · Ear acupuncture; adapted to each base, with the inclusion criteria: experimental works published in the last 10 years.

**Results:** 79 articles found. After reading the title, 22 articles composed the sample for analysis in its entirety. In the final sample, five studies answered the guiding question and presented the inclusion criteria. These showed ear acupuncture as an effective intervention for glycemic control. Despite this diversity, auriculotherapy can be applied by means of seed techniques (3 studies), with manual stimulation and

electrical stimulation in the auricular pavilion (2 studies), both with variable number of sessions.

**Conclusion:** Treatment protocol varied from and there is no consensus among the experts on the number of sessions, duration of treatment and the points applied.

**A8****Action planning and coping planning strategies to improve adherence to oral antidiabetics: a secondary analysis of a randomized controlled trial**

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**Background:** Discontinuation of drug treatment may be considered a common problem in patients with type 2 diabetes mellitus (T2DM) and, consequently, contribute to inadequate glycemic control. A systematic approach to improving adherence consists of: assessing adherence, removing barriers to overcoming them, and finally establishing follow-up plans that confirm the change in planned treatment and the evaluation of their goals.

**Aim:** To describe action plans related to the behavior of adherence to oral antidiabetic drugs (OADs), developed by patients with type 2 diabetes mellitus in primary care, as well as to identify the perceived barriers and respective coping strategies to effect this behavior.

**Method:** A cross-sectional study derived from a randomized controlled trial. Individuals (n = 44) who used oral antidiabetics and who had the ability to read and write in Brazilian Portuguese, composed the sample and were invited to elaborate behavioral strategies to improve OADs adherence. Ethics Approval: The study was approved by the University of Campinas' Ethics Board, approval number 1.278.099/2016, 1.408.883/2016 and 1.528.738/2016 and conducted according to the recommendations of the Declaration of Helsinki.

**Results:** It was evidenced that 97.7% of the action plans were associated with taking OADs after meals, 36.4% of the participants chose to take OADs in the room, and 45.4% associated them with activities of daily living such as preparing breakfast, brushing teeth and bathing. In daily activities, forgetfulness (21.4%), presence of adverse events (59.1%) and absence of routine (6.1%) were the most prevalent barriers raised by patients. The preparation of daily coping plans, such as leaving the tablets in an easily accessible place (17.3%), eating every three hours (14.3%), drinking 2 L or more of water per day (7.2%) and standardized mealtimes (6.1%) were the coping strategies that were most related to overcome the behavioral failure gap.

**Conclusion:** Most of the action plans were associated with taking OADs to temporal markers or the wake/sleep cycle. The development of coping planning including day-to-day activities were the strategies that most related to overcoming the behavioral failure gap. These findings provide support for the application of these strategies to promote adherence to drug therapy among patients with T2DM.

**A9****Acute coronary syndromes with and without elevation of the st segment in diabetic patients type 2: a 5-year follow-up analysis**

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**Introduction:** Acute coronary syndromes (ACS) are associated with increased risk of disability, hospitalization and death in populations, especially in diabetic patients. Type 2 diabetes mellitus (DM2) accounts for 90–95% of all cases of diabetes. It usually occurs in obese individuals and is older than 40 years. Approximately 70–80% of patients with T2DM have a set of factors that implies a high cardiovascular risk (abdominal obesity, dyslipidemia, glucose intolerance or diabetes and arterial hypertension), thus denominating the metabolic syndrome (MS). The dyslipidemia found in patients with MS is highly atherogenic, considerably increasing the cardiovascular risk of these patients, since the combination of these multiple risk factors makes this population a group of patients highly susceptible to cardiovascular diseases (CVD), with a risk up to 3× greater for the event cardiovascular, up to 4x for death by CAD and up to 2.4× for death from any cause. The more components of MS the patient has, the greater the risk of CVD and the presence of MS in patients with pre-existing CVD increases the risk of a new event in these people.

**Objective:** The objective of this study was to compare the clinical differences, the impact and the characteristics of hospitalizations for Acute Coronary Syndrome (ACS), either acute myocardial infarction without ST-segment elevation (STEMI) or acute myocardial infarction with ST-segment elevation (IAMCSST) in type 2 diabetic patients.

**Methodology:** Retrospective study from the charts of diabetic patients followed up by the Endocrinology Team who were diagnosed with ACS (IAMCSST and IAMCSST) between March/2012 and March/2017. Clinical data included sex, age, main cause of admission, comorbidities, and mean length of hospital stay. Patients hospitalized with other macrovascular causes (cerebrovascular disease and peripheral arterial insufficiency) were excluded. Data are presented in absolute numbers and percentages.

**Result:** Of the 446 admissions due to macrovascular causes, 86% were due to ACS (n = 384, 73% male and mean age 62.5 ± 12.4 years). The main age group was between 61 and 70 years (59%). The main diagnoses at hospital discharge were: 34% AMI (with/without SST), 57% AI and 9% noncardiac chest pain. The mean hospital stay was 16.8 ± 2.6 days. Overall mortality occurred in 3% (n = 6), occurring only in patients with AMI/AI.

**Conclusion:** Our data reaffirm the diabetic condition as an independent risk factor for cardiovascular events, being 2 to 3 times greater in males, which are more prone to the development of coronary diseases, being the main cause of hospitalization in this population. These results reinforce the need for a simultaneous intervention between glycemic control and the traditional cardiovascular risk factors, in order to weaken the central determinants involved in the genesis of atherosclerosis.

## A10

### Acute lowering of circulating fatty acids does not improve the incretin effect in patients with type 2 diabetes

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**Background and aims:** Plasma glucose is the main stimulus for insulin secretion (IS), but non-esterified fatty acids (NEFA) and the incretin hormones (GLP-1 and GIP) also are important modulators of IS. The incretin effect (IE) accounts for the ~40–80% higher IS after oral ingestion compared to intravenous glucose. Palmitate impairs IE by downregulating GLP-1 receptor signaling in beta-cell lines and isolated mouse islets. Insulin resistance and defective IE are common in T2DM. Thus, increased NEFA levels could impact beta-cell function through an impairment of IE. Our aim was to test whether an acute NEFA reduction induced by acipimox (ACP, a potent inhibitor of lipolysis) improves IE in T2DM.

**Materials and Methods:** 13 patients (10F/3 M; 54.8 ± 7.6 years, mean ± SD; BMI = 32.8 ± 5.6 kg/m<sup>2</sup>; HbA1c = 7.24 ± 0.48%) received

a 3 h OGTT (75 g) and a 3 h isoglycaemic glucose infusion (IV) on separate days. Both tests were repeated after ACP ingestion (200 mg 2 h before and 1 h after starting glucose). C-peptide deconvolution was used to calculate IS rates; mathematical model to quantitate β-cell function and IE. Main parameters: insulin secretion rate (ISR); glucose sensitivity (βGS), i.e., the slope of the IS/glucose dose–response curve; glucose-induced potentiation (PGLU), a time-dependent modulation of the dose–response; incretin-induced potentiation (PINCR) calculated as the fold IS increment during OGTT compared to IV glucose.

**Results:** On the OGTT, ACP decreased NEFA OGTT-area-under-curve (AUC) by 55 ± 14% (64 ± 28 vs 27 ± 9 mol L<sup>-1</sup> h<sup>-1</sup>, p < 0.01). Fasting glycaemia, OGTT and IV glucose AUCs were similar before and after ACP, while ACP decreased incremental OGTT-glucose AUC (744 ± 163 vs 902 ± 262 mol L<sup>-1</sup> 3 h<sup>-1</sup>, p < 0.05). ISR was lower during IV than OGTT both in the control (58 ± 19 vs 70 ± 23 nmol m<sup>-2</sup>; p < 0.01) and ACP studies (53 ± 15 vs 64 ± 20 nmol m<sup>-2</sup>; p < 0.01). ACP reduced ISR (64 ± 20 vs 70 ± 23 nmol m<sup>-2</sup>, p < 0.05) and did not change βGS (32 ± 11 vs 26 ± 9 pmol min<sup>-1</sup> m<sup>-2</sup> mM<sup>-1</sup>), PINCR (1.17 ± 0.14 vs 1.12 ± 0.19 fold), PGLU, plasma glucagon and GIP (all p = ns). In contrast, ACP improved insulin sensitivity, estimated as the oral glucose sensitivity index, OGIS (326 ± 44 vs 291 ± 60 ml min<sup>-1</sup> m<sup>-2</sup>, p < 0.05). Changes in ISR were directly related to changes in NEFA (rho = 0.62, p = 0.03) and inversely related to OGIS (rho = -0.73, p = 0.01).

**Conclusion:** In patients with type 2 diabetes, acute pharmacological NEFA reduction lowers glycaemia and enhances insulin sensitivity but does not improve the incretin effect.

## A11

### Acute omega-3 (3) consumption protect mice from visceral adiposity and hyperphagy

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**Introduction:** The short-term consumption of saturated or unsaturated fatty acids it is enough to change the metabolism. The adipose tissue hypertrophy and dysfunction induced by saturated fatty acids consumption represent strong markers to cardiometabolic risk. On the other hand, omega-3 food sources seems to protect from excess of adiposity, inflammation and hyperphagy.

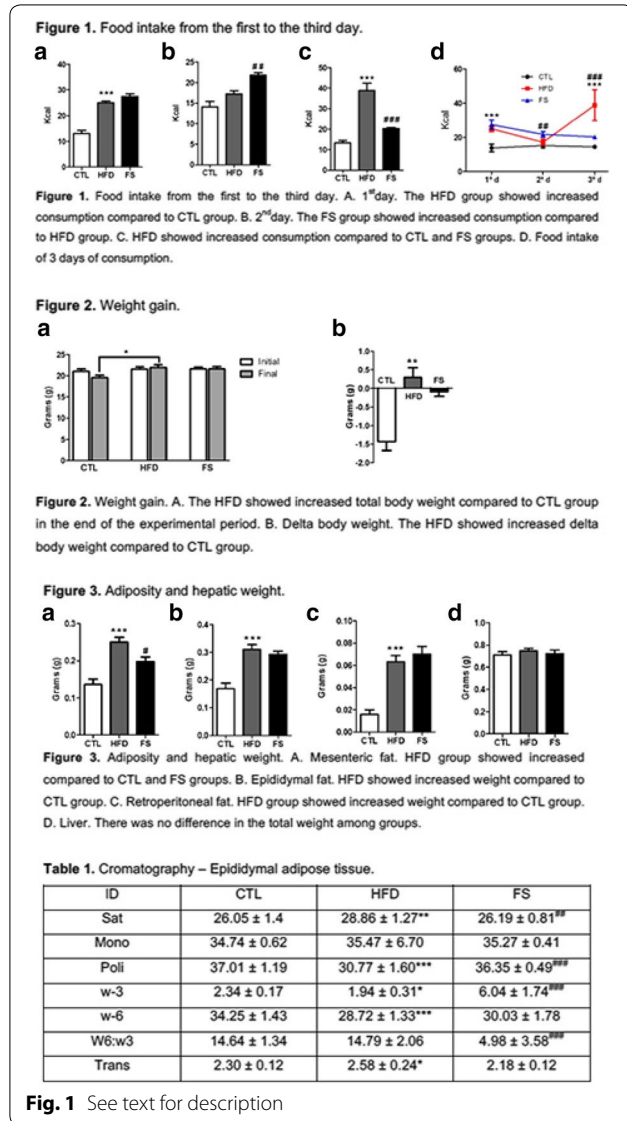
**Objective:** The aim of this study was to test the short effects of flaxseed oil, rich in 3, against high-fat diet disturbances in adipose visceral tissues.

**Materials and methods:** Animals C57BL/6 J, 4 weeks old, were distributed in 3 groups (N = 6 each), maintained during 3 days under specific diets: control diet (CTL—4% soy oil), High-fat diet (HFD—35% lard), and High-fat diet with 10% of flaxseed oil in substitution of lard (FS—25% from lard). It was carried out food intake, fasting glucose, body weight gain, metabolic and physiological parameters, lipidomics and histopathological analysis.

**Results:** On the 1st, the food intake significantly increased in the HFD group compared to CTL (P < 0.05) while in the last day (3rd day), there was a significant increase in the HFD group, compared to FS (P < 0.05). FS diet did not protect mice from weight gain in comparison to HFD group. However, surprisingly, the total fat depots in mesenteric adipose tissue from FS group was smaller than HFD group (P < 0.05), and the difference between HFD and CTL group on mesenteric, epididymal and retroperitoneal tissues was extremely significant (P < 0.001). Interestingly, the 3 fatty acid (C18:3 α-linolenic) bioavailability was confirmed by lipidomics, through its incorporation into adipose tissues from FS group in comparison to HFD group (P < 0.001). In addition, FS oil replaced diet was able to restore 6:3 balance (5:1), even under high fat conditions, when compared to HFD group (14:1).

**Conclusion:** Therefore, acutely high-fat diet consumption was able to impair several metabolic parameters, while 3 fatty acid sources can

protect against these damages. We believe that the sporadic imbalances on diet is not a risk for metabolic diseases. However, changes in the food pattern influenced by western diet, and the continuous consume of high-fat meals can be harmful and determinant to the dysmetabolism (Fig. 1).



**Objective:** The objective of this study was to evaluate the influence of intermittent high intensity exercise on the glucose response of children and adolescents with type 1 diabetes, related to the insulin application schedule.

**Materials and Methods:** Participated in the study 30 patients with type 1 diabetes mellitus, Z score of BMI 0.13 ± 0.93; Chronological age 13.09 ± 1.90; duration of disease 6.47 ± 3.77; Concentration of HbA1c 9.69 ± 1.56%. The patients had a standardized meal and insulin application was performed in the clinic (mean basal insulin 25.75 ± 8.47 U/kg/d and fast acting insulin 17.31 ± 11.35 U/kg/d). Two tests were performed in cycle ergometer, intensity of 60% VO<sub>2</sub>max, interspersed by five high-intensity sprints every 5 min, tests were performed one and 2 h after the application of insulin (T1 h and T2 h). Blood glucose was assessed at the beginning and at the end of the tests and for 8 h after the end of the tests using the continuous glucose monitor (MCG).

**Results:** Pre-and post-test glycemic variation was higher in T2 h (-30.66 mg/dl) than in T1 h (-19.78 mg/dl, p = 0.007). There was a significant difference between the mean number of occurrences of hypoglycemia in the 8 h following the tests (p = 0.017). The hypoglycemic odds ratio showed a higher odds ratio for hypoglycaemia after exercise and up to 8 h after insulin administration (OR: 37.94% CI 9.30–15.75).

**Conclusion:** According to the results of this study, the practice of intermittent high-intensity exercises performed 1 h after insulin and feeding showed a lower risk of hypoglycemia in the following 8 h compared to the exercises performed 2 h later. Ethics Approval The study was approved by Ethics Committee on Human Research at Hospital de Clínicas, UFPR, CAAE 44193214.7.0000.0096 with opinion number 1,101.60. (Fig. 1).

**A13 Adhesion to the autocare for patients with diabetes mellitus in a public hospital**

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**Introduction:** The evaluation of the autocare in patients with diabetes mellitus has as checking finality if the patients put in practice the directions that they receive of the health professionals to reach a better control glicêmico and lipídico, to maintain the appropriate weight and to obstruct or to delay complications resulting from the disease.

**Objective:** This study aimed to value the autocare of the patient at the next dimensions: general food, specific food, physical activity, monitorização of the glicemia, care with the feet, use of the medication and the practice of the tobaccoism.

**Method:** Cross study carried out in a public hospital of Brasília, DF—in the period from 12th of January till 21st of May of 2016. The sample was composed by 100 patients with DM1 and DM2, both sexes, ages between 18 and 64 years attended in the outpatient department of

**A12 Acute response to high intensity intermittent exercise in children and adolescents with type 1 diabetes**

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**Introduction:** The risk of hypoglycemia during and after exercise is a limiting factor to regular exercise in patients with type 1 diabetes. Studies related to intermittent exercise, characteristic of most sports and games, present contradictory results regarding glycemic responses and the risk of hypoglycemia induced by exercise.

endocrinologia of this hospital more than a year ago. A validated questionnaire was applied, QAD—Questionnaire of Activity of Autocare with Diabetes.

**Resulted:** The care with to the food was satisfactory with reduced consumption of sweets and fats in the diet; the practice of physical activity between the participants of this sample was low. The use of prescribed medicines and direction as for the care they was with the feet that they had bigger adhesion as the patients. Regarding tobaccoism practice, 41% of the interviewed ones said to have smoked in some phase of the life, nevertheless, in the moment of the inquiry, only 6% maintains the habit.

**Conclusion:** This study reinforces the importance of the autocare for control and prevention of the complications of diabetes mellitus (Fig. 1).

Tabela 1. Análise do Questionário de Atividades de Autocuidado como Diabetes. Estudo com pacientes do Ambulatório de Diabetes do Hospital Regional da Asa Norte – HRAN, Distrito Federal (Jan-mio, 2016).

Itens do QAD	Adesão* (n = 7)
<b>1. ALIMENTAÇÃO GERAL</b>	
1.1 Em quantos dos últimos sete dias seguiu uma dieta saudável?	4,98 (62,54)
1.2 Durante o último mês, quantos dias por semana, em média, seguiu orientação alimentar, dada por um profissional de saúde (médico, enfermeiro, nutricionista)?	3,39 (62,98)
<b>2. ALIMENTAÇÃO ESPECÍFICA</b>	
2.1 Em quantos dos últimos sete dias comeu cinco ou mais porções de frutas e/ou vegetais?	4,81 (62,62)
2.2 Em quantos dos últimos sete dias comeu alimentos ricos em gordura, como carnes vermelhas ou alimentos com leite integral ou derivados?	2,17 (62,31)**
2.3 Em quantos dos últimos sete dias comeu doces?	1,84 (62,44)**
<b>3. ATIVIDADE FÍSICA</b>	
3.1 Em quantos dos últimos SEIEM DIAS realizou atividade física durante pelo menos 30 minutos (minutos totais de atividade contínua, inclusive andar)?	2,37 (62,47)
3.2 Em quantos dos últimos SEIEM DIAS praticou algum tipo de exercício físico específico (nadar, caminhar, andar de bicicleta), sem incluir suas atividades em casa ou em seu trabalho?	2,36 (62,52)
<b>4. MONITORIZAÇÃO DA GLICEMIA</b>	
4.1 Em quantos dos últimos sete dias avaliou o açúcar no sangue?	4,31 (63,01)
4.2 Em quantos dos últimos sete dias avaliou o açúcar no sangue o número de vezes recomendado pelo médico ou enfermeiro?	3,25 (63,30)
<b>5. CUIDADO COM OS PÉS</b>	
5.1 Em quantos dos últimos SEIEM DIAS examinou os seus pés?	6,25 (62,00)
5.2 Em quantos dos últimos SEIEM DIAS examinou dentro dos sapatos antes de calçá-los?	6,01 (62,34)
5.3 Em quantos dos últimos SEIEM DIAS secou os espaços entre os dedos dos pés depois de lavá-los?	6,57 (61,67)
<b>6. MEDICAÇÃO</b>	
6.1 Em quantos dos últimos SEIEM DIAS tomou seus medicamentos do diabetes, conforme foi recomendado? OU (se insulina e comprimidos):	6,77 (61,07)
6.2 Em quantos dos últimos SEIEM DIAS tomou suas injeções de insulina, conforme foi recomendado?	6,86 (60,97)
6.3 Em quantos dos últimos SEIEM DIAS tomou o número indicado de comprimidos do diabetes?	6,65 (61,27)
<b>7. TABAGISMO</b>	
7.1 Você fumou um cigarro – ainda que só uma tragada – durante os últimos sete dias? 1 Sim / 2 Não	1,94 (60,24)
7.2 Se sim, quantos cigarros fuma, habitualmente, num dia? Número de cigarros:	0,33 (61,53)
7.3 Quando fumou o seu último cigarro? 1 Nunca fumou / 2 Há mais de dois anos atrás / 3 Hoje	1,45 (60,57)

\* Média da adesão em dias por semana (1: desvio-padrão) para as atividades de autocuidado nos sete dias anteriores. \*\* Média invertida.

Fig. 1 See text for description

**A14**

**Adverse perinatal outcomes of diabetic pregnant women treated with metformin in a tertiary hospital between 2009 and 2016**

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**Background:** Diabetes mellitus (DM) is the main endocrinopathy in pregnancy and its treatment aims to reach an adequate maternal glycemic control and reduce the adverse perinatal outcomes. The classic treatment is diet (D), physical activity (PA) and insulin (I), the last one associated to hypoglycemia and weight gain. On the other hand, metformin (MTF) does not lead to hypoglycemia neither weight gain. However, there are limited data regarding the use of metformin during pregnancy.

**Goals:** The aim of the study was to retrospectively analyze the impact of the glycemic control on perinatal outcomes of the diabetic pregnant women who received MTF, alone or associated with insulin, and to compare the results with those on conventional treatment.

**Methods:** We analyzed the medical records of the diabetic pregnant women who were attended at the Endocrinology Clinic of Hospital do

Servidor Público Municipal between 2009 and 2016. The incidence of fetal macrosomia, prematurity, respiratory distress, hospitalization in intensive care unit and abortion were analyzed and correlated to the glycemic control. Good glycemic control was defined by the presence of at least 80% of capillary blood glucose within the following range: pre-prandial < 90 mg/dL, 1 h postprandial < 140 mg/dL, 2 h postprandial < 120 mg/dL

**Results:** 98 pregnant women were evaluated and divided into four groups: D + PA (n = 27), D + PA + I (n = 33); D + PA + MTF (n = 12); and D + PA + MTF + I (n = 26). The mean age of the patients was 34.9 years old, which was similar between the four groups. In the group D + PA, 3/27 women had adverse outcomes. Two (67%) of them had poor glycemic control. In the group D + PA + I, 8/33 pregnant women presented adverse perinatal outcomes. Of these, three (37.5%) were poorly controlled. In the D + PA + MTF group, 5/12 pregnant women had adverse outcomes, of which four (80%) had poor glycemic controls. Finally, in the group who received D + PA + MTF + I, 9/26 had adverse outcomes and of these, eight (89%), had inadequate glycemic control (Fig. 1).

Table 1: Number of diabetic pregnant women with adverse perinatal outcomes

Pregnant women with adverse perinatal outcomes, n (%)	D + PA n = 27		D + PA + I n = 33		D + PA + MTF n = 12		D + PA + MTF + I n = 26	
	Good control	Bad control	Good control	Bad control	Good control	Bad control	Good control	Bad control
	1 (33.3%)	2 (66.7%)	5 (62.7%)	3 (37.5%)	1 (20%)	4 (80.0%)	1 (11.1%)	8 (88.9%)

D, diet; PA, physical activity; I, insulin; MTF, metformin

Table 2: Adverse perinatal outcomes events by group

	D + PA (n = 3/27)		D + PA + I (n = 8/33)		D + PA + MTF (n = 5/12)		D + PA + MTF + I (n = 9/26)	
	Good control	Bad control	Good control	Bad control	Good control	Bad control	Good control	Bad control
Macrosomia	1	1	1	1	1	1	0	2
Neonatal hypoglycemia	1	0	2	0	1	1	0	6
Respiratory distress	1	0	1	2	1	2	1	0
Intensive care hospitalization	1	0	1	0	0	0	0	1
Prematurity	0	1	0	0	0	0	0	0
Abortion	0	0	0	0	0	0	0	0

D, diet; PA, physical activity; I, insulin; MTF, metformin

DISCUSSION: The glycemic control is a determining factor in the occurrence of adverse perinatal outcomes, once 68% of the pregnant women with these events were

Fig. 1 See text for description

**A15**

**Air pollution participates in the genesis of obesity through the activation of hypothalamic TLR4**

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**Background:** Exposure to air pollution has unfavorable cardiometabolic effects. Particulate matter 2.5 (PM2.5) is associated with the induction of chronic inflammation in many tissues. Leptin signaling in



the hypothalamus participates in the maintenance of energy homeostasis. Leptin resistance may occur due to hypothalamic low grade inflammation in obese models. One of the mechanisms that triggers the low grade inflammation is the activation of toll-like receptor 4 (TLR4) pathway by lipopolysaccharide (LPS), which is one of the components of PM2.5.

**Objectives:** Therefore, the aims of the present study are to investigate: 1) TLR4 gene expression in the hypothalamus of C57BL/6 J mice (C57) exposed to PM2.5 (polluted) compared to C57 exposed to filtered air (FA); 2) the changes in weight gain, energy intake and energy expenditure (respirometry), glucose tolerance (GTT) and insulin tolerance (ITT) in TLR4- knockout mice (TLR4KO) exposed to PM2.5 or FA.

**Materials and methods:** 6 weeks-old male mice were exposed to PM2.5/FA in the Harvard Ambient Fine Particles Concentrator at University of Sao Paulo during 3 months. All mice received standard diet (Nuvilab®) and potable water ad libitum. After this period, part of these mice was submitted to intraperitoneal leptin sensitivity protocol, which consisted of daily injections of leptin for 2 days followed by saline injections for 3 days. During this protocol, body weight and food intake were measured daily. Another part of the mice underwent to glucose and insulin tolerance tests (GTT and ITT) made in different weeks. At the end of all in vivo experiments, mice were killed for tissues dissections after intraperitoneal leptin or saline stimulation. Hypothalamus and epididymal adipose tissue were collected and kept under  $-80^{\circ}\text{C}$ .

**Results:** As a result, it was observed that the polluted C57 mice had increased body weight, adipose mass and serum insulin concentration. The GTT and ITT were altered in the polluted C57 compared to C57 FA. There was no difference on food intake between groups; however, the oxygen consumption was significantly lower in polluted C57 compared to FA mice, suggesting lower energy expenditure in this group. Leptin resistance in the hypothalamus was observed in the polluted C57 mice compared to FA mice, because body weight and food intake in response to leptin only decrease in the FA C57 mice. TLR4 gene expression levels were elevated in the hypothalamus of polluted C57 mice. The TLR4KO exposed to PM2.5 did not present changes in body weight or adipose mass and hypothalamic leptin sensitivity was similar to FA C57 mice. In addition, GTT and ITT were similar between polluted TLRKO and FA C57 mice.

**Conclusion:** Together, the data suggest that the air pollution participates in the genesis of obesity, insulin resistance and glucose intolerance. The increase of adiposity was due, at least in part, to the reduction of energy expenditure. Hypothalamic inflammatory pathways may be involved in leptin resistance induced by air pollution, because the TLR4 deletion protected the animal from obesity, insulin resistance and glucose intolerance.

#### A16

##### Albuminuria reduction after high dose of vitamin D in patients with type 1 diabetes mellitus: a pilot study

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**Background:** Some studies suggest an association between diabetic kidney disease (DKD) and vitamin D (VD), but there is no data about the effect of high dose of VD on DKD in type 1 diabetes mellitus (T1DM). Our pilot study aims to evaluate albuminuria reduction in patients with T1DM supplemented with high dose of VD.

**Methods:** 22 patients received doses of 4000 and 10000 IU/day of cholecalciferol for 12 weeks according to patient's previous VD levels. They were submitted to continuous glucose monitoring system (CGMS), 24-h ABPM and urine albumin-to-creatinine ratio (UACR) before and after VD supplementation.

**Results:** There was a reduction of DKD prevalence at the end of the study (68 vs 32%;  $p = 0.05$ ), with no changes on insulin doses, HbA1c, glycemic variability (GV) and blood pressure (BP) values. A correlation between percentage variation of VD levels ( $\Delta\text{VD}$ ) and albuminuria at the end of the study was presented ( $r = -0.5$ ;  $p < 0.05$ ). Among T1DM patients with DKD at the beginning of the study, 8/13 (62%) had their DKD stage improved, while the other five ones (38%) showed no changes ( $p < 0.05$ ).

**Conclusions:** Our pilot study suggests an association between VD high dose supplementation, lower prevalence and improvement in stages of DKD in T1DM.

#### A17

##### Allergy to insulin: case report

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**Introduction:** Allergy to human insulin or its analogues is rare. No effective strategy has been found yet. The incidence is estimated between 1 and 2.4% on insulin-treated patients. Reactions range from local signs to anaphylaxis. Individuals may be allergic to the insulin molecule itself or to pharmaceutical excipients such as protamine, zinc or metacresol. A defective injection technique (intra-dermal application) facilitates the development of such reactions. The underlying mechanisms of allergy may be type I (IgE-mediated), type III (IgG-mediated immune complex) and type IV (T cell-mediated late-type hypersensitivity). Epidermal Langerhans cells carry a foreign antigen to T lymphocytes and perform a key role on the beginning of cutaneous immune responses and responses to chemical allergens found on the surface of the skin.

**Case report:** Patient 55 years old, fem, DM2 for 4 years, in the use of 2 sulfonylureas (SUs) at the same time and NPH insulin, came to our hospital. She denied allergies. SUs were suspended. Metformin was introduced and adjusted to be used with insulin. Ten days later she returned presenting erythema and pruritus at the site of insulin application, that had no improvement with antihistamine drugs nor taking off technique application error and there was an itchy maculopapular rash after 10 min around the injection spot, the same being observed after switching to another Insulin (Detemir). IgE antibody specific for insulin was positive. Insulin was suspended and started SGLT2 inhibitor together with DDP4 inhibitor, and submitted to desensitization protocol according to scheme Pföhler et al. In a new insulin test 3 months later, the skin reaction was again presented.

**Discussion:** The frequency of allergic reactions to insulin has decreased significantly since the introduction of the recombinant human form and its analogues. The hypersensitivity reactions are now generally due to the presence of various additives of pharmaceutical formulas. Treatments go from the use of antihistamines drugs to desensitization therapy. Systemic corticosteroids can be used as long as attention is paid to glycemic control. Changing Insulin could be effective because of little differences in amino acid sequences and their antigenicities. Initially, the patient presented with a good response to desensitization, although presented recurrence before the end of the protocol. The availability of oral treatments allowed the control without the use of insulin at this time.

Informed consent to publish had been obtained from the patient.

**A18****Analysis of anthropometric parameters in patients with type 2 diabetes at a university hospital in Belém, PA**

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**Introduction:** Diabetes mellitus (DM) is considered a progressive metabolic disease. Several factors may contribute to the aggravation of this disease, such as overweight and visceral fat accumulation. It is well known that some visceral fat assessment methods could be complex and expensive. But, since waist circumference (WC) correlates directly with the amount of visceral fat, it can be used as a useful alternative method of measurement. Besides that, when WC results are compared to the body mass index (BMI) ones, a better evaluation of metabolic and cardiovascular risk is performed.

**Objective:** To analyze the nutritional status of diabetic patients by using anthropometric measurements.

**Methods:** A cross-sectional, quantitative and descriptive study was carried out with type 2 diabetic patients hospitalized in a university hospital, located in the city of Belém, State of Pará, Brazil, in a period of April to July 2016. Patients were asked about socioeconomic issues and were performed some anthropometric assessments (BMI and WC). Optimal WC cut-offs were 80 cm and 94 cm, in men and women. While for BMI the cut off used was 18.5 to less than 25 kg/m<sup>2</sup>. All the patients understood and accepted the Informed Consent Term (ICT).

**Results:** Fifty-five patients with type 2 DM were interviewed. Most of them were females (54.55%) with ages ranging from 32 to 78 years (mean: 61 ± 9.75 years). The mean time of diagnosis was 15 ± 10 years. Regarding the level of education, it was noted that most of the diabetic patients had only incomplete elementary schooling (81.81%). This might contributed to a low adherence to treatment. In the present study, it was found that the frequency of overweight (BMI ≥ 25 kg/m<sup>2</sup>) was high (41.8%), often resulting from a sedentary lifestyle and a high consumption of processed foods. Waist circumference analyzes showed an elevated risk of metabolic alterations in both women (93.33%) and men (52%), demonstrating the impact of this measurement on the occurrence and progression of diabetes.

**Conclusion:** Most of the patients had elevated WC and almost half had overweight. This condition of body fat accumulation in patients with type 2 DM is cause of concern, since it is a factor that impairs the metabolic control. This contributes to the appearance of chronic complications of diabetes. The role of nutritional therapy aims to introduce and sensitize the patient to having healthy living habits that provide a better quality of life.

**A19****Analysis of brazilian videos about diabetic neuropathy shared on youtube**

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**Background:** There are numerous tools, social networking platforms and sites that share information. Studies highlight the importance of YouTube as a source of useful information about some diseases, including Diabetes Mellitus (DM). However, no study has evaluated YouTube's use in Brazil as a source of information on diabetic neuropathy. This term is used to describe a group of manifestations characterized by the presence of symptoms and/or signs of peripheral and autonomic nerve dysfunction in people with DM after the exclusion of other causes.

**Objective:** In this study, our aim was to research the source and audience of videos on YouTube Brazil regarding diabetic neuropathy.

**Materials and methods:** The Web site ([www.youtube.com](http://www.youtube.com)) was searched on May 16, 2017, for the associated terms "diabetic

neuropathy," "neuropathy treatment," and "neuropathy complications." The videos of greater than 30-min duration, without audio, not recorded in Brazilian Portuguese language and those not related to the focus were excluded. Were included the videos associated with the terms and available on the first 10 pages (200 videos) of search results. The videos were analyzed independently by G.N. and G.S. Were recorded the following parameters for all videos: the upload date, number of views, duration, "likes," "dislikes," and comments. The video sources were categorized into 4 groups: organizational, professional, personal and advertisement. Approval by the ethics committee was not required, since YouTube search is not directly involved with humans using public domain material.

**Results:** Our search resulted in a total of 346 videos, of which 200 were pre-selected, and 34 analyzed. The 34 videos analyzed were published between 2007 and 2016, and presented the following metrics: 308,693 views; 1,464 "likes"; 93 "dislikes"; 46 comments; and total duration of 4 h, 33 min and 56 s. The video source revealed the following classification: organizational, n = 19; professional, n = 10; personal, n = 5; and advertisement, n = 0.

**Conclusion:** It was evidenced that YouTube in Brazil is little used in both the availability and the search for information about diabetic neuropathy. So, we should admit its educational potential to be explored. There was greater contribution of health organizations and health professionals in the elaboration of the videos. However, videos not related to the theme predominated, which could to appoint, a risk of sharing inaccurate or misleading information about the diabetic neuropathy. Studies will be needed to analyze the quality of content about diabetic neuropathy presented on YouTube videos in Brazil. The authors are grateful to the CNPq, FAPEMIG and UFVJM for the support.

**A20****Analysis of the blue friday campaign elaborated in a diabetes education social network**

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**Background:** The Blue Friday initiative was created by Cherise Shockley after being diagnosed with Diabetes Mellitus (DM). Nowadays, Blue Friday is a campaign of the International Diabetes Federation (IDF) with support from several institutions, including the Brazilian Society of Diabetes. Its purpose is to make people aware of the importance of bringing everyone together for the prevention and control of DM.

**Objectives:** This research aimed to analyze actions of the Blue Friday Campaign conducted in the Fanpage Diabetes Diamantina (FDD) during the year 2016.

**Materials and methods:** This study analyzed the number of individuals reached by a Blue Friday Campaign. The Diabetes Study Group of the Federal University of the Jequitinhonha and Mucuri Valleys (UFVJM) promoted the campaign during 30 weeks, between April and November 2016. Photographs from 26 Brazilian States and the Federal District were captured with a Sony Digital Camera. Thirty digital images of tourist spots in the Brazilian States containing some reference in the blue color were selected and edited using the software Microsoft Office PowerPoint<sup>®</sup>. Thus, all digital images received the slogan of World Diabetes Day 2016: 'Eyes on Diabetes'. The slogan was originally written in English and translated into Portuguese. Messages were complemented by several descriptions about DM in Portuguese, English and Spanish to be posted online in the FDD. To identify general data with publication metrics, two researchers accessed the Facebook database. Numbers of 'likes', 'shares' and 'total reach' of people who saw the publications during all campaign time were analyzed.

**Results:** The data revealed an expressive virtual public involvement throughout the campaign. The total reach, numbers of 'like' and 'share' publications increased over the months. At the end of the Blue Friday

Campaign 2016 the postings reached 73,722 views in Brazil and in others more than 40 countries; 3,520 likes and 2,197 shares.

**Conclusion:** The total range of people who shared the images in FDD was high. The content possibly informed and/or sensitized many people around the world about the great importance of DM nowadays. In addition, the use of Brazilian tourist spots images attracted the virtual interaction of the people each other and an involvement with the campaign theme. Thus, the use of this social network as a complementary tool for educational actions in favor of DM was relevant in this research. However, future studies are needed, in order to understand the impact of this kind of virtual campaign about DM education.

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**A21**

**Analysis of the ophthalmoscopy examination in people with diabetes mellitus from a program of health promotion in the amazon**

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**Introduction:** Retinopathy is the third cause of blindness in adults in Brazil, and it is the major one among people of productive age (16–64 years). It is also one of the most common complications of Diabetes Mellitus (DM) being found after 20 years of DM analysis, 90% of diagnosis being type 1 and 50–80% type 2 and the growth of life expectancy of the patients is greatly increasing the incidences (Aragon, 2013).

**Objective:** Evaluate eye health of participants of a health promotion program for people with Diabetes Mellitus in the Amazon.

**Method:** Descriptive study of quantitative approach. The data gathering was made through analysis of fundoscopy results. Participation in the program was the inclusion criterion used for the development of the study. The study was approved by the Ethics and Research Committee (Comitê de Ética e Pesquisa) (CEP) of the Federal University of Amapá (Universidade Federal do Amapá), under Postal Code/CEP: 900.066/2015.

**Results:** Twenty-one (21) clinical examinations were analyzed, the majority of participants were female (76.1%); male (23.8%) (Table 1). Description of the results analysis: MACULA: brightness, 15 people (71.4%), low brightness, 2 people (9.5%) and no brightness 1 person (4.76%) and with no evaluation of the macula 2 people (9.5%). OPTIC DISC WITH CUPPING: 0.2 (19%), 0.3 (19%), 0.4 (23.8%), physiological (14.2%) and no result (23.8%). VESSELS: normal (61.9%), slight tortuous (4.7%), tortuous (4.7%), no vessel evaluation (23.8%). CONTOUR: preserved (42.8%), regular (19%), no result (38%). DIAGNOSES: Glaucoma, 1 person (4.7%), Cataract, 5 people (23.8%); Diabetic Retinopathy: mild, 1 person (4.7%), severe 1 person (4.7%); Hypertensive retinopathy, 1 person (4.7%) Asteroid Hyalitis, 1 person (4.7%); Pterygium 1 person (4.7%) (Table 2)

**Conclusion:** The analysis of the data showed that most of the participants presented good ocular health; it may be related to the satisfactory adherence to the DM treatment, stimulated by the health actions developed in the Program for the Promotion of Diabetic Health in the Amazon (Programa de Promoção à Saúde dos Diabéticos na Amazônia). However, programmed assessment of visual function for the detection of ophthalmological changes and early diagnosis of visual complications in the diabetic population is important for the prevention of major diseases, especially blindness. For Nursing, it provides the elaboration of a plan of care that adapts to the lifestyle and limitations of the patient, in order to provide a better quality of life and active participation in their own care (Fig. 1).

**Table 1.** Characterization of people with Diabetes Mellitus by gender. Macapá/AP/Brazil, 2017 (N = 21).

Sex Variable	N	%
Female	16	76.1
Male	5	23.8

Source: Patients examinations

**Table 2.** Characterization of people with Diabetes Mellitus as to ophthalmoscopy exam, 2017 (N = 21).

RETINAL EVALUATION	CATEGORIES	N	%
Macula	Brightness	15	71.4
	Low brightness	2	9.5
	No brightness	1	4.76
Optic Disc With Cupping	Cupping	0.2	19
		0.3	19
		0.4	23.8
	Physiological	-	14.2
	No results	-	23.8
Vases	Normal	-	61.9
	Slight tortuous	-	4.7
	Tortuous	-	4.7
	No evaluation of vessels	-	23.8
Contour	Preserved		42.8
	Regular		19
	No results		38
Diagnoses	Glaucoma	1	4.7
	Cataract	5	23.8
	Mild Diabetic Retinopathy	1	4.7
	Severe Diabetic Retinopathy	1	4.7
	Hypertensive Retinopathy	1	4.7
	Asteroid Hyalitis	1	4.7
	Pterygium	1	4.7

Source: Patients examinations

**Fig. 1** See text for description

**A22**

**Analysis of the profile, indication and metabolic and social impact of the use of continuous insulin infusion system in young patients, with type 1 diabetes mellitus**

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**Introduction:** Severe hypoglycemia, multiple admissions, glycemic variability and poor adherence to treatment are some of the problems that young patients with type 1 diabetes mellitus (DM1) face during disease progression. The continuous system of insulin infusion (CSII), when indicated, becomes a technological allied helping to obtain glycemic control and reduction of complications in young people, who often face the diagnosis in early childhood.

**Objective:** To evaluate the profile, indication and the metabolic and social impact of CSII use in young patients with DM1.

**Method:** Retrospective cohort of patients with DM1, attended at the Diabetes Mellitus outpatient clinic of the Hospital das Clínicas, Faculdade de Medicina de Marília, CSII users.

**Results:** 22 patients (64% male, 82% white), with 15.5 ± 7.3 years; 10.3 ± 6.77 years of disease evolution; started using CSII with 11.9 ± 6.55 and 6.91 ± 5.2 years diagnostic time. The pump used by all patients was Medtronic® and 13.63% associated with continuous monitoring. Hypoglycemia was the indication in 72.72%, followed by other causes: pregnancy, depression (18.18%), frequent diabetic ketoacidoses (4.54%). The average glycosylated hemoglobin (HbA1c) before and after the pump was 8.86 and 8.06%, respectively. There was a reduction in the frequency of severe hypoglycemia of 50% in

the pre-use period of CSII to 13.6% after use. Prior to the use of the pump, we found 22.7% of hypoglycemic convulsions and 22.7% of diabetic ketoacidosis. No episodes with CSII were observed. The percentage of the basal insulin dose was 71% pre-pump and 49% post-pump. The mean total insulin dose at multiple doses was 1.05 U/kg/day and after CSII; 0.89 U/kg/day. The improvement in the quality of life was reported in 100% of the patients.

**Conclusion:** All patients presented improvement in quality of life, reduced frequency of severe hypoglycaemia and/or diabetic ketoacidosis. There was a better distribution of the infused insulin, with an improvement in the ratio between basal insulin and bolus, associated with a slight reduction in the average total insulin dose. However, there was no significant reduction in HbA1C levels. Data suggest that even with the difficulty in glycemic control, it is possible to improve patients adherence to therapy and reduce serious health damage, as well as expenses with prolonged hospitalizations. Informed consent to publish has been obtained from this patients or family.

### A23

#### Ancestry and health-related quality of life in type 1 diabetes: a nationwide study in Brazil

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Type 1 diabetes patients have reduced Health-related Quality of Life (HRQoL) compared with general population. Recent study in an aging population of a small city in Brazil showed influence of African ancestry in self-reported health status. The aim of the present study was to evaluate the relationship between self-reported color/race and genomic ancestry with HRQoL of patients with type 1 diabetes in a highly admixed population. This was a nationwide, cross-sectional study conducted with 1,760 patients with type 1 diabetes from 2011 to 2014 at public clinics in all five Brazilian geographical regions. Information on HRQoL was obtained from two self-completed questionnaires: Short Form-6 Dimensions (SF-6D) and EuroQol-5 Dimensions (EQ-5D) with a visual analogue scale (EQ-VAS). Genomic ancestry was assessed using a Multiplex PCR methodology. Utility scores generated from the questionnaires were analyzed with multivariate logistic regression models. We included 1,698 patients. Those patients who self-reported as black had lower EQ-VAS scores compared to the patients who self-reported as white, ( $67.46 \pm 18.45$ ;  $72.37 \pm 16.44$ , respectively,  $p = 0.02$ ). In a linear regression model, each 1% increase in African ancestry resulted in a 9.5 point decrease in EQ-VAS score ( $p < 0.001$ ). In a multivariate logistic regression, after adjusting for demographic, socioeconomic status and diabetes-related variables, African ancestry remained associated with lower EQ-VAS scores. Other variables responsible for a decrease in EQ-VAS values were: female gender, higher economic status, higher HbA1c, presence of microvascular complication, sedentary lifestyle and overweight/obesity status. In conclusion, this was the first study to demonstrate that ancestry influenced HRQoL in patients with type 1 diabetes. A higher level of African ancestry implicates on lower quality of life even after adjustments for sociodemographic and diabetes-related data. This highlights the importance of social aspects such as ethnicity in diabetes management and highlights the need for psychosocial and economic actions to mitigate those differences and improve the quality of life of patients.

### A24

#### Ankle-arm index related to the diabetes mellitus diagnosis time

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**Introduction:** Type 2 diabetes mellitus (DM2) causes degenerative complications that generate human, social and economic repercussions, resulting in a major public health problem. Among the complications are the lesions in target organs, such as retinopathy, nephropathy, acceleration of atherosclerosis along with increased risk of myocardial infarction, or stroke, and those affecting the feet, which are more frequent (Junior et al. 2014).

**Objective:** To verify the relation of the index values in Ankle-Arm (ITB) with the time of diagnosis of DM II, with patients from a group of chronic diseases.

**Method:** A cross-sectional, descriptive study of a quantitative approach, carried out with participants of a Health Promotion Program for People with Diabetes Mellitus in the Amazon, from March to June 2017. The data was collected from the patients' records between the years 2015 and 2017, with 29 patients. The Ethics and Research Committee (Comitê de Ética e Pesquisa) (CEP) approved the study of the Federal University of Amapá (Universidade Federal do Amapá), with Postal Code/CEP number: 518.389/2013.

**Results:** It was found that (89.7%) of the patients were female and (10.3%) were male (Table 1). In relation to ITB and MD II diagnosis time, (27.6%) were diagnosed at less than five years and had a mean ITB value of 1.04 mmHg in the lower right limb (MID) and 1.02 mmHg in the left lower limb (MIE); (37.9%) had a diagnosis of five to ten years and presented a mean ABI value of 1.07 mmHg in the MID and 1.00 mmHg in the MIE; and (34.5%) had more than 10 years of diagnosis and had a mean ABI of 0.91 mmHg in the MID and 0.94 mmHg in the MIE (Table 2).

**Conclusion:** It was found that all people with DM had the results indicating ITB within the values considered normal in the literature (0.91–1.30 mmHg), even with the variation of the diagnosis time of DM 2. Thus, that indicates ITB is an indicative as a method of early diagnosis of cardiovascular events and in the diagnosis of Peripheral Arterial Disease (PAD), which are frequent events in people with diabetes and directly related to the time of diagnosis of the disease. We also stress the importance of health promotion measures focused on this population, such as this program, which stimulates self-care, increase the practice of physical activities and the adoption of healthy eating habits is emphasized in this research. Starting from educational practices that can intervene in a satisfactory and continuous way in the course of the disease, seeking to minimize the complications and promoting the quality of life of this population (Fig. 1).

**Table 1.** Characterization of people with Diabetes Mellitus by gender. Macapá/AP/Brazil, 2017 (N=29).

Sex variable	N	%
Female	26	89.7
Male	3	10.3

Source: Primary

**Table 2.** Characterization of people with Diabetes Mellitus as to the time diagnosis and the Ankle-Arm Index. Macapá/AP/Brazil, 2017 (N=29).

DIAGNOSTIC TIME	ITB MID	ITB MIE	%
Less than five years	1.04 mmHg	1.02 mm Hg	27.6
Five to ten years	1.07 mmHg	1.00 mmHg	37.9
More than ten years	0.91 mmHg	0.94 mmHg	34.5

Source: Primary

**Fig. 1** See text for description

### A25

#### Anti-gad positive syndrome (stiff-man): a 9-years-case report of treatment, evolution and a review

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#### Abstract

**Case:** 66 years, male, white, engineer, type 1 DM (T1D)-LADA (24 years ago) + AntiGAD neurological syndrome (Stiff-man-SPS) 9 years

4 months, all time Anti-GAD  $+> 60$  U/mL, progressive psychomotor agitation, cognitive loss (recent-memory-language) (Fig. 1). Firstly he used orally: aminotriptyline 75 mg/d-bd, gabapentin 600 mg/d-bd, hydantol 200 mg/d-bd, diazepam 40 mg/d/4x, flurazepam 30 mg and muscle-relaxant baclofen 30 mg/day/3x. IV Infusion/month: cyclophosphamide 14.29 mg/kg (3 cycles), IV-immunoglobulin 2 g/kg-w/m<sup>2</sup> (30 cycles). Later, he used smaller doses by interval/dose adjustments: Nowadays(cycle60) use IV-immunoglobulin 0.68 g/kg/3 m hospitalized. Oral drug was decreased with clinical improvement, Diazepam and Baclofen has equal dosis. Glycated hemoglobin (HBG) was  $< 6.5\%$  up to 7 years evolution, despite dexamethasone use (Fig. 2). After presenting progressive psychomotor-agitation and cognitive-impairment antidepressants and antipsychotics were prescribed. After HBG = 12 he used 24 h nursing for T1D control.



**Discussion:** Stiff-person (SPS) is a rare neurological disease (1:1,000,000–1:2,000,000 ihb/year) firstly described in 1956. Pubmed-search as cognitive deficit + SPS = 10 articles, 5 case-reports, one patient had all the AntiGAD-stiff-person spectrum disorders described (SPSD). Epitopes recognized by SPSD-anti-GAD65 differ from T1D. It's been described T-lymphocyte-infiltration in the medulla. In T1D-LADA freq 1:10,000. In Central Nervous System (CNS), anti-GAD65 blocks inhibitory GABAergic-neurons. This deficit has been related to tetanus-toxin-sign, schizophrenia, and tetany of SPS, the agitation-cognitive alteration of SPSD, confused as psychiatric. One article revises the treatment of SPS-SPSD, maintaining the IV-immunoglobulins (Dalakas MC validated A-1-double blind), stimulating-GABA-neurons: Benzodiazepines and Baclofen as an improved treatment. Two review the physiology of SPSD: in rats with infusion of antibodies from patients, and a case-control-study suggests cognitive loss in anti-GAD65/non-carriers, needing increased sample. Recently Dalakas MC Trial doesn't demonstrate statistical difference rituximab/placebo. We have already published another patient case study with lethal outcome without treatment and described this patient when the treatment was successful. Unfortunately, the patient had a cognitive loss without circulatory or immuno-neurological disease only SPSD.

**Final Comments:** Our review confirm the best treatment for SPSD, despite this unexpected 9-year-evolution. Informed consent to publish had been obtained from the patient.

#### A26

##### Assesment of food intake of patients with congenital generalized lipodystrophy in relation to the guidelines of brazilian diabetes society

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**Background and Aims:** Generalized Congenital Lipodystrophy (LGG) is a rare autosomal recessive disorder characterized by the difficulty of storing adipose tissue and metabolic abnormalities such as insulin resistance (IR), diabetes mellitus (DM), dyslipidemia and hyperphagia. The nutritional orientation in these patients contributes to the control of these comorbidities and represents one of the main treatment lines in force in Brazil. The aim of this work was to evaluate the dietary intake of patients with LGC at a center of reference in Ceará.

**Methodology:** A quantitative descriptive study performed at a hospital of reference in this disease in the state of Ceará, from November 2014 to February 2015. Eleven patients with a genetic diagnosis of LGC were evaluated. Food consumption was obtained through three 24-h recall (R24 h) collected on different days. The interviewers were trained and followed the automated multi-step method consisting of a five-step guided interview. The results of the R24 h analysis were grouped in means and standard deviation and compared to the values of energy, macronutrients and fibers recommended by the Brazilian Society of Diabetes (SBD).

**Results:** The mean age of the patients was  $11.18 \pm 9.26$  years, ranging from 2 to 31 years. Eight patients were female. The average energy consumption was  $1990.09 \pm 483.09$  kcal. There were inadequate intakes of protein, saturated fatty acids, total fat and fiber in 100% (11), 90.9% (10), 72.8% (8) and 45.6% (5) of the patients, respectively. While 90.9% (10), 90.9% (10) and 81.8% (9) of the subjects presented adequate intake of carbohydrates, polyunsaturated fatty acids and monounsaturated fatty acids, according to SBD recommendations, respectively.

**Conclusions:** The dietary intake of the patients was characterized by the inadequacy of proteins, saturated fatty acids, total fats and fibers. Considering the importance of nutritional management for the treatment of this group of patients, nutrient adjustment becomes essential.

#### A27

##### Assessment of emotional suffering and attitudes in relation to type 1 diabetes of users admitted in a public diabetes center in Belo Horizonte

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**Background:** The identification of the attitudes and emotional state of people with diabetes in relation to coping with the disease can facilitate more personalized interventions that help to obtain better results in self-management of the treatment.

**Objective:** To evaluate the level of emotional stress and attitudes towards diabetes in patients with type 1 diabetes (T1DM) admitted to a Reference Diabetes Center of the Unified Health System in Belo Horizonte, Minas Gerais.

**Methods:** This was a cross-sectional study with evaluation of patients admitted from January 2015 to July 2017. Patients with cognitive

limitations which impaired understanding of the instruments were excluded from the evaluation. Two instruments adapted and validated for Brazilian culture were applied: self-administered B-PAID for the measurement of emotional distress related to daily diabetes coping (a score above or equal to 40 points indicates a high level of emotional distress) and ATT-19, a self-administered questionnaire that assesses the attitude of the person with diabetes to the disease (above 70 points indicates a positive attitude towards the disease).

**Results:** Thirty-eight individuals with T1DM met the inclusion criteria. The median age was 34 years (10-79), with a diagnosis time of 8 years (1-26), female predominance (57.9%) and complete primary education (52.6%). Regarding instrument scores, the average score for B-PAID was 36.82 (1.25–80), which indicates a low stress index, with 39.4% of participants with a high diabetes-related stress index (> 40 points). Regarding the sub-dimensions of B-PAID, it is observed that the predominance of stress responses was related to emotional, followed by feeding, treatment and social support (Table 1). In ATT-19, 73.6% of the people showed negative attitudes related to dealing with diabetes (score < 70), with an average score of 62.56 (36-81).

**Conclusion:** The study indicated the need for evaluations to be carried out from diagnosis and periodically, to guide interdisciplinary interventions and specific education programs for people with greater diabetes negative attitudes towards diabetes (Fig. 1).

**Tabela 1:** B-PAID subdimensões.

B-PAID scale domains	n=38
Emotional problems related to diabetes	24.1 (1.25-56,25)
Feeding related problems	6.25 (0-15)
Treatment related problems	3.71 (0-11.25)
Social support related problems	2.4 (0-10)
<b>Total</b>	<b>36.82 (1.25-80)</b>

Values expressed in median (Q1-Q3).

#### Ethics Approval

The study was approved by Santa Casa of Belo Horizonte Institution's Ethics Board, approval number 1.064.985 and written consent was obtained from all participants or from the parent or guardian if the patient is under 16.

**Fig. 1** See text for description

#### A28

##### Assessment of health-related quality of life of patients with type 1 diabetes (DM1) using continuous insulin infusion system (CSII) or multiple doses of insulin (MDI): what is the scenario of an outpatient reference clinic in SUS-DF?

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**Introduction:** Fear of bad glycemic control association to diabetic complications might affect quality of life among DM1 patients. Moreover, the psychosocial impact on health-related quality of life (HRQoL) has not been widely evaluated yet in the Brazilian Unified Health System (SUS).

**Objective:** To compare the HRQoL of DM1 patients treated by CSII, MDI and fixed dose of insulin (FDI).

**Methods:** Cross-sectional, observational study for the evaluation of HRQoL of DM1 patients > 18 years of age followed at the CSII reference outpatient clinic in the Federal District SUS. PAID Scale (Problem Area in Diabetes) validated in Brazil (B-PAID) was applied to quantify the stress. B-PAID comprises 20 questions in four subdivisions of related emotional problems (DM, treatment, diet, social support); score ranges 0–100 and score  $\geq 40$  indicates high emotional distress. Glycemic control was verified with HbA1c. Statistical analysis: non-parametric tests and Dagun distribution (Mathematica software).

**Results:** Sample comprised 85 patients, 58.8% female, age  $30.39 \pm 10.53$  years, age at diagnosis  $16.54 \pm 8.9$  and DM duration  $14.27 \pm 8.17$  years. Patients education level showed academic degree completed/in progress among 57.6 and 40% in high school, denoting good schooling. Patients were divided into three groups: CSII (25 patients), MDI and FDI 30 patients each. Mean HbA1c was  $7.82\% \pm 2.13$ , highest value found in FDI group ( $9.05\% \pm 2.13$ ) and lowest in CSII patients ( $7.29\% \pm 1.98$ ) and MDI ( $7.19\% \pm 1.73$ ). No correlation was found between HRQoL and glucose control, age, DM duration and age a diagnosis. Score B-PAID  $\geq 40$  was found in 57.6% of whole sample and CSII and FDI showed the highest frequency: 68 and 57%, respectively, while 50% in MDI. Overall median score was  $44.64 \pm 21.42$ , there were no statistical differences between groups (CSII 47.9,  $p = 0.41$ ; MDI 38.1,  $p = 0.72$ ; and FDI 50.0,  $p = 0.24$ ). Emotional subdivision scores were:  $1.99 \pm 1.45$ ; treatment  $1.4 \pm 1.48$ ; diet  $1.76 \pm 1.32$ ; social support  $1.19 \pm 1.60$ ; and the highest scores were: "Worrying about the future and the possibility of serious complications" ( $2.91 \pm 1.09$ ) and "Feeling guilty or anxious when you stop taking care of your diabetes" ( $2.81 \pm 1.14$ ).

**Conclusion:** There was a high level of stress among DM1 patients, higher in the FDI group and lower with SICI and MDI, who showed better HbA1c. Fear of future complications represents the greatest stressful concern. Outpatient psychological support was canceled some time ago and this gap might have contributed to reduce HRQoL, despite high-level insulin therapy availability, and addresses the lack of an integrative psychosocial approach faced by patients with DM1 in the SUS.

#### A30

##### Assessment of insulin resistance in patients with diabetes mellitus type 1 between 7 and 22 years old

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**Introduction:** The prevalence of overweight and obesity seems to follow the worldwide trends of weight gain in type 1 diabetes mellitus (DM1), with obesity being the most common cause of insulin resistance (IR) in children and adolescents. In recent years, there has been an increase in the number of children and adolescents with a mixture of both types of diabetes, these being obese and/or presenting signs of insulin resistance and autoimmune markers for beta cells. Romualdo, Nóbrega and Escrivão, conducted a retrospective study with children and adolescents from 5 to 14 years of age. It was observed that those who were resistant to insulin had higher values of body mass index, waist circumference, triglycerides and HDL-C reduction. The possibility of a relationship between insulin resistance in young patients with DM1 has not yet been clarified and it is what this paper intends to verify as well as its relation with z-BMI score, insulin dose used by the patient and time of disease.

**Methods:** A quantitative cross-sectional study based on the retrospective analysis of medical records of the pediatric endocrinology clinic at the University Polyclinic was performed. Patients with a diagnosis of DM1, aged between 7 and 22, who signed the Free and

Informed Consent Term were included. The following variables were evaluated: gender, chronological age (CA) at diagnosis, CA at the time of the test, weight and height at the exam and time of disease (TD). Laboratory tests: glycemia and fasting insulin, glyated hemoglobin (HbA1c), exogenous slow insulin dose and microalbuminuria value. IR was calculated using the Homeostasis Model Assessment-Insulin Resistance (HOMA-IR). Values of statistical significance were considered when  $p < 0.05$ . Data analysis was performed by Microsoft Excel 2013 and SPSS version 13. The study was approved by the Regional University of Blumenau Ethic's Committee, approval number: 57640416.2.0000.5370.

**Results:** Thirty-five medical records were evaluated. Three patients did not have IR. The 32 patients with IR were 21 females (60%), with averages of CA at diagnosis: 6.07 years, CA at the examination: 13.38 years, TD: 7.3 years, HbA1c: 9.1% and 8 patients (22%) presented altered values of microalbuminuria. There was no correlation between HOMA-IR with z-BMI score, insulin dose and TD in this sample.

**Conclusion:** Insulin resistance could not be related to any of the variables studied in this sample. Thus, HOMA-IR has not been shown to be a good parameter for assessing the quality of treatment in pediatric patients with DM1 (Figs. 1, 2, 3, 4).

TABELAS, FIGURAS, LEGENDAS

Tabela 1 – Matriz de Correlações lineares de Spearman entre as variáveis quantitativas do estudo considerando todos os indivíduos (n = 32).

Variáveis	HOMA IR	Idade no diagnóstico (anos)	Tempo de doença (anos)	Escore Z do IMC	Micro-albuminúria	HbA1c (glicemia glicada)	Dose de insulina /Kg	Idade no exame	
HOMA IR	R	1,0000	-0,0590	-0,1740	0,2230	0,1990	0,1090	0,0050	-0,3070
	P		0,7470	0,3400	0,2190	0,2830	0,5510	0,9780	0,0880
Idade no diagnóstico (anos)	R	-0,0590	1,0000	-0,4950	-0,0740	0,0110	0,1410	-0,0850	0,1110
	P	0,7470		0,0040	0,6850	0,9510	0,4400	0,6450	0,5470
Tempo de doença (anos)	R	-0,1740	-0,4950	1,0000	-0,1340	0,0850	-0,0290	0,1010	0,7020
	P	0,3400	0,0040		0,4660	0,6500	0,8740	0,5810	0,0000
Escore Z do IMC	R	0,2230	-0,0740	-0,1340	1,0000	0,1310	-0,1190	-0,1860	-0,2640
	P	0,2190	0,6850	0,4660		0,4830	0,5180	0,3090	0,1440
Microalbuminúria	R	0,1990	0,0110	0,0850	0,1310	1,0000	0,0000	0,1970	0,1470
	P	0,2830	0,9510	0,6500	0,4830		1,0000	0,2880	0,4290
HbA1c (glicemia glicada)	R	0,1090	0,1410	-0,0290	-0,1190	0,0000	1,0000	0,3790	-0,0240
	P	0,5510	0,4400	0,8740	0,5180	1,0000		0,0330	0,8970
Dose de insulina /Kg	R	0,0050	-0,0850	0,1010	-0,1860	0,1970	0,3790	1,0000	-0,1110
	P	0,9780	0,6450	0,5810	0,3090	0,2880	0,0330		0,5440
Idade no exame	R	-0,3070	0,1110	0,7020	-0,2640	0,1470	-0,0240	-0,1110	1,0000
	P	0,0880	0,5470	0,0000	0,1440	0,4290	0,8970	0,5440	

1 – R: Correlação linear de Spearman. A correlação linear de Spearman (R) pode ser classificada como: (i) inexistente (se  $0\% \leq R \leq 20\%$ ), (ii) fraca (se  $20\% < R \leq 50\%$ ), (iii) moderada (se  $50\% < R \leq 80\%$ ), (iv) forte (se  $80\% < R \leq 100\%$ ). P: Valor P da correlação. Se  $P < 0,05$  então correlação significativa.

Fig. 1 See text for description

Tabela 2 – Matriz de Correlações lineares de Spearman entre as variáveis quantitativas do estudo considerando os indivíduos cuja classificação do HOMA-IR: ( $\leq 10$ ), (n = 13).

Variáveis	HOMA IR	Idade no diagnóstico (anos)	Tempo de doença (anos)	Escore Z do IMC	Micro-albuminúria	HbA1c (glicemia glicada)	Dose de insulina /Kg	Idade no exame	
HOMA IR	R	1,0000	-0,0600	-0,1050	-0,0300	-0,1040	-0,1740	-0,2640	-0,1240
	P		0,8450	0,7340	0,9220	0,7340	0,5710	0,3840	0,6870
Idade no diagnóstico (anos)	R	-0,0600	1,0000	-0,6240	-0,1240	-0,2690	0,5870	-0,0550	-0,1870
	P	0,8450		0,0230	0,6870	0,3740	0,0350	0,8590	0,5410
Tempo de doença (anos)	R	-0,1050	-0,6240	1,0000	-0,3360	-0,0280	-0,1920	0,3030	0,7410
	P	0,7340	0,0230		0,2620	0,9290	0,5300	0,3150	0,0040
Escore Z do IMC	R	-0,0300	-0,1240	-0,3360	1,0000	0,2340	-0,2440	0,1290	-0,5690
	P	0,9220	0,6870	0,2620		0,4420	0,4210	0,6740	0,0420
Microalbuminúria	R	-0,1040	-0,2690	-0,0280	0,2340	1,0000	0,0190	0,2580	-0,1570
	P	0,7340	0,3740	0,9290	0,4420		0,9500	0,3940	0,6090
HbA1c (glicemia glicada)	R	-0,1740	0,5870	-0,1920	-0,2440	0,0190	1,0000	0,4350	0,1720
	P	0,5710	0,0350	0,5300	0,4210	0,9500		0,1370	0,5730
Dose de insulina /Kg	R	-0,2640	-0,0550	0,3030	0,1290	0,2580	0,4350	1,0000	-0,0360
	P	0,3840	0,8590	0,3150	0,6740	0,3940	0,1370		0,9080
Idade no exame	R	-0,1240	-0,1870	0,7410	-0,5690	-0,1570	0,1720	-0,0360	1,0000
	P	0,6870	0,5410	0,0040	0,0420	0,6090	0,5730	0,9080	

1 – R: Correlação linear de Spearman. A correlação linear de Spearman (R) pode ser classificada como: (i) inexistente (se  $0\% \leq R \leq 20\%$ ), (ii) fraca (se  $20\% < R \leq 50\%$ ), (iii) moderada (se  $50\% < R \leq 80\%$ ), (iv) forte (se  $80\% < R \leq 100\%$ ). P: Valor P da correlação. Se  $P < 0,05$  então correlação significativa.

Fig. 2 See text for description

Tabela 31 – Matriz de Correlações lineares de Spearman entre as variáveis quantitativas do estudo considerando os indivíduos cuja classificação do HOMA-IR: ( $10 < x \leq 50$ ), (n = 14).

Variáveis	HOMA IR	Idade no diagnóstico (anos)	Tempo de doença (anos)	Escore Z do IMC	Micro-albuminúria	HbA1c (glicemia glicada)	Dose de insulina /Kg	IC exame	
HOMA IR	R	1,0000	0,2680	-0,4580	0,3610	0,4180	0,1340	-0,1030	-0,1690
	P		0,3530	0,1000	0,2050	0,1560	0,6480	0,7250	0,5630
Idade no diagnóstico (anos)	R	0,2680	1,0000	-0,6330	-0,1190	0,1540	-0,0070	-0,0880	-0,0260
	P	0,3530		0,0150	0,6850	0,6160	0,9820	0,7650	0,9290
Tempo de doença (anos)	R	-0,4580	-0,6330	1,0000	0,1850	-0,1070	-0,0220	0,2510	0,6120
	P	0,1000	0,0150		0,5270	0,7270	0,9400	0,3870	0,0200
Escore Z do IMC	R	0,3610	-0,1190	0,1850	1,0000	0,2640	-0,0440	-0,2330	0,1650
	P	0,2050	0,6850	0,5270		0,3830	0,8810	0,4220	0,5780
Microalbuminúria	R	0,4180	0,1540	-0,1070	0,2640	1,0000	0,0110	0,0550	0,1350
	P	0,1560	0,6160	0,7270	0,3830		0,9720	0,8590	0,6610
HbA1c (glicemia glicada)	R	0,1340	-0,0070	-0,0220	-0,0440	0,0110	1,0000	0,1210	-0,0530
	P	0,6480	0,9820	0,9400	0,8810	0,9720		0,6810	0,8580
Dose de insulina /Kg	R	-0,1030	-0,0880	0,2510	-0,2330	0,0550	0,1210	1,0000	-0,0660
	P	0,7250	0,7650	0,3870	0,4220	0,8590	0,6810		0,8230
IC exame	R	-0,1690	-0,0260	0,6120	0,1650	0,1350	-0,0530	-0,0660	1,0000
	P	0,5630	0,9290	0,0200	0,5780	0,6610	0,8580	0,8230	

1 – R: Correlação linear de Spearman. A correlação linear de Spearman (R) pode ser classificada como: (i) inexistente (se  $0\% \leq R \leq 20\%$ ), (ii) fraca (se  $20\% < R \leq 50\%$ ), (iii) moderada (se  $50\% < R \leq 80\%$ ), (iv) forte (se  $80\% < R \leq 100\%$ ). P: Valor P da correlação. Se  $P < 0,05$  então correlação significativa.

Fig. 3 See text for description

Tabela 4 – Matriz de Correlações lineares de Spearman entre as variáveis quantitativas do estudo considerando os indivíduos cuja classificação do HOMA-IR: (> 50), (n = 5).

Variáveis	HOMA IR	Idade no diagnóstico (anos)	Tempo de doença (anos)	Escore Z do IMC	Micro-albuminúria	HbA1c (glicemia glicada)	Dose de insulina /Kg	IC exame
HOMA IR	R: 1,0000 P: 0,1040	-0,8000 0,1040	-0,2000 0,7470	-0,1000 0,8730	-0,5000 0,3910	0,7000 0,1880	0,4000 0,5050	-0,7000 0,1880
Idade no diagnóstico (anos)	R: -0,8000 P: 0,1040	1,0000 0,1040	-0,2000 0,7470	-0,1000 0,8730	0,4000 0,5050	-0,5000 0,3910	0,1000 0,8730	0,5000 0,3910
Tempo de doença (anos)	R: -0,2000 P: 0,7470	-0,2000 0,7470	1,0000 0,3910	-0,5000 0,2850	0,6000 0,6240	0,3000 0,8730	-0,1000 0,1880	0,7000 0,1880
Escore Z do IMC	R: -0,1000 P: 0,8730	-0,1000 0,8730	-0,5000 0,3910	1,0000 0,1880	-0,7000 0,2850	-0,6000 0,1040	-0,8000 0,5050	-0,4000 0,5050
Microalbuminúria	R: -0,5000 P: 0,3910	0,4000 0,5050	0,6000 0,2850	-0,7000 0,1880	1,0000 0,8730	-0,1000 0,6240	0,3000 0,2850	0,6000 1,0000
HbA1c (glicemia glicada)	R: 0,7000 P: 0,1880	-0,5000 0,3910	0,3000 0,6240	-0,6000 0,2850	-0,1000 0,8730	1,0000 0,2850	0,6000 1,0000	0,0000 1,0000
Dose de insulina /Kg	R: 0,4000 P: 0,5050	0,1000 0,8730	-0,1000 0,8730	-0,8000 0,1040	0,3000 0,6240	0,6000 0,2850	1,0000 0,8730	-0,1000 0,8730
IC exame	R: -0,7000 P: 0,1880	0,5000 0,3910	0,7000 0,1880	-0,4000 0,5050	0,6000 0,2850	0,0000 1,0000	-0,1000 0,8730	1,0000 0,8730

1 – R: Correlação linear de Spearman. A correlação linear de Spearman (R) pode ser classificada como: (i) inexistente (se 0% < R ≤ 20%), (ii) fraca (se 20% < R ≤ 50%), (iii) moderada (se 50% < R ≤ 80%), (iv) forte (se 80% < R ≤ 100%). P: Valor P da correlação. Se P < 0,05 então correlação significativa.

Fig. 4 See text for description

**A31**

**Assessment of knowledge and the practice of insulin application in patients with type 1 diabetes mellitus**

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**Introduction:** Good control of Type 1 Diabetes Mellitus (DM1) consists of several educational and psychosocial factors, emphasizing the knowledge and technique of insulin application. The lack of theoretical and practical knowledge about insulin application techniques may result in worsening glycemic control, resulting in possible acute and chronic complications of the disease.

**Objective:** To analyze the knowledge and practice of insulin application in patients with DM1.

**Methods:** This was a cross-sectional study, conducted in a clinic of Sorocaba-SP, from January to July, 2017, through a questionnaire, with questions about the technique of insulin application, degree of schooling, duration of illness and participation in education groups about DM1 and insulin application.

**Results:** Among the 75 DM1 patients evaluated, 60% were female, with a mean age of 28.4 ± 11.3 years, 1.4% of whom were not literate, 24.7% with elementary education, 54.8% with high school, 13.7% with higher education. Regarding disease time, 8% had up to 5 years of diagnosis, while 28% had 5 to 10 years and 64% had more than 10 years of illness. Regarding the time of outpatient follow-up, 32.4% of the patients were followed for more than 10 years, 96% of whom reported receiving adequate guidelines from health professionals about insulin application techniques and 62.6% were regularly attending the education group in diabetes. It was found that 54.6% of the patients reused needles, mainly due to economic reasons. Only 12% of the patients had knowledge about lipodystrophy. When asked about skin fold, 70.6% performed it correctly; 93.3% of the patients reported site rotation, but when asked

about the interval of days to return to the same site, 85.3% had intervals of less than 10 days and only 4% between 10 and 14 days. Most patients (58.6%) waited 10 s or longer to withdraw the needle after application.

**Conclusion:** After analyzing the questionnaires applied to DM1 patients, it was possible to conclude that regardless of the level of education, adequate knowledge about insulin application techniques and regular participation in the multidisciplinary group, adherence to diabetes education practices was not observed. These results showed the need for multi-professional commitment to institute educational strategies to face the challenges of lack of adherence.

**A32**

**Assessment of knowledge, self-care, and attitudes of diabetes type 2 individuals enrolled in a health education program**

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**Introduction:** There are several ways to improve the care of diabetic patients, such as the investment in new treatments and diets, support groups, global actions and health education.

**Objective:** Evaluate if a health education program changes the knowledge, self-care, and attitudes of subjects with type 2 diabetes attended by a philanthropic Institution in Nova Friburgo, RJ, Brazil.

**Method:** The study was approved by the Universidade Federal Fluminense Ethics Board (CAAE 51508915.0.0000.5626). Eleven participants with type 2 diabetes were followed up for 4 weeks. They attended health education lectures approaching diabetes physiopathology and complications and, glucose, cholesterol and triglycerides metabolism. A multiple choice questionnaire evaluated knowledge before and after lectures. Self-care and attitudes toward diabetes were assessed before and after lectures as well by the Summary of Diabetes Self-Care Activities questionnaire (SDSCA) and by the Diabetes Attitudes (ATT-19) questionnaire. Anthropometric measurements, random blood glucose and blood pressure (BP) were also evaluated before and after lectures. Data were analyzed by GraphPad Prism 6.0 and a P < 0.05 was considered significant.

**Results:** Data are presented as mean ± S.D. or percentage, and paired t-test assessed differences. The sample consisted of 11 participants, where 36.4% were male and 64.6% female with 58.5 ± 8.7 years old. Random blood glucose was 134.8 ± 44.8 mg/dL, systolic BP 124.8 ± 18.2 mmHg and diastolic BP 75.4 ± 8.8 mmHg before lectures, with no change after lectures. All anthropometric variables evaluated were not influenced by health education, but the waist-to-hip ratio showed a trend to decrease (0.96 ± 0.05 cm vs. 0.95 ± 0.04 cm, P = 0.08). Regarding knowledge, global questionnaire grade increased from 53.8 ± 23.3% to 65.1 ± 23.6% (P = 0.005), but the health education program did not improve the knowledge about glucose and cholesterol metabolism. Surprisingly, self-care score (SDSCA, 0-105 points) did not change after lectures (60.4 ± 18.1% before vs. 61.9 ± 13.7% after, P = 0.7) and diabetes attitude score (ATT-19, 19-95 points) decreased from 51.6 ± 10.5 to 45.9 ± 11.5 points after attending the lectures (P = 0.015).

**Conclusion:** Enrollment in a Health Education Program increased the knowledge of subjects with type 2 diabetes about their condition. However, lectures did not improve self-care, and their attitude toward their disease worsened. Informed consent to publish has been obtained from patients.

**A33**

**Associated factors with the control of type 1 diabetes mellitus**

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**Introduction:** Type 1 Diabetes Mellitus (DM1) is a chronic disease that should receive intensive treatment aimed at preventing complications. Good glycemic control depends on patient adherence to therapy and multidisciplinary follow-up.

**Objective:** To identify factors associated with the quality of glycemic control in DM1 patients.

**Methods:** A cross-sectional study through medical records review, of 66 DM1 patients on insulin-based basal-bolus regimen, on a regular follow-up. Were evaluated: gender, age, degree of schooling, illness time, follow-up time, body mass index (BMI), and frequency in the multidisciplinary diabetes education group (GMED) in relation to glycemic control by glycated hemoglobin (HbA1c). Patients were divided in two groups: best glycemic control with HbA1c less than or equal to 7.5% and poor glycemic control with HbA1c greater than 7.5%.

**Results:** Of the 66 patients, 22.7% were in the best control group: mean HbA1c was  $6.6 \pm 0.9\%$ ; 53.9% female, age  $28.3 \pm 6.5$  years (6.6% between 15 and 20 years old). Illness time was  $15.9 \pm 8.6$  years, 30.8% between 5 and 10 years, and 69.2% longer than 10 years. Regarding follow-up time, 53.9% had less than 5 years and 46.1% regularly participated in the GMED. Half of this group was eutrophic and 16.7% obese. On the degree of schooling, 46.2% finished high school. In the poor control group, mean HbA1c was  $9.8 \pm 1.9\%$ , 60% female; mean age  $27.9 \pm 12.6$  years, with 35.3% being aged between 15 and 20 years. Illness time was  $15.5 \pm 9.8$  years, 5% of patients had the disease for less than 5 years and 60% for more than 10 years. Regarding follow-up time, 60% had more than 5 years and 55% were assiduous to GMED. Evaluating the BMI, 57.9% were eutrophic and 21.1% obese. And about degree of schooling, 50% finished high school. Comparing the variables, a difference was observed between the age of the two groups: 35.3% of the patients in the group of the poor control group vs. 6.7% of the best control group were aged between 15 and 20 years ( $p = 0.014$ ).

**Conclusion:** Glycemic control did not correlate with disease time, outpatient follow-up, participation in the GMED and educational level. The group with the poor glycemic control presented a younger age group compared to the group with the best control. The results show the difficulty of identifying variables associated and the need for attention regarding the biopsychosocial factors involved in disease control.

#### A34

##### Association between dietary fatty acid composition and diabetes kidney disease: a systematic review a systematic review and meta-analysis of observational studies

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**Introduction:** Some studies have shown the deleterious and beneficial effects of saturated fatty acids (SFA) and polyunsaturated fatty acids (PUFA), respectively on chronic kidney disease in patients with diabetes. However, so far these results have not been sufficient to establish a base of dietary recommendations for these nutrients specifically.

**Objective:** To make a systematic review of the observational studies that analyzed the association between the intake of SFA, monounsaturated FA (MUFA) and PUFA and diabetic kidney disease (DKD).

**Methods:** A systematic review and meta-analysis of observational studies published until February 2017 were performed, researching the following bases: PubMed, LILACS, Cochrane and EMBASE. Manual search in the cited references in previous review articles was also made. There was no restriction for language or period in the search strategy. Observational studies that evaluated the intake and serum composition of fatty acids and the presence of DKD in diabetic patients were included. The data were extracted independently and duplicated by two researches, including the year in which the studies were performed and published, their design, size, type of population and mean and standard deviation of the content in the diet or in the blood of SFA, MUFA and PUFA, or confidence intervals at the lowest and highest percentile.

**Results:** 4933 articles were found in a systematic and manual search. After the duplicates were removed, 4016 abstracts and titles were read by the reviewers, and 66 articles were selected for complete reading. Finally, seven articles were included in the systematic review and five were included in the meta-analysis. To analyze the dietary PUFA, two studies were evaluated (339 participants). The dietary PUFA were inversely associated with DKD (mean difference:  $-1.95\%$  of energy [95% CI  $-3.57$  to  $-0.32$ ];  $P = 0.02$  [ $I^2 = 85.6\%$ ;  $P = 0.009$ ]). Two studies (748 participants) were included to analyze the serum PUFA. An inverse association was also observed between the presence of DKD and the proportion of serum PUFA (mean difference:  $-0.63\%$  of total FA [95% CI  $-0.85$  to  $-0.40$ ],  $P = 0.0001$  [ $I^2 = 0\%$ ,  $P = 0.368$ ]). In order to analyze the MUFA in the diet, two studies were evaluated (339 participants). The MUFA presented an inverse, but not statistically significant association with the DKD (mean difference:  $-0.69\%$  of energy [95% CI  $-1.50$  to  $0.12$ ];  $P = 0.09$  [ $I^2 = 0.0\%$ ;  $P = 0.4794$ ]). Analyzing the dietary SFA, no association with DKD was observed.

**Conclusion:** In the present review, the lower intake of PUFA appears to be associated with the presence of DKD. However, the small number of studies and great heterogeneity among them are limiting factors for this conclusion. Further studies are needed to evaluate the association between the intake of fatty acids and their possible effects on kidney function in diabetic patients.

#### A35

##### Association between glycaemic control over a decade and the chronic complications of type 1 diabetes

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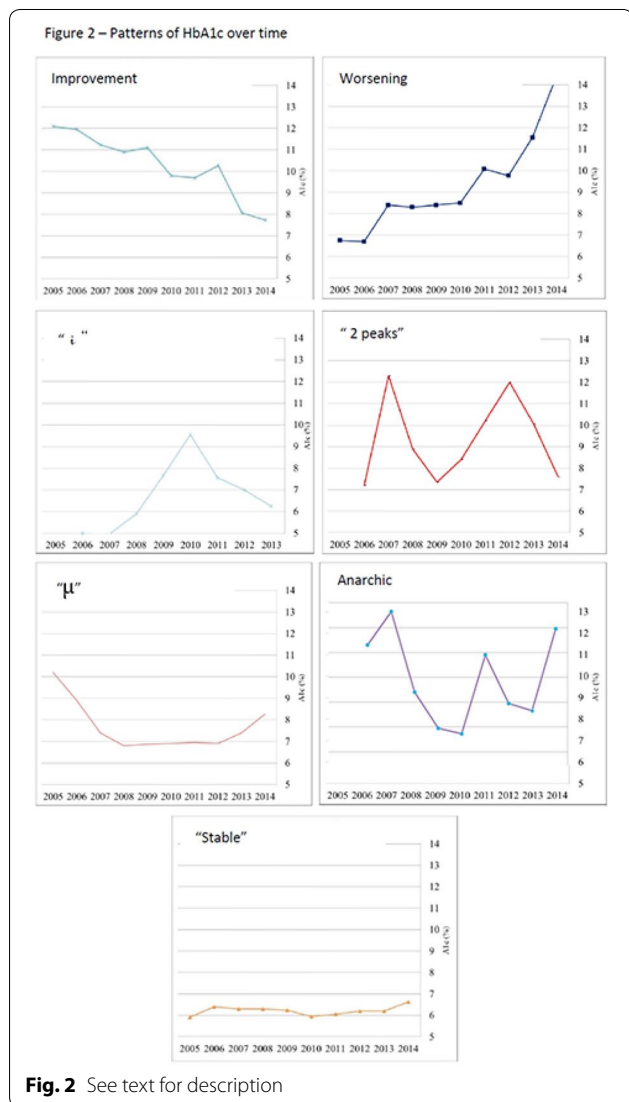
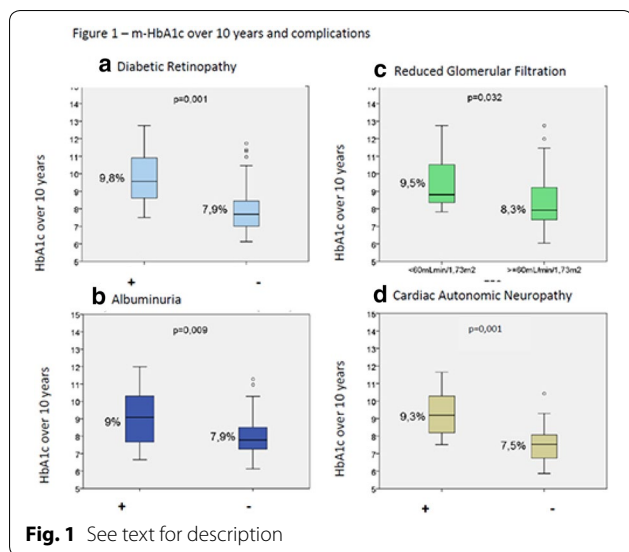
*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A35**

**Introduction:** It is not known any further study in Brazil that has evaluated the glycaemic control for a long period and microvascular complications, which is well demonstrated in Caucasian population with findings from DCCT/EDIC. AIM: We have evaluated the association between the mean of HbA1c over 10 years (m-HbA1c) and glycaemic variability assessed by standard-deviation of HbA1c (SD-mHbA1c) with microvascular complications and it has been attempted to identify HbA1c patterns over time and their relation to complications.

**Methodology:** Patients with  $\geq 10$  years of T1D with medical appointments in 2014 at the Federal University of Rio de Janeiro and at least 7 yrs. of HbA1c mean ( $\geq 1$  HbA1c measurement of certified NGSP methods/year) were selected. The Diabetic Retinopathy was evaluated by indirect funduscopy, Albuminuria by a single urine sample ( $> 17$  mg/L or 30 mg/g) or 24 h urine (30 mg/24 h), eGFR (calculated by CKD-EPI, considered reduced if  $< 60$  mL/min/1.73m<sup>2</sup>) and Cardiac Autonomic Neuropathy (CAN), assessed by heart rate variability tests. The 10-year HbA1c graphics of all patients have been evaluated.

**Results:** The sample consisted of 172 patients with mean age and T1D duration of 28.7 and 18 years respectively. The frequency of DR, IUA, eGFR  $< 60$  mL/min/1.73m<sup>2</sup> and CAN were respectively 12.6% (15/119), 18.9% (22/119), 6% (8/134) and 33.9% (20/59). The m-HbA1c was higher in patients with DR ( $9.8 \pm 1.7\%$  vs.  $7.9 \pm 1.2\%$ ;  $p = 0.001$ ); Albuminuria ( $9 \pm 1.6\%$  vs.  $7.9 \pm 1.1\%$ ;  $p = 0.009$ ); eGFR  $< 60$  mL/min/1.73m<sup>2</sup> ( $9.5 \pm 1.8\%$  vs.  $8.3 \pm 1.4\%$ ;  $p = 0.032$ ) and CAN ( $9.3 \pm 1.3\%$  vs.  $7.5 \pm 1\%$ ;  $p = 0.001$ ). SD-mHbA1c was associated with DR and CAN, being higher in these groups ( $1.6 \pm 1.1\%$  vs.  $1 \pm 0.6\%$ ;  $p = 0.011$ ) and ( $1.3 \pm 0.7\%$  vs.  $0.9 \pm 0.6\%$ ;  $p = 0.026$ ). Some HbA1c patterns were identified over time: (a) stable, (b) improvement, (c) worsening, (d) in "i", (e) in "u", (f) "2 peak" and (g) anarchic and 55% patients with Albuminuria presented anarchical pattern while most of patients without albuminuria exhibited a stable pattern ( $p = 0.005$ ).

**Conclusion:** This study found an association between DR, reduced eGFR, IUA and CAN with higher HbA1c mean over 10 years. In a Brazilian sample and higher SD-mHbA1c with DR and CAN. These findings show the importance of establishing not only an adequate glycaemic control, but also the need to seek this, avoiding large glycaemic fluctuations, showing the importance of the concept of metabolic memory in the development of complications even in our population (Figs. 1, 2).



**A36**

**Association between low bone density with type 1 diabetes mellitus and celiac disease**

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**Case report:** A 27-year-old male with a previous history of type 1 diabetes mellitus since the age of 19 and an irregular disease control in this period. He was diagnosed with celiac disease and diabetic distal polyneuropathy at the age of 27. At the same time, a dual energy X-ray absorptiometry (DXA) revealed femur Z-score of -5.09 and lumbar spine Z-score -3.62. Bisphosphonate and colecalciferol were promptly administered and combined to a gluten free diet. After 1 year, bisphosphonate was discontinued and the patient remains in regular medical care.

**Discussion:** The association between type 1 diabetes mellitus with autoimmune diseases such as celiac disease is not uncommon. It is well established that both diseases can lead to bone metabolism dysfunction, which seems to be related to an imbalance of the immune system and not only due to a nutritional or endocrine disorder.

**Conclusions:** The association between type 1 diabetes mellitus with autoimmune diseases, such as Celiac Disease, seems to worsen bone loss. It suggests a synergistic negative effect of hyperglycemia and autoimmunity on bone mineral density. Specific therapies to control this immunoregulatory imbalance and consequently bone reabsorption inhibition are still not available.

Informed consent to publish had been obtained from the patient.

**A37**

**Association between nutritional status and dyslipidemia in children and adolescents with diabetes mellitus type 1 in a pediatric university hospital of Rio de Janeiro**

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**Introduction:** Children and adolescents with type 1 diabetes mellitus type 1 (DM1) have a higher prevalence of cardiovascular risk factors, among them dyslipidemia [1, 2].

**Objective:** To evaluate the association between nutritional status and lipid profile of children and adolescents with DM1.

**Method:** This was a cross-sectional study carried out at the Diabetes Service of a Pediatric University Hospital of Rio de Janeiro from May 2016 to June 2017. The eligibility criteria were: age between 7 and 16 years, diagnosis of DM1 for at least 1 year and absence of other autoimmune diseases. The dependent variables were: total cholesterol, HDL, LDL, triglycerides and nutritional status, evaluated by body mass index by age (BMI/age). The independent variables were: age, family income, place of residence, sanitation conditions, parental level of education, diabetes diagnosis time, insulin regimen, dietary method used (traditional or carbohydrate counting method) and glycated hemoglobin (HbA1c). All variables were obtained by means of medical records. Statistical analysis included simple descriptive analysis (means and frequencies), Chi square test for comparison of categorical variables and ANOVA for comparison of means. The statistical program SPSS version 23.0 was used, and the significance level adopted was 5% (p < 0.05).

**Results:** A total of 105 patients with a mean age of 11.6 (± 2.9) years were included in the study, of which 47.6% (n = 50) were males. High levels of total cholesterol, LDL cholesterol and triglycerides were observed in 74.3% (n = 78), 42.9% (n = 45), 15.2% (n = 16), respectively. Approximately 12.4% (n = 13) had inadequate HDL values.

The mean HbA1c was 8.27% ( $\pm$  1.41). No significant differences were found in serum lipid averages in relation to the age of the child, time of diagnosis of DM1, insulin regimen and ethical diet method. There was an association between triglyceride levels and inadequate glycaemic control ( $p = 0.032$ ).

**Conclusion:** The results showed a high frequency of dyslipidemia, representing an important cardiovascular risk factor for this population. It is suggested the adoption of healthy eating habits and lifestyle practices regardless of anthropometric nutritional status, in order to prevent cardiovascular diseases.

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## A38

### Association between reduced vitamin d levels and glomerular filtration rate estimated by CKD-EPI equation and measured by a reference method

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**Introduction:** Diabetes kidney disease (DKD) is the leading cause of end-stage renal disease and current treatment is not able to fully control disease progression. New therapeutic alternatives have been investigated and some evidence points to 25 (OH) vitamin D deficiency as a possible factor related to the onset and/or progression of DKD.

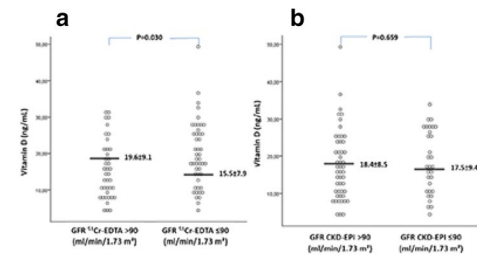
**Objective:** The objective of this study was to evaluate the relationship between 25 (OH) vitamin D levels and degree of renal damage in patients with type 2 DM.

**Methods:** Cross-sectional study, type 2 DM subjects. The glomerular filtration rate (GFR) was estimated by the Chronic Kidney Disease Epidemiology (CKDEPI) equation and measured by the <sup>51</sup>Cr-EDTA technique. Urinary albumin excretion albumin (UAE) was assessed by immunoturbidimetry and 25 (OH) vitamin D by the chemiluminescence technique. ROC curve and multiple logistic regression were employed to evaluate the relationship between vitamin D levels and renal damage.

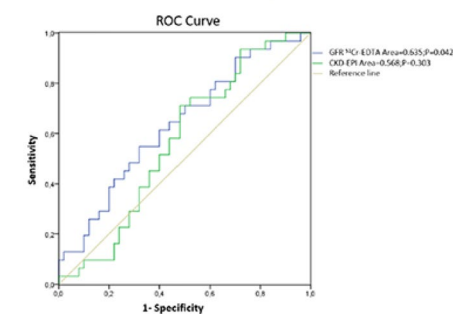
**Results:** A total of 87 individuals with type 2 DM with a mean age of  $61 \pm 10$  years were included, of which 46 were female (53%), with DM duration of  $12 \pm 6$  years and self-reported white ethnicity at 81%, GFR had to be  $\geq 60$  mL/min/1.73 m<sup>2</sup>. Figure 1 shows the vitamin D values according to GFR, both measured and estimated by equation, categorized in levels  $\geq$  vs.  $<$  90 mL/min/1.73 m<sup>2</sup>, demonstrating that using measured GFR, lower vitamin D values were found in the lower GFR group. However, no difference was observed in vitamin D levels when GFR was calculated with the equation. Figure 2 shows ROC curves of the two methods of GFR, and again a relationship between reduced GFR and lower levels of vitamin D was only observed with measured GFR.

**Conclusion:** The CKD-EPI equation is not able to identify the phenomenon of vitamin D reduction with mild loss of renal function, which is clearly detected with the measured GFR (Fig. 1).

**Figure 1.** Vitamin D levels according to the GFR values  $>$  vs.  $\leq 90$  mL/min/1.73 m<sup>2</sup>, measured by the <sup>51</sup>Cr-EDTA (panel A) and estimated with the CKD-EPI equation (panel B).



**Figure 2.** ROC curve for analysis of association of vitamin D deficiency (Youden vitamin D  $\geq 16.5$  vs.  $<$  90 vs.  $\leq 90$  mL/min/1.73 m<sup>2</sup>).



**Fig. 1** See text for description

## A39

### Association between trans fatty acids from natural and industrial sources of diet and cardiovascular risk factors and endothelial function of patients with type 2 diabetes mellitus

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**Introduction:** In human nutrition the 3 main sources of trans fatty acids (TFA) are: transformation of polyunsaturated fatty acid (FA) in the rumen of animals, partial hydrogenation of vegetal oils and process of frying foods. Several studies investigate the difference of the impact that industrial TFA (I-TFA) and those from ruminants exert on cardiovascular disease (CVD), finding conflicting results. Considering the importance of the reversion of modifiable risk factors to prevent CVD in patients with type 2 DM, it is very important to study the association between the different sources of intake of TFA and CV risk factors and endothelial function in these patients.

**Objective:** To evaluate the relationship between the dietary TFA from ruminant (R-TFA) sources and industrial sources, with CV risk factor and endothelial function of patients with type 2 DM.

**Methodology:** Patients with type 2 DM followed in the Diabetes Outpatient Clinic at Hospital de Clínicas de Porto Alegre were evaluated. The clinical evaluation consisted of glycemic control, lipid profile, blood pressure and detection of chronic complications of DM.

The endothelial function was determined by the Doppler study of the brachial artery to determine its diameter and the flow-mediated dilatation (FMD). The patients made 3-day weighed food records and the diet was calculated using the Nutribase Clinical Nutritional Manager software. A spreadsheet was constructed to calculate the TFA with data from the Brazilian Table of Food Composition (TACO - Tabela Brasileira de Composição dos Alimentos) and the American table (USDA). The anthropometric evaluation consisted of measures of weight, stature and abdominal circumference (AC).

**Results:** 186 patients were analyzed (44% men's; mean age: 63 years and mean body mass index: 29.4 kg/m<sup>2</sup>). It was observed that the intake of R-TFA was associated with the AC of higher risk CV (dependent variable) [Risk Ratio: 2.45 (95% CI 1.11—5.38); P = 0.026], adjusted for sex and age. Also, the intake of R-TFA was associated with the greater diameter of the brachial artery [Risk Ratio: 1.93 (95% CI 1.01—3.69); P = 0.047], adjusted for age, hypertension and AC. No association was found between the I-TFA sources and the CV risk factors and parameters of endothelial function.

**Conclusion:** The present study suggests that the greater consumption of R-TFA sources in patients with type 2 DM is related to the greater AC and worse endothelial function.

#### A40

##### Association of anemia in diabetic obeses

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**Introduction:** In Brazil, the nutritional transition presents a simultaneous aggravation of two opposing issues: a nutritional deficiency (anemia) and a typical condition of overeating, obesity. Few studies have evaluated this epidemiological paradox in the prevalence of diabetes mellitus and other chronic diseases.

**Objective:** Evaluate the association of anemia in obese, diabetic and cardiomyopathy patients.

**Methods:** A retrospective cross-sectional study was carried out to verify the admission data of overweight, diabetic and cardiac patients hospitalized at a cardiology reference center in Pernambuco. Overweight was considered according to the World Health Organization criteria (WHO, 1995) for adults (IMC  $\geq$  25 kg/m<sup>2</sup>) and from the cut-off point established for the elderly (BMI > 27 kg/m<sup>2</sup>) by Lipschitz in 1994. Anemia was considered when serum haemoglobin results were < 13 m/dl for men and < 12 mg/dl for women. The study was approved by the Ethics and Research Committee of the University of Pernambuco hospital under the protocol number 656.800/2014. Statistical analyzes were performed in the software SPSS, v. 13.0, adopting statistical significance when p < 0.05.

**Results:** From the sixty patients evaluated, the mean age was estimated at 60.7 ( $\pm$ 10.5) years, and 53.4% were female. The prevalence of anemia in diabetic patients with overweight was 41%, similar in both sexes (p = 0.846) and in adults and elderly (p = 0.951).

**Conclusions:** The high prevalence of anemia in diabetic patients with overweight highlights the need for an investigation, monitoring and prevention of this condition, regardless the nutritional condition of the individual. In addition, it is important to study other issues related to diabetes that may contribute to anemia, favoring its prevention.

#### A41

##### Association of maternal outcomes in pregnant women with diabetes mellitus and users of the unified health system who had their deliveries in a university hospital of the south of Brazil

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**Background:** Gestational Diabetes Mellitus (GDM) is the most prevalent metabolic change in pregnancy. The impact of their screening on maternal and perinatal morbidity and mortality for women treated in the Basic Health Care is questioned. The Ministry of Health (MH) recommends universal screening at the first prenatal visit through fasting glycemia (FG) and clinical risk factors for GDM. The prenatal diagnosis of GDM is fundamental and its approach improves the prognosis of gestation.

**Objectives:** To verify the association between GDM screening (according to what MH advocates) and the repercussions on maternal outcomes in women who underwent prenatal care in the basic health care in the central region of Rio Grande do Sul, and had their births at the University Hospital of Santa Maria-RS (HUSM).

**Methods:** This descriptive-transversal study evaluated 283 puerperal women who underwent their prenatal care in the basic health care system through an interview, analysis of medical records and the Pregnant Woman's Card, and had their deliveries in HUSM between January and April 2015. Informed consent to publish has been obtained from patients. The study was approved by University of Santa Cruz do Sul Institution's Ethics Board, approval number 37290714700005343.

**Results:** Data collected were allocated to the Statistical Package for Social Sciences (SPSS) version 20.0, with a descriptive statistical analysis and a Chi square test with significance of 0.05. In this sample, 53% of women were overweight according to the Body Mass Index (BMI), being the most observed risk factor for GDM. 27.9% of the puerperal women were overweight and 25.1% were obese. Among the puerperal women, 14.5% did not undergo GDM screening through FG. The prevalence of positive screening in this sample was 86.4%. The most frequent maternal outcomes were preterm labor (12.4%), maternal tocotraumatism and lacerations (5.3%), preeclampsia in various degrees (3.9%) and premature amniorrhexis (2.1%). Placental abruption occurred in two cases. There was a significant association of pregnant women with positive screening only with preeclampsia outcome.

**Conclusion:** Many of the maternal and fetal outcomes are known to be preventable. For this, the identification of DMG through adequate screening and early control of its risk factors is essential in the application of prenatal care actions by the health team of the basic network in the region studied in order to minimize them.

#### A42

##### Association of the phase angle with hospital hyperglycemia in surgical patients

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**Introduction:** Phase Angle (PA) has been related to the integrity of cell membranes, as a good prognostic indicator, with the general health and nutritional status of the patients. The hyperglycemia can be triggered by adverse and characteristics of the hospital routine; the metabolic stress is one of the main causes. It has already been shown that hyperglycemia is a common outcome observed in hospitalized patients; capable of causing cellular glycototoxicity. In addition it is considered marker of poor prognosis for serious patients, both clinical and surgical.

**Objective:** To evaluate the prevalence of hyperglycemia and its association with PA in hospitalized surgical patients.

**Methods:** A prospective longitudinal study was performed at Clinical Hospital in Belo Horizonte, Brazil. Patients PA was calculated by electrical bioimpedance in three moments: before, postoperative and hospital discharge moments. Blood glucose was also collected before and postprandial capillary glycemia and the average values were considered. Results above 140 mg/dL were classified as hyperglycemia. To compare the glycemic averages, according to the categorization of the PA; the Ancova Test was used. For all analyzes a significance level of 5% was adopted.

**Results:** Fifty patients were analyzed, and 33.3% presented hyperglycemia. The mean glucose levels observed were 120  $\pm$  33 mg/dL, 135  $\pm$  37 mg/dL and 125  $\pm$  37 mg/dL at the before, postoperative

and hospital discharge moments, respectively. In the paired analysis, hyperglycemia was observed with significantly higher postoperative values ( $135.35 \pm 37.57$  mg/dL) in relation to hospital discharge ( $125.68 \pm 37.21$ ); ( $p = 0.031$ ). There was a higher frequency of non-infectious complications among diabetic individuals (50.0% vs. 24.8%,  $p = 0.23$ ). Ancova test showed a significant difference between the glycemic groups, according to the categorization of PA, and patients with nutritional risk showed higher blood glucose levels in relation to patients without nutritional risk: ( $133.11 \pm 8.7$  vs.  $115, 99 \pm 4.6$   $p = 0.089$ ).

**Conclusion:** The importance of glycemic evaluation in hospitalized patients before and after surgical intervention is highlighted, in order to verify if there are significant alterations in relation to moments, outcomes and if this, and to date, this study was the first to evaluate the association between PA and hyperglycemia in the hospital. Future studies are necessary to verify the depth of this association.

#### A43

##### **Bacterial endocarditis in a patient with type 2 diabetes mellitus: case report**

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A43**

**Case report:** a 54-year-old female was admitted with a medical history of type 2 diabetes mellitus (T2D), hypertension, non-dialysis dependent chronic kidney disease, and lower extremity ulcers. For the treatment of the ulcers the patient underwent debridement and received antibiotics (ATB). Subsequently, the patient sought a hospital with chief complaint of dyspnea and was diagnosed with pneumonia (sic) and treated with use of ATB. Then, she presented with anasarca and fever. There was no leukocytosis probably due to the use of ATB. On the physical examination, mitral murmur was found. On the echocardiogram the patient showed mitral and tricuspid insufficiency and vegetation in the mitral valve, indicating infective endocarditis. At the time of admission, the patient presented pleural effusion, high serum urea levels (142 mg/dl), hyperglycemia (256 mg/dL of serum glucose), and low serum albumin levels (2.6 g/dL). After 6 days, the mitral valve was replaced by a bioprosthetic valve, and a tricuspid valve cerclage was performed. Postoperative blood transfusions were required. She went into cardiac arrest and a cardiopulmonary resuscitation was performed successfully. Ten day later she presented with arrhythmia, cardiopulmonary arrest, sepsis and then she died.

**Discussion:** Infective endocarditis is a microbial infection of the endocardial surface of the heart. It mainly affects heart valves, most commonly the mitral valve. Common etiologies are: use of injectable drugs, oral infection, long-term hemodialysis, and diabetes mellitus. The Duke Criteria was used for the diagnosis of infective endocarditis. In this case report we present a case of a patient with type 2 diabetes who evolved with an infective endocarditis. The patient's uncontrolled glycemia led to worsening of endocarditis

**Final comments:** Adequate management of T2D can prevent complications such as lower extremity ulcers, consequently avoiding hematogenous dissemination and infective endocarditis. We must consider the previous antibiotic use when analyzing the patient's white blood cell count.

Informed consent to publish had been obtained from the patient.

#### A44

##### **Banana skin: wound healing analysis in patients with diabetics**

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A44**

Diabetes mellitus is a public health problem which assails millions of people around the world, and its cause can have not only hereditary factors but also environmental. The biggest worry for the health system is in relation to the lack of control of the disease by the sufferers, what can lead to a big number of consequences that can be disabling or even fatal. An important fact of the chronic phase of the disease allied to the lack of control is the appearance of skin lesions, as ulcers, which can be a simple injured or cut and progress to skin cavities formation. For the treatment of these wounds it was proposed the analysis of these wound healing through the use of a gel made from the green banana skin per 10%. This study took place in NAEENF (Nursery Assistance and Teaching Center) in the city of Pouso Alegre-MG and it was composed by 30 patients who used the gel from the green banana skin per 10% for 1 month. The protocol was approved by the Ethics Comittee of UNIVÁS (Vale do Sapucaí University) with the CAAE 48017915.6.0000.5102 and the Approval Report number 1.575.890. The results were the complete healing in 9 patient s. The initial average of the wounds was 32.89 mm<sup>2</sup> and it finished in the eighth collection representing 22.45 mm<sup>2</sup>. The average was 19.94 mm<sup>2</sup> for 10.30 mm<sup>2</sup>. By making the central tendencies measures there was significance in the obtained general results of the whole group ( $p < 0.001$ ). We can conclude that the gel made from the green banana skin per 10% has a healing action in chronic ulcers presented by patients with diabetes.

#### A45

##### **Beneficial effects of dapaglifozin in patients with diabetes mellitus type 1**

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A45**

**Introduction:** The effects of dapaglifozin inducing glycosuria, reducing hyperglycemia optimizing weight control and declining of pressure level is already well known in patients with diabetes type 2, however there are still a few studies abouts its use in patients with diabetes mellitus type 1 (DM1). As the phenotype of patients with diabetes mellitus type 1 have been modified with 25% showing metabolic syndrome, becomes necessary the use of supplementary therapies to insulin.

**Purpose:** Assess the potential benefits and adverse effects of Dapaglifozin in a population with DM1 followed in particular offices in Salvador/BA city.

**Methods:** Observational and retrospective study in which they were analysed the medical recordo f patients with DM1 who made use of this medication in dose of 10 mg/day through 3-6 months.

**Results:** Twelve patients with DM1 were assessed, 10 females with average rate of 37.5 years. The average weight was 68.3 kg and 65.3 kg before and after therapy with dapaglifozin respectively ( $p = 0.002$ ). The average BMI decreased from 26.1 to 25.4 kg/m<sup>2</sup> after treatment ( $p = 0.002$ ). There was a significant decrease in glicated hemoglobina (HbA1c) after therapy with Dapaglifozin ( $p = 0.002$ ). There was a tendency to decrease of total cholesterol, LDL and triglycerides ( $p = 0.260$ ). Systolic blood pressure (SBP) decreased from a median of 120 mmHg to a mediano f 115 mmHg befora and after therapy with Dapaglifozin respectively ( $p = 0.02$ ). With regard to dyastolic blood pressure a decrease in median values were noticed, however without statistic relevance ( $p = 0.059$ ). Correlation among the use of Dapaglifozin and decreasing of basal insulin was found ( $p = 0.012$ ). Values of creatinina did not change after us of adjuvante therapy ( $p = 0.207$ ). With regard to adverse effects, 8.3% of patients presented urinary tract infection (UTI), 33.3% pain or pruritus on genital region and 8.3% ketoacidosis.

**Conclusion:** The presente study describes the uso of dapaglifozin and its beneficial and adverse effects in a population with DM1. Statistic significant decrease of Hba1C, body weight and BMI, in addition to tendency of increasing lipid profile were observed. Other studies are needed to ratify possible benefits and safety of this class of medication in patients with DM1.

**A46**

**Beneficial effects of recreational soccer training on health profile of untrained postmenopausal women with type 2 diabetes mellitus**

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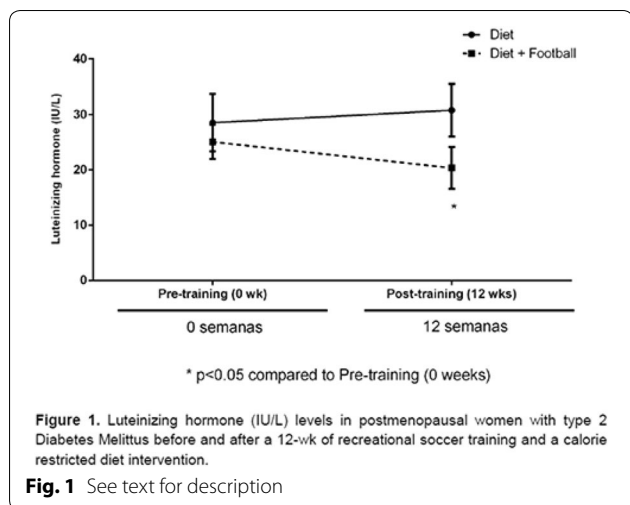
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**Background and aims:** Postmenopausal is linked to modifications in blood hormone level and a progressive decrease in physical activity contributing to changes in metabolism and overweight, leading to an inflammatory status. This aging process and Diabetes Mellitus are strongly correlated with many chronic diseases and in this context, women warrant special attention. Lifestyle changes may modulate these disturbances among postmenopausal women. Therefore, we aimed to investigate the impact of recreational soccer combined with a calorie restricted diet on metabolic and hormonal responses of untrained postmenopausal women with T2DM vs. diet alone.

**Materials and methods:** Twenty-one (n = 21) untrained postmenopausal women with T2DM aged 48-74 years were randomized into a soccer + diet group (SDG; n = 9) and a diet group (DG; n = 12). Training sessions were held for 40 min, 3 times per week for 12 weeks. Dual-energy X-ray, treadmill testing, and fasting blood samplings were performed before and post 12 weeks.

**Results:** Maximal oxygen uptake increased only in the SDG (P < 0.05) while a decrease (P < 0.05) was observed in DG after 12 weeks. HBA1c decreased (P < 0.05) by ~ 10% in both SDG and DG after 12 weeks. In all groups, bone mineral density increased (P < 0.05) by ~ 0.03 g/cm<sup>2</sup>, fat mass decreased (P < 0.05) by ~ 3 kg, and lean body mass was not altered ~ 46 kg (P > 0.05). Baseline triglycerides and VLDL-cholesterol were reduced (P < 0.05) by 23.9% (35.0 ± 1.6 mg/dL) and 23.5% (6.9 ± 0.4 mg/dL), respectively, while HDL-cholesterol was increased (P < 0.05) by 8.1% (3.7 ± 1.1 mg/dL) in the SDG. Total cholesterol and LDL-cholesterol was unaltered (P > 0.05) in both groups. Luteinizing hormone (LH) levels decreased (P < 0.05) in SDG after 12 weeks intervention (Pre: 25.0 ± 3.1 vs. Post: 20.3 ± 3.8 IU/L), whereas the diet group alone did not alter (Fig. 1).



**Conclusion:** Soccer training improved lipids profile in postmenopausal women probably related to increased fat oxidation rate post-training due to the multiple intense actions, stimulating musculoskeletal and cardiovascular adaptations. Lower LH levels may be associated with reduced risk in the prevalence of breast cancer in postmenopausal women, suggesting a potential mechanism of the favorable effect produced by regular training and weight reduction on neoplastic prevention. Thus, recreational soccer training plus diet resulted in large benefits on health profile of T2DM, decreasing risk factors associated with cardiovascular disease and cancer better than diet alone.

**A47**

**Blog as a digital pedagogical tool in diabetes education**

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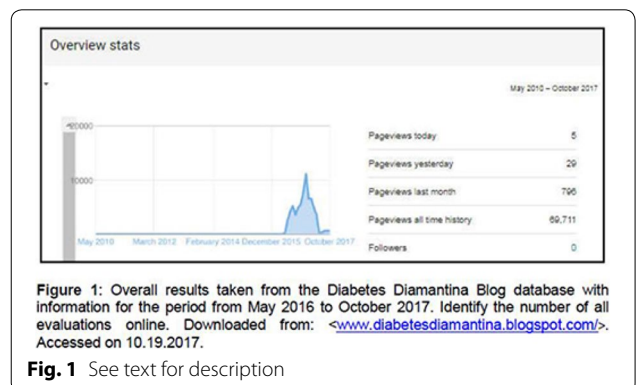
*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A47**

**Background:** Social media are spaces that favor interaction between people, irrespective of social level and geographical position. Blogs and social networks are examples of social media used daily by a large part of the population, including as a means of creating content that promotes connection between people with common interests.

**Objective:** The objective of this study was to report the experience with the first year use of the Blog Diabetes Diamantina as a diabetes education tool.

**Materials and methods:** The Blog Diabetes Diamantina ([www.diabetesdiamantina.blogspot.com.br](http://www.diabetesdiamantina.blogspot.com.br)) was created in March 2016 and became active in May of the same year (Fig. 1). Publications covered content produced by students and university professors or, in some cases, were publications adapted of national and/or international organizations of diabetes. The Blog database was accessed monthly from its creation until July 8, 2017 for analysis. Posts have been sorted into 7 categories. Subsequently, the total number of publications, content visualizations and readers'countries of origin were identified. The data were analyzed and described. Results Sixty publications in the Portuguese language were produced, including texts, videos and images (Fig. 2). The subjects were classified as: complications of diabetes (n = 9), nutrition (n = 6), therapeutics/clinical aspects (n = 12), cell biology (n = 3), obesity (= 4), exercise (n = 2) and education (n = 24). The Blog received 67,546 views by national and international readers until the month of July. Currently, in October 2017 the number increased to almost 70 thousand views (Figs. 1 and 4). The United States was the main country from origin of the readers, followed by Brazil, Portugal, the United Kingdom, Chile, Mexico, France, Argentina, Spain and Russia (Fig. 3). Some Blog posts have been shared on Fanpage Diabetes Diamantina, a social network of diabetes education that publishes in the Portuguese, English and Spanish languages, which possibly justifies the origin of international access to the Blog.

**Conclusion:** The Blog proved to be a favorable tool for sharing information about diabetes mellitus, since its access reached Brazil and other countries. The Blog reinforced the integration relations between the use of technology, the University and the Society. This tool has renewed awareness and encouraged social participation among people interested in updates on diabetes. In addition, it provided innovative experiences to students involved in the use of the social media in diabetes education actions with bidirectional interaction between different social agents interconnected in this type of online health education. The authors are grateful to the CNPq, FAPEMIG and UFVJM for the support (Fig. 4).



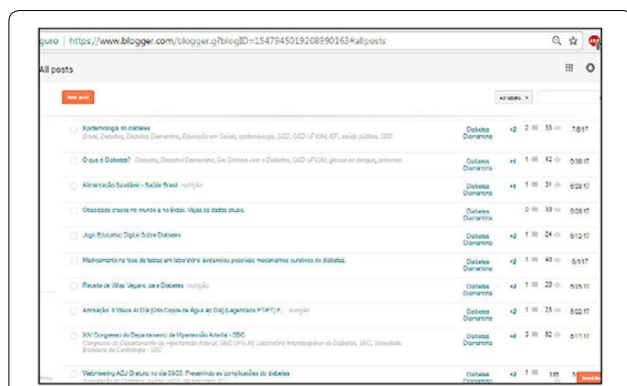


Figure 2: List of the latest postings of Diabetes Diamantina Blog among the 60 publications made between May 2016 and July 2017. Downloaded from: <www.diabetesdiamantina.blogspot.com/>. Accessed on 10.19.2017.

Fig. 2 See text for description



Figure 3: Number of Diabetes Diamantina Blog views by country from readers who accessed the page between May 2016 and July 2017. Downloaded from: <www.diabetesdiamantina.blogspot.com/>. Accessed on 10.19.2017.

Fig. 3 See text for description



Figure 4: Themes for the postings and number of views of Diabetes Diamantina Blog. Downloaded from: <www.diabetesdiamantina.blogspot.com/>. Accessed on 10.19.2017.

Fig. 4 See text for description

**A48**  
**Brazilian young-onset type 2 diabetes in comparison to type 1 diabetes in adults and type 2 diabetes**

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**Introduction:** There is an increasing prevalence of young-onset diabetes, especially in developing areas. Also, there is increasing recognition that the phenotype of YT2DM is more severe than type 1 diabetes mellitus (T1DM) and type 2 diabetes mellitus (T2DM) in older adults, with a lower response to metformin, a more rapid evolution for insulin dependence. Further, the youth may be more susceptible to the development of some complications. At the moment there are no data on YT2DM in Brazil.

**Objective:** To evaluate long-term clinical outcomes in a Brazilian YT2DM group compared to T1DM and T2DM.

**Patients and Methods:** YT2DM was defined as age between 18 and 39 years at the diagnosis, T1DM and DM2 according to the criteria of the SBD and ADA. We abstracted clinical data from electronic medical, laboratory records.

**Results:** The age at diagnosis of YT2DM (n = 61), T1DM (n = 26) and T2DM (n = 39) groups were, respectively: 29.8 ± 5.1, 25.8 ± 6.0 and 50.5 ± 8.4 years. The duration of diabetes was 22.3 ± 12.1 years (YT2DM), 13.5 ± 7.5 (T1DM), 17.3 ± 6.4 (T2DM). The BMI of YT2DM, T1DM and T2DM was 31.9 ± 5.5, 23.7 ± 3.3 and 29 ± 4.8 kg/m<sup>2</sup>. HbA1c (%) was 9.1 ± 1.9 (YT2DM), 8.8 ± 1.5 (T1DM) and 8.8 ± 1.6 (T2DM). YT2DM compared to T1DM showed a higher percentage of retinopathy (55.7 vs 26.9%, p 0.018), nephropathy (55.7 vs 30.8%, p 0.019) and neuropathy (62.3 vs 19.2% p 0.0002). Cardiovascular events showed superiority trend in YT2DM group (27.9 vs 11.5% p = 0.09) compared to T1DM. The percentage of complications, either micro (retinopathy (55.7 vs 51.3% p 0.68), nephropathy (55.7 vs 53.8%, p < 1.0), neuropathy (62.3 vs 51.3%, p < 0.21) as macro (27.9 vs 33%, p = 0.66) were not significant, when compared YT2DM to T2DM.

**Conclusions:** YT2DM compared to T1DM with a similar age of onset, duration of diabetes and similar glycemic control was more aggressive in relation to microangiopathy. In relation to T2DM, YT2DM was similar. Glycemic control and screening of microangiopathy should be intensified in YT2DM.

**A49**  
**Brittle diabetes in a patient with polyglandular autoimmune syndrome type 2 (schmidt's syndrome), neurogenic bladder and psycho-familial distress: a case report**

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**Introduction:** Brittle diabetes occurs in a small group of patients with type 1 diabetes and is characterized by a severe instability of glycaemic levels, with frequent and unpredictable episodes of hypo or hyperglycaemia. The individuals with brittle diabetes are predominately young women and they use twice as much insulin than usual. The causes of the instability are varied and the prevalence of psychosocial distress is high in these patients. The type 1 diabetes is one of the components of Schmidt's syndrome, a rare autoimmune syndrome.

**Objective:** To report a case of brittle diabetes in a patient with Schmidt's syndrome and neurogenic bladder, as well as psycho-familial distress.

**Case report:** R.A.S, 28 years old, woman, single, presented with a picture of urinary retention in 2002, which was then characterized as neurogenic bladder. She has always used catheterization procedure for bladder drainage thereafter. In the following months of the initial presentation, the patient had a ketoacidosis episode and was diagnosed with type 1 diabetes. From the beginning, the glycaemic levels control has proved to be extremely difficult, even after trying different types of high dose insulin. In addition, the patient was diagnosed with hyperthyroidism in 2013, and after treatment with radioactive iodine,

she developed renal insufficiency. After 7 months of haemodialysis, her renal function was unexpectedly recovered. In 2015, she started using a pump for continuous subcutaneous insulin infusion, which contributed for the attenuation of glycaemic instability and improved her quality of life. In 2016, the patient developed adrenal insufficiency, which together with type 1 diabetes and thyroid dysfunction characterizes Schmidt's syndrome. Regarding the psycho-familial distress, she has had traumas in her childhood, she lives by her own since she was 14 years old and she does not have any family support. The medicines used by this patient includes prednisone, levothyroxine and ultra-fast insulin. The patient is assisted by a multidisciplinary team.

**Conclusion:** Brittle diabetes is a severe condition that requires constant vigilance from the patient as well as from the professionals involved. In addition to the other endocrine dysfunctions that this patient presents, there is the poor family support and consequent negative psychological impact. This psycho-familial aspect possibly plays an important role in the genesis and maintenance of the glycaemic instability.

Informed consent to publish had been obtained from the patient.

#### A50

##### Brunns-garland and parsonage-turner syndrome as a differential diagnosis of diabetic neuropathy: 2 case reports

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A50**

**Case 1:** A 45-year-old male with type 2 diabetes mellitus (T2DM) and 6 years of diabetes duration (DD) presented with a complaint of severe lumbar pain (Verbal Numeric Rating Scale ,VNRS, 10 out of 10) since the last 2 months. The characteristics of pain were paroxysmal, with nocturnal worsening, and irradiated to the left thigh. One month after the pain, this was associated with quadriceps weakness, which was initially asymmetrical and progressing to bilateral. Three weeks later, the patient presented crural paraplegia and could not walk. Physical examination (PE) revealed severe quadriceps wasting and bilateral patellar areflexia. Electroneuromyography showed asymmetric polyneuropathy and axonal degeneration, suggestive of Bruns-Garland (BG) syndrome. Consequently, the patient was started with prednisone (60 mg/day). After 30 days, he recovered the quadriceps strength, improved the sleep pattern and returned to walking. The pain was successfully managed with the combination of pregabalin and duloxetine (VNRS of 4 out of 10).

**Case 2:** A 68-year-old male with T2DM and 7 years of DD presented with a six-month history of intense burning pain in his right shoulder (VNRS 8 out of 10), with irradiation to the entire arm. 15 days after began the symptoms, deltoid weakness was observed. On PE, there was a right deltoid atrophy; therefore, a Parsonage-Turner (PT) syndrome was diagnosed. Although the patient had had a good response to pain after 12 months (VNRS of 0 out of 10) with the combination of pregabalin and imipramine, he developed severe depression. Discussion: BG and PT are diabetic radiculoplexus neuropathies (DRN) and can develop serious complications as paraplegia, chronic pain, insomnia, and depression. By contrast with the more common diabetic polyneuropathy, DRN usually manifests as an intense and acute or subacute focal pain that progresses to muscle weakness. Since DRN is an immune-mediated condition, the use of corticoids or intravenous immune globulin has been used in patients with onset of symptoms in the preceding 30-60 days. Improvement of pain, muscle weakness, and quality of life (QOL) has been reported following corticoid immunosuppression.

**Conclusions:** DRN is an overlooked condition that requires both a high level of suspicion and a careful clinical examination. An early diagnosis is essential to the success of immunotherapy, which can reverse this syndrome improving plegia, pain, insomnia, and quality of life of these patients.

Informed consent to publish had been obtained from the patient.

#### A51a

##### Cardiovascular autonomic neuropathy (CAN) is frequent in type 2 diabetic patients with painful polyneuropathy, even in the absence of known autonomic dysfunction or signs or symptoms of can

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A51a**

**Background:** The 10-g monofilament test is widely used in clinical practice for the detection of neuropathic impairment. Alterations in this test reflect the involvement of large fibers, which occurs late in DM. Neuropathic pain reflects the involvement of small fibers, which occurs early in diabetes mellitus (DM) [1]. Cardiovascular autonomic neuropathy (CAN), which is a serious complication even if subclinical, also results from the involvement of small fibers [1]. It is therefore possible that neuropathic pain is more related to the presence of CAN and the early stage of this condition.

**Objective:** This study evaluated the frequency of CAN in type 2 diabetic patients with painful polyneuropathy (PNP), but without known autonomic dysfunction, or signs or symptoms of CAN. **Materials and Methods:** Type 2 diabetic patients with PNP (based on signs and symptoms of neuropathic impairment), who reported no exercise intolerance and who had no known autonomic dysfunction (e.g., gastroparesis, neurogenic bladder) and no postural hypotension or resting tachycardia, were selected. Patients with conditions that can also cause neuropathy or interfere with the evaluation proposed were excluded. A control group without DM, which was similar in terms of sex, age and BMI, was studied. Tests evaluating heart rate variability (HRV) during deep breathing, Valsalva maneuvers and orthostatism, and spectral analysis of HRV (spectral amplitude in the three bands: very low-frequency, low-frequency, and high-frequency) [2] were performed.

**Results:** Thirty patients (22 women and 8 men) aged  $\geq 40$  years (mean 63 years), with a mean BMI of 28.6 kg/m<sup>2</sup> and diagnosed with DM2 at least 3 years ago (mean 15.4 years) were included. The mean value of the last HbA1c was 8.8%. Eleven patients (36.6%) had a definite diagnosis of CAN ( $\geq 3$  altered tests [2]) and 3 patients had 1 altered test. None of the subjects of the control group had any altered test (100% specificity). (Fig. 1)

**Table.** Number of altered HRV tests in type 2 diabetic patients with PNP without known autonomic dysfunction, or signs or symptoms of CAN [2].

Number of altered tests	Number of patients (%)
$\geq 3$	11 (36.6%)
$\geq 2$	11 (36.6%)
$\geq 1$	14 (46.6%)
0	16 (53.3%)

##### Compliance with Ethical Standards

The study was approved by the Research Ethics Committee of our institution. Informed consent was obtained from all individual participants included in the study.

**Fig. 1** See text for description

**Conclusion:** In patients with DM2 and PNP, but without known autonomic dysfunction, or signs or symptoms of CAN, HRV tests detected subclinical CAN in 36.6%, with 100% specificity. Compliance with Ethical Standards The study was approved by the Research Ethics Committee of our institution. Informed consent was obtained from all individual participants included in the study.

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**A51b**

**Cardiovascular autonomic neuropathy (CAN) may even be present in type 2 diabetic patients without sensorimotor polyneuropathy, known autonomic dysfunction, or signs or symptoms of can**

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A51b**

**Background:** Symmetrical sensorimotor polyneuropathy (PN) is a known complication of diabetes mellitus (DM). Cardiovascular autonomic neuropathy (CAN) is another possible complication of the involvement of nerve fibers in DM. It is therefore reasonable to imagine the CAN is present in patients with PN.

**Objective:** This study evaluated the frequency of subclinical CAN in patients with DM2, but without PN, known autonomic dysfunction, or signs or symptoms of CAN.

**Materials and methods:** Type 2 diabetic patients without PN (based on signs and symptoms of neuropathic impairment), who reported no exercise intolerance and who had no known autonomic dysfunction (e.g., gastroparesis, neurogenic bladder) and no postural hypotension or resting tachycardia, were selected. Patients with conditions that can also cause neuropathy or interfere with the evaluation proposed were excluded. A control group without DM, which was similar in terms of sex, age and BMI, was studied. Tests evaluating heart rate variability (HRV) during deep breathing, Valsalva maneuvers and orthostatism, and spectral analysis of HRV (spectral amplitude in the three bands: very low-frequency, low-frequency, and high-frequency) [1, 2] were performed.

**Results:** Twenty-four patients (17 women and 7 men) aged ≥ 40 years (mean 63 years), with a mean BMI of 27 kg/m<sup>2</sup> and diagnosed with DM2 at least 3 years ago (mean 9.5 years) were included. The mean value of the last HbA1c was 7%. Four patients (16.6%) had a diagnosis of CAN, which was incipient in 3 (≥ 2 altered tests [1, 2]) and definite in 1 (3 altered tests [1,2]). None of the subjects of the control group had any altered test (100% specificity).

**Conclusion:** In patients with DM2, but without PN, known autonomic dysfunction, or signs or symptoms of CAN, HRV tests detected subclinical CAN in 16.6%, with 100% specificity. The study was approved by the Research Ethics Committee of our institution. Informed consent was obtained from all individual participants included in the study (Fig. 1).

**Table.** Number of altered HRV tests in type 2 diabetic patients without PN, known autonomic dysfunction, or signs or symptoms of CAN [1,2].

Number of altered tests	Number of patients (%)
≥ 3	1 (4.1%)
≥ 2	4 (16.6%)
≥ 1	9 (37.5%)
0	15 (62.5%)

**Fig. 1** See text for description

**References**

1. Vinik et al. *Circulation* 2007;
2. Spallone et al. *Diabetes Metab Res Rev*. 2011. Compliance with Ethical Standards

**A52**

**Cardiovascular risk assessment by coronary calcium score in brazilian subjects with GCK- and HNF1A-mody**

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**Introduction:** Monogenic diabetes due to glucokinase (GCK-MODY) and hepatocyte nuclear factor-1 homeobox A (HNF1A-MODY) mutations are the most common forms of MODY. Little is known about cardiovascular (CV) risk profile of subjects with these forms of diabetes. Together with clinical and biochemical data and some scores as Framingham, coronary artery calcium (CAC) score has shown good predictive value for coronary artery disease (CAD).

**Objectives:** assess CV risk by CAC score in GCK-MODY (GCK) and HNF1A-MODY(HNF1A).

**Methods:** Ninety-one individuals without CAD have been assessed for CV risk factors by clinical and laboratory data using high-sensitivity C-reactive protein (hs-CRP), Framingham Risk Score, Metabolic Syndrome (IDF), and CAC score with multi-slice computed tomography (Agatston score). We considered CAC > 10U as marker of subclinical atherosclerosis: 27 individuals with GCK-MODY(GCK) from 15 families and 8 individuals with HNF1A-MODY(HNF1A) from 4 families, 24 with type 2 diabetes (T2D), and 28 normoglycemic controls (C) (age-BMI-matched spouses or non-affected relatives of MODY patients), statistics by ANOVA and Kruskal–Wallis, significance P < 0.05,

**Results:** See Table 1.

**Conclusions:** Our data suggest GCK-MODY subjects to have lower CV risk than other common forms of DM such as T2D, with CV risk similar to control individuals and bearing a low long-term risk despite lifelong hyperglycemia. HNF1A subjects, conversely, have high CV risk comparable to T2DM and this has to be taken into account in the clinical follow-up of these individuals (Fig. 1).

**Table 1.** Clinical and laboratory features of studied individuals

	type 2 diabetes	GCK-MODY	HNF1A-MODY	Controls	P
n	24	27	8	32	
CAC score above 10 (%)	54,2	7,4	37,5	6,3	<0.0001
CAC score above 100 (%)	37,5	0	25	6,3	0,0002
CAC score above 300 (%)	12,5	0	12,5	0	0,053
Intermediate Framingham Risk level (%)*	17,4	3,6	0	6,9	0,245
Female gender (%)	64	80	62,5	42,4	0,034
Metabolic syndrome (%)	100	13,3	50	18,2	<0.0001
Hypertension (%)	92	3,3	50	21,9	<0.0001
dyslipidemia (%)	96	3,3	62,5	12,5	<0.0001
statin use (%)	96	3,3	50	6,1	<0.0001
retinopathy (%)	20	0	12,5	0	0,031
proteinuria (%)	27,3	0	25	0	0,01
neuropathy (%)	4,3	0	12,5	0	0,284
age (years)	57 [55-60]	40 [31-46]*	52 [37-57]	42 [34-50]	<0.001
BMI (kg/m2)	29 [26-32]	24 [22-26]*	28 [24-31]	26 [24-29]	<0.001
diabetes duration (years)	8 [5-14]	41 [33-46]*	22 [17-31.5]	-	<0.001
total cholesterol (mg/dL)	170 [140-218]	191 [159-215]	165 [156-210]	211 [185-232]*	0,007
LDL-cholesterol (mg/dL)	91 [78-119]*	114 [87-135]	78 [63-100]*	130 [105-152]	0,001
HDL-cholesterol (mg/dL)	45 [37-50]	52 [45-63]	46 [39-62]	48 [39-54]	0,072
triglycerides (mg/dL)	152 [89-193]	61 [51-114]**	99 [77-388]	122 [76-167]	<0.001
creatinine (mg/dL)	0.8 [0.7-0.9]	0.8 [0.7-0.8]	0.9 [0.6-1.0]	0.8 [0.7-1.0]	0,86
fasting plasma glucose (mg/dL)	125 [114-195]	111 [105-128]	121 [89-158]	90 [81-96]	<0.001
HOMA-IR	1.3 [1.0-1.8]	1.3 [1.2-1.8]	-	2.2 [1.2-3.0]	0,259
C-peptide (ng/ml)	2.9 [2.4-3.4]	1.3 [1.2-1.8]	-	-	<0.001
hs-CRP (ng/ml)	3.0 [1.2-4.7]	1.5 [0.8-3.0]	0.6 [0.4-0.6]**	1.6 [0.6-2.8]	<0.001
A1C (%)	8.5 [6.6-10.7]*	6.3 [6.0-6.6]**	7.9 [7.3-8.4]*	5.4 [5.2-5.7]*	<0.001
CAC score (Agatston units)	39 [0-129]	0 [0-0]*	3.6 [0-193]	0 [0-0]*	<0.001
Framingham risk score (%)	4 [2-8]	1 [1-1]*	2 [1-4]	2 [1-5]	0,002

\*p < 0.05 compared to type 2 diabetes; \*\*p < 0.05 compared to GCK-MODY; †p < 0.05 compared to controls

**Fig. 1** See text for description

**A53**

**Cardiovascular risk profile and reach of LDL targets in diabetic patients type 2 attended in the diabetes ambulatory**

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**Introduction:** Identifying asymptomatic patients with increased cardiovascular risk (CVR) is fundamental for the implementation of therapeutic strategies aiming to more rigid risk factor control goals.

**Objectives:** To evaluate the CVR profile and the achievement of LDLc targets in type 2 diabetic patients treated at diabetes outpatient clinic.

**Methods:** Cross-sectional study with electronic data collection of patients treated in July 2017 for the following variables: age, sex, duration of diabetes, total cholesterol, HDLc, HbA1C systolic BP, history of

hypertension treatment, smoking, coronary artery disease, stroke, peripheral vascular disease, atrial fibrillation (AF) and statin use and doses. The Framingham calculator (Wilson 2008) was used to evaluate CVR in patients aged 30-74 years and without history of previous events. The consensus of the AACE 2017 was used as a reference to define the lipid goals according to the degree of risk. The percentage of patients that were within the proposed goal were evaluated. Data were described as mean  $\pm$  SD (min-max) and frequencies.

**Results:** 127 patients were evaluated, of which 33 (26%) had previous history of at least one cardiovascular event. The mean age was  $62.9 \pm 10.9$  (28-91) years, and the duration of diabetes was  $16.5 \pm 10.7$  (1-56) years. The following frequencies were found for the evaluated variables: female 61.4%, hypertension 93.7%, AF 1.6%, smoking 9.4%. The CVR was calculated in 84 patients: 61.9% were classified as high risk, 29.8% as intermediate risk and 8.3% as low risk. The percentage of patients with established cardiovascular disease (CVD) who presented LDLc below 70 mg/dl, according to the goal, was only 39.4%. Among the patients without CVD, 55.3% presented LDL-c below 100 mg/dl according to the goal. Statin use was observed in 109 (85.8%) and none of the patients were using the maximum dose.

**Conclusion:** Although the patients' profile was high in CVR, the proportion with LDL-c outside the goals established by the AACE consensus was high, pointing to the need for improvement in statin therapy. The prescription of more potent statins and in higher doses is often hampered by the financial difficulties of the patients attended in public clinics.

#### A54

##### Case report: rare form of diabetes mellitus type 1 in adolescent patient

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**Background:** Being a rare form of presentation of Diabetes Mellitus type 1 (DM1), Mauriac Syndrome (MS) is characterized by the symptomatology of hepatomegaly, growth retardation and diabetes with poor metabolic control of long evolution. It is reversible with improved metabolic control of the patient.

**Case presentation:** A 15-year-old male patient, during the 6-year diagnosis of DM1, presented a history of poor glycemic control, growth retardation and development, hepatomegaly, and dyslipidemia. Makes continuous use of insulin, enalapril, simvastatin and gabapentin, for neuropathic pain. Also presents Arterial Hypertension with investigation of normal secondary causes (renal ultrasound (US) and normal metanephrines). During an investigation of low weight gain with occasional abdominal pain, he had no antibodies or clinical history compatible with celiac disease. Laboratory screening revealed a significant increase in transaminases, with viral and autoimmune markers that did not justify liver injury. US liver suggestive of enlarged liver with diffusely high density. Normal proteins lectrophoresis. In spite of 3 years of insulin therapy, his weight-height curve was reduced to values lower than the percentile 3, which is maintained until now. No delay in psychomotor development, with good school performance. Tanner G1P1 classification (pubertal delay). Last hospitalization at age 14 was scheduled to evaluate adherence to treatment and dose adjustment, as A1c reached 18.2%. After this measure, with the intervention of a team composed of endocrinologists, psychologist, social worker, nurses and educators in diabetes, it returns to adequate metabolic control and after one year there was a reduction of A1c to 7.1%. Patient is now conscientious and adherent to treatment and with good response in weight gain and height (Fig. 1).

Figure 1 - Growth Chart



Informed consent to publish has been obtained from the parent of this patient.

**Fig. 1** See text for description

**Conclusions:** The diagnosis of MS is clinical and should be early. The prognosis is reserved, although the treatment is the same as in the traditional forms of DM1. Hepatic growth is a sign of inadequate glycemic control, in the exclusion of other secondary causes. Adequate patient therapy accelerated the growth curve and pubertal development. MS is a rare complication of poorly controlled DM1, the attending physician should be attentive to perform differential diagnoses, and thus, be able to perform timely interventions.

Informed consent to publish has been obtained from the parent of this patient.

#### A55

##### Case report: cardiovascular autonomic neuropathy associated with type 1 diabetes—evolution after myocardial revascularization

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**Case report:** Female patient, 43 years old, DM1 for 35 years, compensated hypothyroidism, grade 1 central obesity, SOAS, former smoker (aged > 20 years), current treatment (CIIS) and OAD (metformin; iSGT2, offlabel), mean HbA1c 8.0%. MI positive Family history (father died at age of 44 years). Painful diabetic polyneuropathy (PDPN) screening was absent and Installed cardiac autonomic neuropathy (ICAN) presente with high heart rate (HR, 95 bpm). Beta-blocker and thioctic acid HR 600 mg were initiated and she was referred to a cardiologista. Angiotomography could not be performed due to bronchospasm and further catheterization showed severe lesion in anterior descending artery (AD) and pharmacological stent was implanted. Reevaluation 8 months later showed CAN change to Incipient rather than Installed and HR reduced to 75 bpm.

**Discussion:** CAN is a DM frequent complication and considered a cardiovascular risk marker due to its association with silent infarctions, arrhythmias, sudden death. CAN is evaluated through cardiovascular autonomic reflex tests (CARTS) and cardiac frequency spectral analysis (CARTS and HR; Ewing DJ, 1986), respectively. CAN: Absent (0-1 abnormal test: sensitivity 99%); Incipient (2 abnormal tests: specificity 98%); Installed (3 abnormal tests, specificity 99%); Severe (3 abnormal tests and systolic hypotension). CARTS are non-invasive, have high sensitivity, specificity, reproducibility, easy to perform (time 20-30 min) and are golden standard for CAN. Overt changes indicate 56% mortality in 5 years (Vinik A, 2007). Screening should be performed after 5 year duration of DM1 independently of clinical symptoms (rest tachycardia,

syncope, palpitation or weakness). Patient has never been investigated either for CAN or coronary heart disease.

**Final comments:** CAN is a strong predictor of CVR, early diagnosis and treatment increase survival and quality of life. However, CARTS have not been performed into the endocrinological or cardiologic clinical routine. This poor approach contribute to subdiagnosis, higher risk of sudden death and may explain the lack of studies of CAN following myocardial revascularization.

Informed consent to publish had been obtained from the patient.

#### A56

##### Case report: painful diabetic polyneuropathy and cardiovascular autonomic neuropathy associated with type 1 diabetes—evolution after myocardial revascularization

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**Case presentation:** Female patient, 56 years old, DM1 since 10 years of age, no smoker. Current treatment: insuline glargine + ultra fast acting insulin. Screening: severe diabetic polyneuropathy (DPN) and installed cardiovascular autonomic neuropathy (CAN). Angiotomography and coronary artery calcium score (CAC): diffuse calcification in anterior descending artery (AD), circumflex, marginal and right coronary arteries without possibility of determining stenosis due to intensity of calcification. Immediate catheterization was performed as AD showed 70% occlusion requesting a drug-eluting stent implantation.

**Discussion:** DPN and CAN are frequently associated DM complications. CAN is considered a marker of cardiovascular risk (CVR) and it is associated with silent infarctions, arrhythmias, sudden death. DPN and CAN were evaluated by validated protocols (Abbot C, 2011; Gomes MB, 2012 and Ewing DJ, 1986): Neuropathy Disability Score (NDS), cardiovascular autonomic reflex tests (CARTS) and heart rate, respectively. Painful DPN presente (PDPN) if score of signs  $\geq 3$  and symptoms  $\geq 5$ ; CAN: Absent (0-1 abnormal test: sensitivity 99%); Incipient (2 abnormal tests: specificity 98%); Installed (3 abnormal tests, specificity 99%); Severe (3 abnormal tests and systolic hypotension). CARTS are non-invasive, have good sensitivity, specificity, reproducibility and are easily performed (20-30 min), thus are considered gold standard. Abnormalities indicate 56% mortality in 5 years (Vinik A, 2007) and screening must be performed after 5 years of DM1 diagnosis. Patient had never been investigated for CAN neither for coronary heart disease. Strong relationship between PDPN and CAN as a result of small nervous fiber (pain and autonomic innervation, Testfaye S, 2010). ACCORD STUDY (2010) showed that CAN + DPN were the greatest predictors of cardiovascular death; and DCCT/EDIC (2013) the association of DM duration, age at DM diagnosis and CVR alluding a "metabolic memory" effect which influenced the lower incidence. Finally, Vinik A and Ziegler D (2007) points out CAN as a vector of the CVR.

**Conclusion:** Coexistence of CAN + DPN increases CVR, but are still underdiagnosed and subtreated. CAC with our without scan is not routinely used to screen CVR. The presente case is a clear example of lack of proper approach 2 and reinforces the need of screening, early diagnosis and prompt treatment of cardiovascular complications among DM1 patients.

Informed consent to publish had been obtained from the patient.

#### A57

##### Challenges in the management of type 1 diabetes with suspected hyporeninemic hypoaldosteronism

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**Case presentation:** A 24-year-old male, diagnosed with type 1 diabetes mellitus (DM1) for 12 years, presented progressive of walking difficulties 5 years ago, associated with dizziness, weakness, and tachycardia at rest with hypotension. The patient had a history of poor glycemic control, with no evidence of nephropathy, retinopathy, and serum potassium levels within normal limits. Neuropathy Disability Score (NDS) was carried out, presenting 10 out of 10 points, classified as severe impairment. Because of an extremely significant clinical condition, with no evidence of microvascular compromise, hyporeninemic hypoaldosteronism (HH) was investigated. He was submitted to the posture test, with aldosterone dosage and renin plasma activity, without a significant increase in his values. Subsequently, the patient was exposed to the exogenous ACTH test, with the administration of ACTH 250mcg intravenous and dosages of serum cortisol and aldosterone at times 0', 30', 60'. There was an elevation of serum cortisol to levels above the limit of normality (18 mcg/dL), discarding primary adrenal insufficiency, and aldosterone levels at the lower limit of normal (attached tables). Even tests without confirmation, the use of fludrocortisone 0.2 mg/day was started as a therapeutic test. The patient progressed with an improvement of the blood pressure (BP) and dizziness.

**Discussion:** HH is an uncommon condition, often associated with DM1, and such diagnosis is considered a challenge to the endocrinologist. Pathophysiology is supported by two main factors: reduction of aldosterone and renin production, secondary to autonomic neuropathy of the juxtaglomerular cells. HH has the effect of reducing angiotensin II, leading to hydro electrolytic disorders such as hyperkalemia, as well as BP deregulation. Recent studies showing this association are scarce due to the difficulty in diagnosis and lack of knowledge of this complication.

**Final comments:** The patient described presents an unusual clinical condition, incompatible with a standard laboratory HH picture, which may be justified by the probable autonomic neuropathy, triggered by denervation of the glomerular zone, with subtle elevations in aldosterone levels, without suppression of plasma renin. In conclusion, HH is a group of diseases that are difficult to diagnose and may manifest in atypical forms. Therefore, the dedication of the medical team should be expanded to avoid underdiagnosis of this condition. Informed consent to publish had been obtained from the patient (Fig. 1).

Table 1

Posture Test	Lying	After 2 hours staning
Aldosterone	2.2ng/dL (RV: 1.8 a 23.2ng/dL)	13.0 ng/dL (RV: 2.5 a 39.2ng/dL)
Renin Plasma Activity	0.16ng/ml/h (RV: 0.15 a 2.33ng/ml/h)	0.20ng/ml.h (RV: 0.15 a 2.33/m)

Table 2

Cortrosin Test	Basal	30 minutes	60 minutes
Cortisol	11.5 (RV: 3.7 a 19.4ug/dL)	22.10 (RV: 3.7 a 19.4ug/dL)	24.4 (RV: 3.7 a 19.4ug/dL)
Aldosterone	1.6 (RV: 1.8 a 23.2ng/dL)	3.5 (RV: 1.8 a 23.2ng/dL)	3.4 (RV: 1.8 a 23.2ng/dL)

**Fig. 1** See text for description

#### A58

##### Changes in intestinal ttrs gene expression after 3 months of roux-en-y gastric bypass (RYGB) in type 2 diabetes mellitus (T2DM) obese patients

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**Background:** Toll-like receptors (TLRs) are immune receptors involved in inflammation and are mostly activated by fatty acids and endotoxins. TLRs are present in inflammatory states such as obesity and metabolic syndrome. TLR4 and TLR7 receptors, for example, have been associated with chronic inflammation, impaired immune function and type 1 and type 2 diabetes mellitus (T2DM), while TLR10 is an anti-inflammatory pattern recognition receptor. Following Roux-en-Y Gastric Bypass (RYGB), patients may present changes in intestinal TLRs gene expression, decreased inflammation, and rapid improvement in glycemic control.

**Objective:** Examine selected TLRs in intestinal tissue within 3 months after RYGB.

**Methods:** Intestinal biopsies (duodenum, jejunum and ileum) were obtained from 20 obese women with T2DM (age,  $46.9 \pm 6.2$  years, body mass index [BMI],  $46.5 \pm 5.3$  kg/m<sup>2</sup>) before and 3 months after RYGB (BMI,  $38.2 \pm 4.2$  kg/m<sup>2</sup>), and submitted to transcriptomic analysis by microarray technique and RT-qPCR. Markers of glycaemic homeostasis were measured in the blood. After 1 year of RYGB, patients were classified as responsive (R) and nonresponsive (NR) to total remission of type T2DM.

**Results:** Three months after RYGB, TLR-encoding gene expression had significantly reduced TLR4 and TLR7 in the jejunum of patients responsive to remission of T2DM ( $p < 0.05$ ).

**Conclusion:** RYGB and weight loss induce change in intestinal expression of TLRs mainly in the jejunum of R group. Modulation of TLRs in the gastrointestinal tract could mediate mechanisms of attachment to remission of T2DM after RYGB.

#### A59

##### Characterization of care of patients with foot diabetic in a public ambulatory in Sao Paulo's interior

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**Introduction:** Diabetic foot is considered a complication of diabetes mellitus and it is the major cause of lower limb amputations. Avoiding its appearance, there is a need for guidelines on preventive measures and self-care.

**Objective:** Performing the matriciament of patients' wounds with diabetic foot, propose therapeutic actions to treat the lesions and emphasize the importance of self-care and prevention of complications related to diabetic foot.

**Methods:** Data were collected from February 2016 to July 2017, through an evaluation form of wounds. This is a descriptive and quantitative study with a sample of 24 patients who were followed up in nursing consultations.

**Results:** Data revealed a prevalence of males, aged average 59, predominance of type 2 diabetes, with neuropathic etiology and mean disease duration of 16 years. It was verified that 30% of patients presented amputation, five had osteomyelitis and three had progressed to amputation. Regard to the use of shoes, it was observed the use of inappropriate footwear in all patients' therapeutic for 71% of the cases. Among 24 patients, 79% participated in multidisciplinary guidance on foot care. 17% of patients are under treatment, 46% wound healing, 21% were against referral to the primary service and 17% were referred to tertiary service, due to the complexity of the lesion.

**Conclusion:** This study revealed the need for educational, mainly in relation to preventive measures and, therefore, required education and self-care in order to prevent complications. Nurses play a key role in the evaluation and prescription of dressing, guidance and injury prevention. A multi professional action may potentiate as guidelines and increase adherence to treatment.

#### A60

##### Circulating microparticles are associated with type 2 diabetes mellitus and correlate with fasting glucose levels

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**Introduction:** Type 2 diabetes mellitus (T2DM) is associated with a chronic and subclinical inflammatory state. Microparticles (MPs) are extracellular microvesicles released during apoptosis and cellular activation. MPs express pro-coagulant and -inflammatory activities, contributing to endothelial dysfunction observed in T2DM.

**Objective:** This study aimed to evaluate the circulating MPs profile in T2DM patients and to correlate it with fasting glucose levels in this group.

**Methods:** Sixty-nine subjects were selected, of whom 39 patients with clinical and laboratorial diagnosis of T2DM and diabetic kidney disease, and 30 gender and body mass index -matched non-diabetic control. Circulating MPs from platelets (PMPs; CD41 +), leukocytes (LMPs; CD45 +), endothelial cells (EMPs; CD51/61 +), and that express tissue factor (TFMPs; CD142 +) were measured by flow cytometry. Fasting glucose levels were measured in serum samples, after 8 h of fasting, using a commercial kit by enzyme-colorimetric method. Statistical analysis were performed with SPSS (version 17.0) using Mann-Whitney and Spearman's correlation tests. The data were presented as "median (interquartile range)". A pvalue < 0.05 was considered statistically significant. This study was approved by Federal University of Minas Gerais Ethical Committee and an informed consent was obtained from the individuals.

**Results:** We observed higher total levels of circulating MPs in T2DM [153.40 (142.15) MPs/μL] than in control group [85.33 (76.08) MPs/μL;  $p < 0.0001$ ]. Moreover, higher levels of circulating PMPs [T2DM 167.53 (206.73) MPs/μL; control 113.83 (97.05) MPs/μL], LMPs [T2DM 119.13 (86.27) MPs/μL; control 53.80 (44.42) MPs/μL], EMPs [T2DM 157.53 (131.53) MPs/μL; control 86.50 (71.65) MPs/μL], and TFMPs [T2DM 169.93 (213.47) MPs/μL; control 99.60 (87.53) MPs/μL] were observed in T2DM patients when compared with control subjects ( $p < 0.0001$  for all). Considering all the subjects, fasting glucose levels showed a significant positive correlation with PMPs ( $r = 0.286$ ,  $p = 0.017$ ), LMPs ( $r = 0.549$ ,  $p < 0.0001$ ), EMPs ( $r = 0.462$ ,  $p < 0.0001$ ), and TFMPs ( $r = 0.343$ ,  $p = 0.004$ ) levels.

**Conclusion:** These results suggested that higher circulating MPs levels are associated with T2DM and they correlate with glycemic levels. Therefore, MPs are promising biomarkers for assessment of inflammatory and pro-coagulant status in T2DM patients with diabetic kidney disease.

#### A61

##### Clinical and epidemiological profile of patients with post-transplant diabetes mellitus of liver in a center of reference of the state of Ceará

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**Introduction:** Liver transplantation is becoming one of the most important therapeutic options in the liver failure treatment. One of the complications of the transplantation is the developing of post-transplant

diabetes mellitus (PTDM), due to the presence of multiple risk factors such as the use of immunosuppressive agents that increase the risk of developing PTDM by 74%. PTDM is associated with adverse outcomes such as an increasing mortality, a reduction of graft survival, a risk of sepsis and microvascular complications when compared to patients without PTDM.

**Objective:** To evaluate the clinicoepidemiological profile of patients with PTDM and to identify the potential risk factors for PTDM present in this population.

**Methods:** A cross-sectional, retrospective and descriptive study that occurred in a Hospital in the State of Ceará, Brazil, a national reference in liver transplantation, with patients who were followed up in a specialized center in PTDM between 2009 and 2015. The data were collected from medical charts. Demographic and clinical features were collected, including an evaluation of comorbidities, body mass index (BMI), glycated hemoglobin (HbA1c) and immunosuppressive therapy.

**Results:** From 2009 to 2015, 868 patients underwent liver transplantation, 5.3% (46/868) had diabetes before the transplant. Of those 822 who were not diabetic before surgery, 8.2% (67/822) were diagnosed with PTDM. The average age at diagnosis was  $58.63 \pm 10.5$  years old and 77.8% ( $n = 52$ ) were men. Arterial hypertension was present in 41.8% (28/67), dyslipidemia in 6% (4/67) and overweight/obesity in 65.7% ( $n = 44/67$ ). The glycated hemoglobin at diagnosis was  $7.06 \pm 2.3\%$ . Family history of diabetes was positive in 29.8% (20/67). The immunosuppressive treatment were done with 2 to 3 drugs, mainly tacrolimus, prednisone and mycophenolate mofetil.

**Discussion:** The subjects who developed with PTDM presented risk factors such as mean age greater than 40 years, metabolic syndrome, overweight/obesity, and family history of diabetes. This could suggest that patients who will undergo liver transplantation and present these features should be followed more closely after surgery and should be encouraged to reduce modifiable risk factors prior to surgery, because of the increased risk of developing diabetes. This may be a strategy to prevent PTDM in this population and the adverse outcomes associated with this condition.

## A62

### Clinical and sociodemographic variables associated with chronic complications in diabetic patients type 2 during ambulatory follow-up

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**Introduction:** Type 2 diabetes mellitus (DM2) is one of the main public health problems today, with alarming rates of morbidity and mortality. The production of information on the prevalence and sociodemographic variables associated with complications increases the knowledge about the health of people with DM2 and favors the formulation of feasible policies and strategies for the prevention and treatment of this condition.

**Objectives:** To evaluate the interrelationships between chronic complications and clinical and sociodemographic variables of patients with DM2.

**Materials/Methods:** A cross-sectional study between October and December/2016, based on the medical records of 278 DM2 patients followed up at the Endocrinology Outpatient Clinic. Forty-two patients were excluded from the analysis by incomplete data, totaling 236 patients. The following variables were analyzed: age, gender, weight, height, body mass index (BMI), presence or absence of systemic arterial hypertension (HAS), and the presence of chronic microvascular and macrovascular complications. The data were organized in Excel 2010<sup>®</sup> worksheet and a descriptive analysis was performed.

**Results:** Among Multiple linear regression analysis identified that DM2 correlated positively with age (96% with age > 40 years had DM2,  $r = 0.61$ ,  $p < 0.01$ ), sex (prevalence 64% ( $p < 0.01$ ), BMI (100% of DM2 had BMI > 30 kg/m<sup>2</sup>) and presence of hypertension (84.87%). With regard to complications, 52.56% had some micro or macrovascular complications. There was a reciprocal relationship between hypertension and BMI (76.69% of hypertensive patients had BMI > 25 kg/m<sup>2</sup>, while 77.77% of hypertensive obese patients had hypertension).

**Conclusion:** Our results reinforce the main clinical and sociodemographic variables associated with the phenotype of the metabolic syndrome, which corroborate the development of DM2.

**Acknowledgments:** No funding was obtained from pharmaceutical companies to carry out this study. All authors were involved in the data collection and analysis. **DISCLOSURE:** The authors declare no conflict of interest.

## A63

### Clinical evaluation of methodology based on variability of cardiac frequency for early diagnosis of autonomic neuropathy in individuals with type 1 diabetes

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**Background:** Autonomic neuropathy (AN) is a serious diabetes complication, which affects the autonomic nervous system. This system has the function of controlling the autonomous body's organs, it is sensitive to changes caused by the lack of control of type 1 diabetes mellitus (T1DM) and can cause cardiovascular autonomic neuropathy (CAN). One way to detect AN is by examining the heart rate variability (HRV) that corresponds to fluctuations in the intervals between consecutive heartbeats, using signal processing techniques.

**Objectives:** To evaluate the clinical utility of the method referred to diagnose CAN still in subclinical stage; evaluate its predictive validity as an indicator of prognosis; to determine which set of parameters and clinical characteristics best discriminates between stages of CAN; to evaluate influence on clinical status of individuals who participated in a structured education program (SEP).

**Methods:** In this cohort study, a spectral analysis of HRV was performed through a system that captures ECG signals, and this methodology was refined by comparison with conventional tests O'Brien and BRS for the detection of CAN in individuals with T1DM with different degrees (No CAN, Subclinical CAN and Established CAN). Analysis of clinical and physical examination of peripheral neuropathy (PN) and follow-up of individuals who participated in the SEP.

**Results:** The analysis of these results showed the efficacy of the methodology applied for the early detection of CAN, as well as to discriminate characteristics between the different stages, and determined parameters calculated to identify these groups of individuals. The sample size was 66; the mean age was  $31.35 \pm 9.97$  years; The mean time of DM1 diagnosis was  $16.03 \pm 9.22$  years; The mean HbA1c was  $8.65\% \pm 1.94$  or  $71.05$  mmol/mol  $\pm 21.22$ ; Of the total number of individuals, 25 (37.88%) had previously participated in SEP and 18 (27.27%) had a diagnosis of retinopathy. In the O'Brien test, 16 (24.24%) individuals presented a diagnosis of subclinical CAN and 11 (16.67%) of established CAN, whereas by the HRV test, 35 (53.85%) were diagnosed with subclinical CAN and 12 (18.46%) with established CAN. The HRV parameters HF, LF, SD2, SDNN, RMSSD and TP showed a difference between groups and CSI values for subclinical CAN were higher than for individuals No CAN ( $p < 0.05$ ). SEP participants maintained ideal HbA1c values.

**Conclusion:** It was possible to affirm that the model adopted by the study diagnoses in a simple and efficient way, through some specific parameters, the subclinical CAN in individuals with T1DM with its predictive value and high indices of specificity and sensitivity. In addition, it was understood that SEP has influence on the process of avoiding and/or retarding CAN. It is expected that the study may contribute to scientific, technological and innovation development with emphasis on diabetes, treatment and complications (Fig. 1).

**Table 1:** O'Brien, BRS and VFC test scores, their values and percentages.

AFT Status	Score	Número de indivíduos	(%)
O'Brien Test	No CAN	39	59,09
	Subclinical CAN	16	24,24
	Established CAN	11	16,67
BRS Status	Normal	8	17,39
	Anormal	38	82,61
NAC Status	No CAN	19	27,69
	Subclinical CAN	35	53,85
	Established CAN	12	18,46

**Fig. 1** See text for description

**A64**

**Clinical evolution of patients with type 1 diabetes mellitus followed in a secondary care reference center of Minas Gerais**

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**Background:** Diabetes mellitus is a serious public health problem worldwide. Because it is a chronic condition of high prevalence, regular follow-up is important to prevent complications due to the disease. **Objective:** To evaluate the clinical evolution of patients with type 1 diabetes mellitus (T1DM) attended in a secondary care reference center of Minas Gerais.

**Methods:** This is a longitudinal study with 174 people with T1DM followed up by a multidisciplinary team, all of them referred from primary care from 2010 to 2015. Clinical evolution was based on annual mean levels of glycated hemoglobin (A1c) and LDL cholesterol. Paired T-test and McNemar test were used for the annual comparisons of A1c and LDL-c. In every test a significance level of less than 5% was considered.

**Results:** The sample was constituted by a majority of men (55.1%), single (60.9%), self-referred as brown (47.1%), formal workers (47.1%), with full high school or college education (47.2%), income between 1 and 2 minimum wages (69.6%), average age of 34 ± 14 years old, having diabetes for 15.35 ± 10.3 years and 49.5% of people living in Belo Horizonte. All patients were undergoing intensive treatment of diabetes, with 10 patients (5.7%) in a continuous system of insulin infusion. Of those in multiple daily applications, the majority were in NPH use (61.5%), followed by glargine (32.8%), with 83.3% in ultrafast insulin use. Less than half of the study group, 87 subjects (47.1%), used statins. The study showed that 63.21% of patients (n = 110) started the accomplishment at the health service with A1c values above 8%, of which 47 (27.01%) were above 10%. At the end of the first year of follow-up, that percentage was reduced to 49.99%, with the higher reduction in the ones with A1c levels over 9% (Table 1). In this period, there was a significant reduction in the A1c means (9.01 ± 2.46 in 2010 and 8.2 ± 1.74 in 2011; p < 0.001), remaining unchanged in the following years, but with a concentration of patients in the category of 7–8%, below the national average. Regarding LDL-c, it was observed a significant reduction throughout the follow-up period (p < 0.005) (Table 2).

**Conclusion:** The multidisciplinary assistance to patients with T1DM in a secondary care service has contributed to the improvement of metabolic parameters since the first year of follow-up (Fig. 1).

**Table 1 - Evolution of glycated hemoglobin during the first 5 years of follow-up in the service.**

YEAR	Initial	1	2	3	4	5
n	174	144	140	130	106	94
A1c (%)	9.01±2.46	8.2±1.74	8.19±1.85	8.29±1.6	8.17±1.46	8.1±1.55
Maximum	4.7	4.2	5.41	5.9	5.4	5.3
Minimum	35.5	34.4	35.4	35	34.05	33.5
<7%	39 (37.24)	89 (27.08)	92 (27.7)	25 (19.23)	9 (8.54)	29 (31.21)
7-8%	34 (39.54)	33 (27.81)	35 (33.64)	43 (33.07)	38 (35.18)	29 (30.85)
8-9%	29 (34.66)	35 (24.36)	31 (28.96)	32 (24.61)	24 (22.22)	29 (30.85)
9-10%	34 (31.54)	36 (31.31)	38 (32.36)	35 (31.53)	34 (32.96)	9 (9.51)
>10%	47 (27.9)	24 (24.36)	23 (23.5)	15 (11.53)	12 (11.31)	7 (7.4)

A1c: glycated hemoglobin.

**Table 2 - Evolution of LDL cholesterol during the first 5 years of follow-up in the health care service.**

YEAR	1	2	3	4	5
n	155	127	117	93	80
LDL (mg/dl)	111.43 ± 35.87	105.15 ± 32.87	101.79 ± 31.4	101.23 ± 32.19	99.77 ± 29.65
Maximum	29	56	48	38	49.8
Minimum	268	257	232	220	252

**Ethics Approval**

The study was approved by Santa Casa de Belo Horizonte Institution's Ethics Board, approval number 1.064.985 and written consent was obtained from all participants.

**Fig. 1** See text for description

**A65**

**Clinical impact of treatment intensification in patients with T2D uncontrolled with basal insulin**

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Despite the availability of several antidiabetes agents, treatment intensification (TI) may not be promptly implemented in cases of sub-optimal glycemic control. This study compared clinical outcomes for patients (pts) with T2D uncontrolled after ≥ 6 months of treatment with basal insulin (BI) who underwent TI or no TI (NTI). TI included adding a GLP-1 receptor agonist (RA), bolus insulin or SGLT2 inhibitor, switching to premixed insulin or increasing BI dose. Data on eligible pts undergoing TI within 6 months of the first A1c ≥ 7.0% measure (index date) were collected from the Optum administrative claims database between January 1, 2009 and August 31, 2015. A1c change from the index date and hypoglycemia incidence were determined 12 months after TI (randomly selected date for the NTI cohort). Bivariate comparisons were made between the two cohorts. A total of 10,425/16,140 (65%) adults uncontrolled with BI underwent TI. Pts in the TI cohort were slightly younger than in the NTI cohort (61 vs. 62 years) and had higher index A1c (8.94% vs. 8.60%; P < 0.001). A greater A1c reduction (– 0.30% vs. – 0.04%; P < 0.001) and higher hypoglycemia rate (6.94% vs. 5.76%; P = 0.004) were seen for TI pts at follow-up. Pts adding a GLP-1 RA and bolus insulin showed greater A1c changes vs. those increasing BI dose (GLP-1 RA, – 0.62%; bolus insulin, – 0.61%; BI, – 0.23%; P ≤ 0.002 for both agents vs. BI), and severe hypoglycemia was less frequent with GLP-1 RA-containing vs. insulin-only regimens (GLP-1 RA, 0.43%; bolus insulin, 3.13%; BI, 2.52%; P < 0.05 for GLP-1 RA vs. insulin). Clinical inertia is still widespread in clinical practice. Timely TI improves A1c levels but is associated with more frequent hypoglycemia, primarily driven by basal-bolus insulin and BI titration. Injectable agents are more effective than BI dose increases for pts uncontrolled after ≥ 6 months on BI; GLP-1 RAs show the lowest hypoglycemia rate. Our data highlight a need for new and improved agents that effectively manage glycemia while reducing hypoglycemia risk. This is an ENCORE abstract previously presented at ADA2017. Funding and editorial support provided by Sanofi.

**A66****Clinical inertia in primary health care: can a game change the game?**

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**Background:** Only 24% of patients with diabetes mellitus (DM) present good glycemic control. This is partly due to clinical inertia (failure to adjust therapy when needed), especially related to insulin initiation.

**Objective:** To assess if playing a digital serious game for medical education on insulin therapy (InsuOnline) is associated with changes in the practice of primary care physicians (PCPs) related to insulin initiation.

**Methods:** A noncontrolled experimental study was performed with PCPs working in primary healthcare units (UBSs) in Londrina and Cambé (Paraná). All of them played InsuOnline. We identified the patients for whom those PCPs initiated insulin in their UBSs in 2 time points: up to 6 months before, and up to 6 months after playing the game. Then we collected from their charts: demographic data, time between the first indication for insulin and the first prescription of insulin, and glycemic control indicators. Data were stored and analyzed in Epi-Info 7. Research protocol was previously approved by an institutional review board and local health authorities.

**Results:** 23 PCPs were included (4 from Cambé and 19 from Londrina). They initiated insulin in 56 patients in the period (22 before, and 34 after the game;  $P = 0.09$ ). Patients were most female (32/56), with mean age  $59 \pm 12$ . Mean duration of DM when insulin was initiated was  $5.4 \pm 5.3$  years. Time between the first indication for insulin and the first prescription of insulin by the PCP was 70 days (median; IQ 0–393). When insulin was initiated, mean A1c was  $10.2 \pm 1.8\%$  and mean plasma glucose was  $268 \pm 89$  mg/dL. After insulin initiation, A1c and glucose decreased to  $9 \pm 1.5\%$  and  $193 \pm 72$  mg/dL, respectively; 59% of patients presented improved glycemic control after insulin initiation. No difference was found when the time points (before and after the game) were compared. The small sample and the lack of data in charts were limitations to this study. It is possible that additional interventions are required to improve the actual care of DM patients in primary health care.

**Conclusion:** There was a nonsignificant trend to more frequent insulin initiation by PCPs after playing the game InsuOnline.

**A67****Clinical perspectives from the begin and edition longer-acting insulin programs: trial-level meta-analyses outcomes with either degludec (IDEG) or glargine 300 µ/ml (GLA-300) vs. glargine 100 µ/ml (GLA-100) in T2DM**

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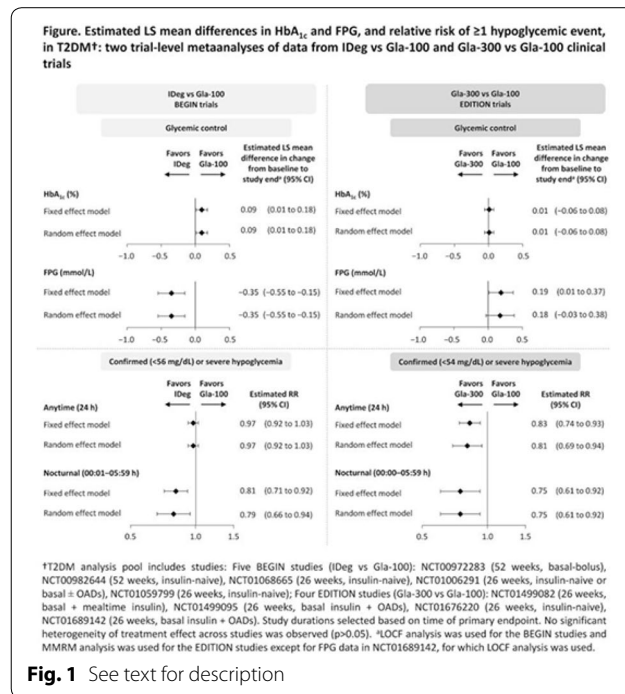
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Efficacy and safety of IDeg and Gla-300 were compared with Gla-100 in the BEGIN and EDITION programs, respectively. HbA<sub>1c</sub>, FPG and hypoglycemia incidence with IDeg or Gla-300 vs Gla-100 were explored in 2 trial-level meta-analyses of clinical trials in T2DM (Fig). FPG reduction was significantly more pronounced with IDeg vs Gla-100 but HbA<sub>1c</sub> reduction was significantly greater for Gla-100. HbA<sub>1c</sub> reduction was comparable with Gla-300 and Gla-100 whereas FPG reduction was significantly greater with Gla-100 in the fixed but not random effect model. Risk of  $\geq 1$  confirmed ( $< 56$  mg/dL) or severe hypoglycemic event was lower with IDeg vs Gla-100 at night (00:01-05:59 h) but comparable at any time (24 h). Risk of  $\geq 1$  confirmed ( $< 54$  mg/dL)

or severe hypoglycemic event was lower with Gla-300 vs Gla-100 at night (00:00–05:59 h) and also at any time (24 h). Risk of  $\geq 1$  severe hypoglycemic event was comparable with IDeg or Gla-300 vs Gla-100. Summary, in trial-level meta-analyses in T2DM, Gla-100 reduced HbA<sub>1c</sub> more than IDeg despite IDeg having a greater FPG-lowering effect. Hypoglycemia risk was lower with IDeg vs Gla-100 for nocturnal but not anytime events. Gla-300 provided comparable glycemic control to Gla-100 with lower risk of anytime and nocturnal hypoglycemia. Head-to-head trials of IDeg vs Gla-300 are needed. Study codes: NCT01499082, NCT01499095, NCT01676220. This is an ENCORE abstract previously presented at ADA2016. Funding and editorial support provided by Sanofi (Fig. 1).

**A68****Clinical profile of patients with diabetes mellitus and liver transplantation and results after a multidisciplinary team intervention**

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**Background and aims:** Over the years, survival after liver transplantation (LT) has increased and metabolic complications are becoming more common, contributing to patients' morbidity and mortality. The objectives of this study were to describe a population of patients with hepatic transplantation and diabetes mellitus (DM), evaluate the frequency of metabolic complications and assess the impact of a multidisciplinary team on DM management.

**Materials and Methods:** This was a retrospective study involving interview and medical record analysis of 46 consecutive patients followed at the Diabetes Mellitus and Liver Transplantation Unit of a tertiary university hospital, all evaluated by a multidisciplinary team. In twenty-nine of these patients anthropometric measures of nutritional status were evaluated including body mass index (BMI), triceps skinfold (TSF), arm circumference (AC), arm muscle circumference (AMC) and fat area (FA).

**Results:** Of all patients, 76.1% were men, with median age of 60 years old (IQR 56–65 years) and LT time of 5 years (0.6–9 years). The most frequent etiology of cirrhosis leading to LT was hepatitis C virus (69.6%), followed by alcohol abuse (19.6%). Hypertension, hypercholesterolemia, hypertriglyceridemia, alcoholism and smoking were present in 47.8, 34.8, 23.9, 34.8 and 30.4% of the patients, respectively. Regarding the evaluation of nutritional status, 11 patients (37.9%) were classified as overweight according to BMI (median 26.27 kg/m<sup>2</sup>) and 12 (41.2%) according to the TSF. Nineteen (66.5%), 21 (72.4%) and 13 (44.8%) patients were classified as eutrophic according to AC, AMC, and FA, respectively. The diagnosis of DM was made after LT in 65.2% of cases, with a median time of 1.5 years (0.5–5.5). The most frequent immunosuppressant in use were tacrolimus (71.1%) and mycophenolate (48.9%). The median HbA1c and weight before and after intervention of the multidisciplinary team were, respectively, 7.6% (5.7%–8.8%) vs. 6.5% (5.7%–7.7%);  $p = 0.022$  and 70.5 kg (64.7–82.0 kg) vs 71.6 kg (65.0–85.0 kg);  $p = 0.18$ .

**Conclusions:** There was a high frequency hepatitis C virus and users of tacrolimus in patients with DM. Hypertension and dyslipidemia are common in transplanted patients with DM. Intervention of the multidisciplinary team resulted in a significant improvement in HbA1c without significant weight gain. This study showed that a multidisciplinary team approach in the management of DM in LT patients is helpful.

#### A69

##### Clinical, demographic and laboratorial parameters in a population of type 1 diabetic patients with metabolic syndrome

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**Introduction:** Obesity has become a concern worldwide, even in patients with type 1 diabetes. It has been associated with musculoskeletal disorders, cancer and metabolic syndrome (MS), which is known to enhance cardiovascular risk.

**Objective:** To investigate the prevalence of MS in a type 1 diabetic population and to determine which parameters are associated with this diagnosis.

**Methods:** We evaluated 1,760 patients from all geographical regions of Brazil, in this cross-sectional multicenter study. Patients were classified according to the International Diabetes Federation criteria for metabolic syndrome (MS).

**Results:** From a total of 1678 (95.3%) patients with complete data, 28.4% ( $n = 477$ ) were classified as having MS. Mean age ( $35.3 \pm 11.9$  vs.  $28.0 \pm 11.4$ ) and diabetes duration ( $18.7 \pm 9.8$  vs.  $14.1 \pm 8.8$ ) were higher and use of metformin (25.4 vs. 7.1%), statin (34.4 vs. 16.7%), fibrate (1.7 vs. 0.4%) and renin-angiotensin system inhibitor (44.4 vs. 20.6%) was more frequent in patients with MS in comparison to those without MS ( $p < 0.05$  for all the analysis). There was no difference between the two groups regarding HbA1c levels ( $8.9 \pm 1.9$  vs.  $9.0 \pm 2.2$ ). Female gender was also more prevalent in the group with MS (68.6 vs 50.0%), as well as family history for type 2 diabetes (33.8 vs 21.9%) and obesity (29.6 vs. 21.2%),  $p < 0.001$  for all the analysis. Patients with MS also showed significantly higher levels of ALT, AST, C-reactive protein and uric acid.

**Conclusions:** MS affects approximately one-third of patients with type 1 diabetes. Female patients, with higher disease duration, higher age, positive family history of type 2 diabetes and/or obesity should bring attention to the risk of MS. Patients with MS exhibit higher levels of ALT, AST, C-reactive protein and uric acid, which might be related to an increase cardiovascular risk and also to an increase risk of non-alcoholic liver disease. Further studies are necessary to determine which complications are more frequent in type 1 diabetic patients with MS and how these patients should be managed.

#### A70

##### Combination of behavioral strategies to improve adherence to oral antidiabetics: a randomized controlled trial

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**Background:** Through psychosocial theories such as the Theory of Planned Behavior (TPB), it becomes possible to apply theoretical models with a view to improving the adherence of patients with T2DM to oral antidiabetics and, consequently, to improve glycemic control.

**Aim:** The aim of this study was to evaluate the effect of the combination of the intervention strategies “Action Planning” and “Coping Planning” on the medication adherence of oral antidiabetics among patients with T2DM.

**Methods:** A randomized clinical trial involving outpatients with T2DM attended in a primary service care in Brazil was conducted. At the baseline, participants were randomized into two groups (intervention—IG and control—CG) and were followed for a 15-week period. The IG received a combination of strategies to promote adherence to oral antidiabetics based on face-to-face meetings and telephone calls. The CG received usual care from the health service. Drug adherence behavior, Global Adherence assessment and Glycated hemoglobin (HbA1c) were evaluated as primary outcomes. Generalized estimating equations models were applied to compare groups throughout the follow-up.

**Results:** Of the 90 participants, 88 completed the follow-up (IG = 44, CG = 44). The regression analysis showed better scores for the adherence behavior ( $p = 0.028$ ), global adherence ( $p < 0.0001$ ) and percentage of adherence ( $p < 0.0001$ ) for IG when compared to CG. At follow-up, it was evidenced that the chance of IG being more adherent corresponds to 18.31 times the CG chance (CI 95%: 4.58–73.10,  $p < 0.001$ ).

**Conclusion:** The findings of the present study allow us to conclude that the combination of behavioral strategies was effective in improving drug adherence behavior, promoting compliance to oral antidiabetic drugs and reducing HbA1c levels. **Keywords:** Diabetes Mellitus, Type 2; Hypoglycemic Agents; Medication Adherence; Nursing; Clinical Trial registration: Brazilian Registry of Clinical Trials (RBR-439f77). **Consent to publish:** Informed consent to publish has been obtained from this patient.

**Ethics approval:** The study was approved by the University of Campinas’ Ethics Board, approval number 1.278.099/2016, 1.408.883/2016 and 1.528.738/2016 and conducted according to the recommendations of the Declaration of Helsinki.

#### A71

##### Comparable glycemic control, greater weight loss, and lower hypoglycemia with once weekly dulaglutide versus insulin glargine, both combined with lispro, in type 2 diabetes and moderate to severe chronic kidney disease (AWARD-7)

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A71**



**Introduction/objective:** The objective was to demonstrate dulaglutide (DU) noninferiority for HbA1c change after 26 weeks.

**Methods:** This phase 3 study compared once weekly DU to titrated daily insulin glargine, both combined with insulin lispro, in people with type 2 diabetes (T2D) and chronic kidney disease (CKD) stages 3–4. Participants were randomized (1:1:1) to DU 1.5 mg or DU 0.75 mg or titrated insulin glargine.

**Results:** Baseline characteristics (N = 576) included: [mean ± SD] age 64.6 ± 8.6 years, HbA1c 8.6 ± 1.0%, eGFR 38.3 ± 12.8 mL/min/1.73m<sup>2</sup>, BMI 32.5 ± 5.2 kg/m<sup>2</sup>, daily insulin dose 58.2 ± 31.8 U. DU was non-inferior to insulin glargine for HbA1c change (table). Body weight decreased with DU, whereas it increased with insulin glargine. The hypoglycemia rate (≤ 70 mg/dL) was lower for DU 1.5 mg and 0.75 mg vs insulin glargine (5.5, 7.8 and 17.1 events/participant/year; p < 0.001). Nausea, vomiting and diarrhea were more common with DU 1.5 mg (19.8, 12.0, 15.6%) and DU 0.75 mg (11.1, 5.8, 13.7%) vs insulin glargine (2.6, 3.1, 3.1%).

**Conclusions:** DU produced comparable glycemic control, greater weight loss, and lower hypoglycemia rate vs insulin glargine in people with T2D and CKD stage 3–4 (Fig. 1).

Primary Endpoint (26 wk, mITT population (safety population for weight))	DU 1.5 mg (N=183)	DU 0.75 mg (N=180)	Insulin Glargine (N=186)
HbA1c change, % (primary)	-1.2(0.1)***	-1.1(0.1)***	-1.1(0.1)**
Percentage of pt with HbA1c<7%/HbA1c<8%	37.5 / 78.3	31.7 / 72.6	34.6 / 75.3
Weight change, kg	-2.8 (0.4)**	-2.0 (0.4)**	1.1 (0.3)*

Data are reported as LSM (SE) unless otherwise indicated; \*, \*\* multiplicity adjusted 1-sided p<0.001 for noninferiority versus insulin glargine with a 0.4% margin or 0.3% margin, respectively; \* 2-sided p<0.05 and \*\* 2-sided p<0.001 change from baseline; \*\* 2-sided p<0.001 versus insulin glargine. Abbreviations: BMI=body mass index; CI=confidence interval; eGFR=estimated glomerular filtration rate (CKD-EPI creatinine equation); mITT=modified intent-to-treat; LSM=least squares mean; SE = standard error; pt =participant(s)

**Fig. 1** See text for description

## A72

### Comparison of different intensities physical exercise on capillary glucose of type 2 diabetics

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**Introduction:** Physical exercise has been advocated as a beneficial activity in the treatment of diabetes mellitus, improving glycemic control, contributing to weight loss and improving quality of life.

**Objective:** To compare different physical exercise intensities on capillary glycemia of type 2 diabetics.

**Method:** The study included 19 type 2 diabetics, of both sexes, with a mean age of 65 years. They were divided into two training groups according to intensity, moderate intensity training (n = 10) and high intensity training (n = 09). They performed the training three times a week in the morning, totaling 18 training sessions. The capillary glycemia was collected from diabetics before and after each training session, using glucoside. The training protocol was composed of aerobic and resistance training. For statistical analysis, the Wilcoxon test and the Kruskal-Wallis non-parametric test were used, adopting a significance level of p < 0.05.

**Results:** The frequency of diabetics in training was 65%. A significant decrease in glycemia in moderate intensity training (182.8 mg/dL ± 41.5 mg/dL vs. 139.2 mg/dL ± 47.2 mg/dL p = 0.00) was observed and in training (169.7 mg/dL ± 43.8 mg/dL vs. 129.2 mg/dL ± 38.9 mg/dL p = 0.00).

**Conclusion:** The training of different intensities, moderate and high intensity, were effective in reducing capillary glycemia of type 2 diabetics, but in the intergroup evaluation there was no significant difference. Keywords

## A73

### Comparative analysis between 2 studies conducted in a public health care center with 10-year interval regarding the selfblood glucose monitoring habits and level of understanding in a population of type 1 diabetic patients

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**Introduction:** Self-monitoring blood glucose (SMBG) is essential for proper treatment of Type 1 Diabetes(DM1). It requires knowledge and skills to understand the tests results and make proper adjustments of the therapy. Therefore, educating the patient with diabetes to use the method has been a constant concern since the regulation of Federal Law No. 11.347, which conditioned patient education to the distribution of glucometers and supplies for the treatment of DM1. In 2007 we evaluated the ability of our patients to use SMBG and adjust the treatment, in order to direct educational actions. After 10 years of the program on a public health care setting, we evaluated another group of patients in our service.

**Objectives:** To compare the abilities of DM1 patient to use SMBG data to adjust their treatment at the beginning of the program and after 10 years of its implementation.

**Methods:** A comparative study between the data from the evaluation done in 2007 and 2017 at the same outpatient referral center about the knowledge of DM1 patients on SMBG. For statistical analysis Epi-Info version 3.5.2 was used.

**Results:** In 2006, we evaluated 108 DM1 patients, with a mean age of 16.6 years, 59% female, mean disease time of 6.6 years. In 2017: 95 DM1 patients, mean age: 17.03 years, 60.22% female, 40.22% with diabetes > 1 year and ≤ 5 years. In 2007 we observed that 41% monitored blood glucose 1x/day and only 11% ≥ 4x/day. Currently, 48.81% monitor ≥ 4x/day and only 2.38% 1x/day. Regarding the understanding of the test results, in 2007, 88.9% believed they knew the glycemic target, and of these 82.4% correctly answered the fasting value and 57.4% postprandial. In 2017, 91.4% answered to be aware of the glycemic target, of these, 80.0% correctly answered the fasting target and 47.37% the postprandial target. The test result was used to adjust treatment by 54.6% of the patients who monitored blood glucose levels in 2007, and currently only 65.22% of the users self-adjust the dose based on tests result.

**Conclusion:** We observed that in our current scenario, where the availability of supplies for SMBG is improving, our patients are monitoring more frequently throughout the day, and although we see improvement in patient skills on interpreting the test results, we still need to focus on the development of an educational program that promotes patient's empowerment to obtain the full benefit of the procedure.

## A74

### Comparison between methods for evaluation of renal function among diabetic patients

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**Introduction:** Chronic kidney disease (CKD) consists of progressive and irreversible renal damage. According to the Brazilian Society of Nephrology, Diabetes Mellitus (MD) is the leading cause of kidney

failure in the world. The best way to measure renal function is glomerular filtration rate (GFR). Currently, to calculate this, we use 24-h urine creatinine clearance (CrCl), and some formulas that estimate it: Cockcroft-Gault (CG), MDRD and CKDEPI.

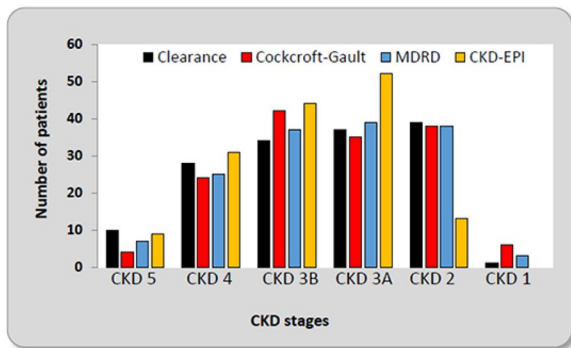
**Objectives:** The main objective is to perform a comparative analysis between the formulas and the creatinine clearance in the diabetic population, in order to determine between the different groups the closest approach to creatinine clearance in the 24-h urine.

**Methods:** It represents a cross-sectional observational study using a population sample of 149 type 2 diabetic patients treated at the nephrology outpatient clinic during 2014 and 2015. Patients were stratified by sex, age, and insulin use. The data were analyzed statistically with the aid of the SPSS and Bioestat program. The parameters of the descriptive statistics were used, with the use of measures of central tendency and dispersion, besides the calculation of the relative frequency and the Kolmogorov-Smirnov test.

**Results:** Patients were stratified by demographic variables of race (black or non-black), sex and age, showing a white (95%), female (69%) and over 50 years (96.6%) prevalence. When the formulas of estimates of renal function compared to each other, we noticed that the CKD-EPI formula behaves statistically different from the others ( $p < 0.05$ ), suggesting that it would be underestimating the value of the GFR. When considering classification by CKD stages, any of the methodologies can be used, although CKD-EPI has a particular pattern in relation to others, all of them have a significant correlation with CrCl. No significant differences were found between the formulas and CrCl when compared to age, sex and insulin use or not.

**Conclusion:** It is concluded that the use of equations developed for the calculation of GFR in diabetic patients is a precise way of evaluation of renal function. It should be routinely used for early diagnosis and control of its progression and delay of renal replacement therapy (Fig. 1).

Descriptive measures	CG	MDRD	CKD-EPI	Clearance CR
Sample size	149	149	149	149
Minimum	11.07	10.18	8.06	5.60
Maximum	149.08	134.69	74.80	93.00
Total amplitude	138.01	124.51	66.74	87.40
Median	48.81	46.67	41.55	45.80
Arithmetic Mean	50.20	48.19	40.35	45.92
Standard Deviation	22.98	20.64	15.55	20.05
Standard Error	1.88	1.69	1.27	1.64
Coefficient of Variation	45.78%	42.84%	38.52%	43.66%



Source: data from the research

Fig. 1 See text for description

**A75**

**Comparison of cardiovascular risk calculators in type 2 diabetic patients attended in tertiary health unit**

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**Introduction:** Diabetes is often considered a “cardiovascular risk equivalent” despite representing a heterogeneous group of patients with different risks. In order to estimate cardiovascular risk (CVR), numerous formulas were developed differing to the population of origin, age group and the analyzed outcomes.

**Objective:** Compare the results of Framingham risk calculator (D’Agostino, Circulation 2008) and ACC/AHA risk calculator(Circulation 2013) in type 2 diabetic patients.

**Methodology:** Cross-sectional study with data collection from electronic medical records: age, total cholesterol, HDL-c, systolic BP, treatment for hypertension, DM, smoking and history of coronary, cerebrovascular or peripheral arterial disease. Patients aged 40 to 74 attended in July 2017 were included. Those with coronary, cerebrovascular or peripheral vascular disease were excluded. Values above 20% in FRS and 7.5% in ACC/AHA were considered high risk. The percentage of agreement between the two calculators was evaluated.

**Results:** 82 patients, mean age 60.29 ± 7.6 years, mean DM duration of 14.9 ± 9.4 years, 64.6% female, 11% with smoking history and 92.7% with hypertension were evaluated. There were 52 (63.41%) patients classified as high risk by FRS and 67 (81.7%) by ACC/AHA. All those classified as high risk by FRS had the same classification by ACC/AHA. However, 14 out of 25 patients (56%) at moderate risk for FRS were classified as high risk by ACC/AHA, and 1 in 5 patients (20%) with low risk from FRS were at high risk by ACC/AHA.

**Conclusion:** Although the FRS, described by D’Agostino 2008, assesses risk of more cardiovascular outcomes than the ACC/AHA 2013 calculator, the latter calculates more patients as being at high risk. There is disagreement mainly in the moderate risk groups of FRS, which may benefit from more intensive preventive measures or other risk assessment exams.

**A76**

**Comparison of neuropathy disability score (NDS) with michigan neuropathy screening instrument (MNSI): peripheral polyneuropathy screening in grade II and III obese and diabetics patients**

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**Introduction:** In the DCCT/EDIC study cohort, the Michigan Neuropathy Screening Instrument (MNSI) was validated for screening of signs and symptoms of peripheral polyneuropathy (PNP) in diabetics’ patients, presenting a sensitivity and specificity of 61% and 79%, respectively, for a cutoff point of ≥ 2.5. Neuropathy Disability Score (NDS) has also been used in epidemiological studies to screening PNP in diabetic patients.

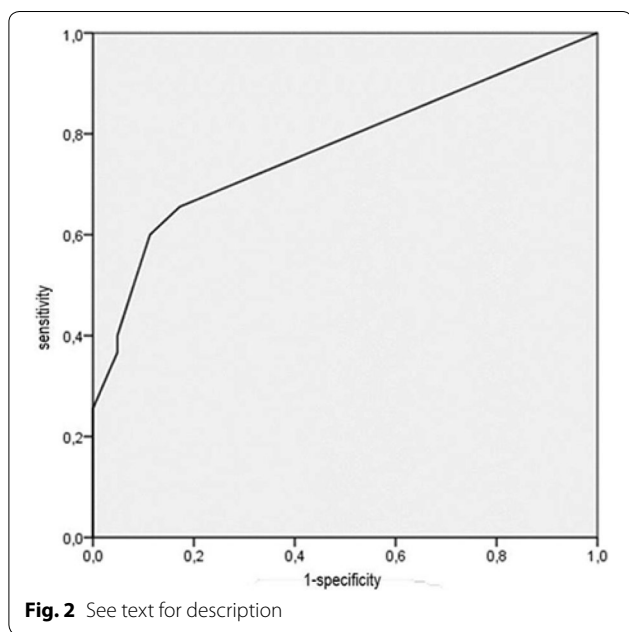
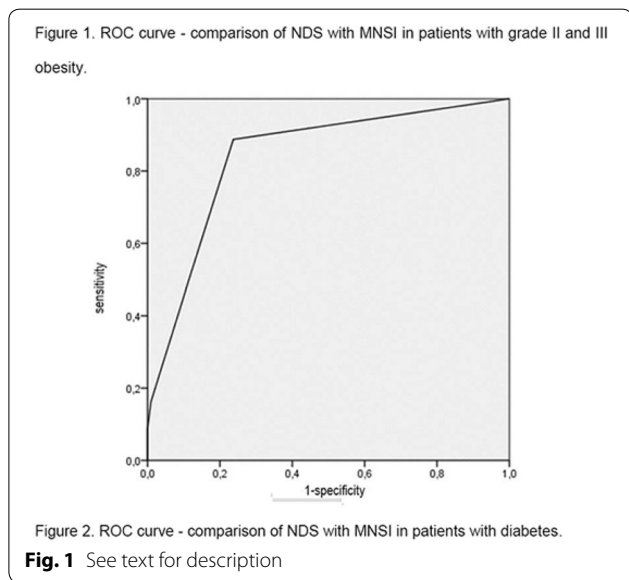
**Objective:** To evaluate PNP prevalence through MNSI and NDS instruments in grade II and III obese and diabetic patients, and to assess the sensitivity and specificity of NDS (cutoff point of ≥ 3) in relation to the gold standard MNSI.

**Methods:** A cross-sectional study was conducted in 291 patients with grade II and III obesity and 276 diabetic patients, where the prevalence of PNP was assessed by MNSI and NDS. For sensitivity and specificity evaluation, ROC curves were constructed.

**Results:** We found PNP prevalence of 5.5 and 16.0% with NDS and 27.5 and 32.6% with MNSI, in the grade II and III obese and diabetics’

patients, respectively. Among the grade II and III obese patients with positive NDS, all presented mild neuropathic signs. The diabetic patients presented mild, moderate and severe symptoms (9.1, 5.1 and 1.8%, respectively). In grade II and III obese and diabetic patients, respectively, the areas calculated below the ROC curves were 0.841 (95% CI 0.790–0.892) (Fig. 1) and 0.770 (95% CI: 0.704–0.836) (Fig. 2) and, for the same cutoff point (1.5), a sensitivity of 51.3 and 60% and a specificity of 11.8 and 11.3% were found.

**Conclusion:** For screening PNP, NDS shows acceptable performance when compared to the MNSI.



**A77**

**Competence for the self-care in diabetic patients**

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**Introduction:** The appearance of complications in diabetic patients have worried some health professionals. Great part of this complications make the person unable to realize some common activities affecting the self-care and consequently his life quality.

**Objective:** Evaluate the competences for the self-care of patients with diabetics and the factors associated, and realize an educative action based on the shortfall self-care.

**Method:** Was realized an exploratory study of quantitative nature in 25 patients monitored in the Integral Attention to Adult Health Program from Family Health Unity, inside the São Paulo state. To collect the data was used the Identification of the Competence of the Diabetic for Self-care (ECDAC in Portuguese).

**Result:** In cognitive competence 51% of the patients presented shortfall of self-care in relation to knowledge about diabetes, signals and symptoms, and treatment. In physics and emotional competence, the patients didn't show any shortfall. From this results realized an educative action based on the shortfall of self-care in the cognitive competence. Has some increase in the scores of the subscales cognitive competence with significant difference ( $p < 0.001$ ), indicating the decrease of the shortfall of self-care in this competence.

**Conclusion:** The knowledge of the competence for the self-care of this population made possible the educational action that show yourself as effective, offering subsidies for the patient be the author of your own care. It's believed that this study sensitized this population for like healthy habits that will contribute in the reduction of events considered preventable.

**A78**

**Consistent outcomes across dose ranges with titratable lixilan, insulin glargine/lixisenatide fixed-ratio combination, in the lixilan-o trial**

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Efficacy and safety of LixiLan, a novel titratable fixed-ratio combination of insulin glargine (Gla-100) with lixisenatide, was compared with Gla-100 alone and lixisenatide alone in T2DM inadequately controlled on metformin (MET) ± a second oral glucose-lowering drug. Participants (n = 1170) were randomized (2:2:1) to once-daily LixiLan, Gla-100 (max 60 U/day), or lixisenatide (20 µg maintenance dose) plus MET for 30 wks. LixiLan provided statistically superior glycemic control compared with Gla-100 and lixisenatide alone. In this exploratory analysis, efficacy and safety were evaluated for LixiLan based on Gla-100 and lixisenatide doses at study end. Reduction in HbA1c and percentages achieving HbA1c < 7% with LixiLan were consistent across Gla-100 and lixisenatide dose categories at wk 30. Across all LixiLan doses, the body weight increase seen with insulin alone was mitigated. With LixiLan, incidence of documented symptomatic hypoglycemia (BG ≤ 70 mg/dL) was similar across final dose categories of insulin and lixisenatide (Table). Incidence of nausea/vomiting was low (Table), related to the slow titration of lixisenatide in the combination. In conclusion, LixiLan efficacy and safety, with a low frequency of nausea and vomiting, was consistent across all final dose categories of its Gla-100 and lixisenatide components. Study code: NCT02058147. This is an ENCORE abstract previously presented at ADA2016. Funding and editorial support provided by Sanofi (Fig. 1).

Table 1. Compared changes on HbA<sub>1c</sub> for Lixilan and Gla-100.

	Lixilan (fixed-ratio combination, QD)			Gla-100 (insulin glargine, QD)		
	HbA <sub>1c</sub> , %	HbA <sub>1c</sub> <7%, n (%)	Body weight (kg)	HbA <sub>1c</sub> , %	HbA <sub>1c</sub> <7%, n (%)	Body weight (kg)
<b>Final Gla-100 dose</b>						
≥10 <20 U (n)	57		57	38		38
Baseline	7.8		79.1	7.8		80.9
Week 30	6.4	40 (69)	—	6.7	20 (51)	—
LS mean change ± SE	-1.44 ± 0.10		-1.8 ± 0.50	-1.29 ± 0.122		-0.9
95% CI	-1.65, -1.24	57.06, 80.87	-2.75, -0.78	-1.53, -1.06	35.59, 66.97	-2.16, 0.37
≥20 <30 U (n)	76		76	95		95
Baseline	7.9		83.4	8.0		82.9
Week 30	6.4	55 (72)	—	6.8	55 (57)	—
LS mean change ± SE	-1.58 ± 0.09		-1.5 ± 0.42	-1.29 ± 0.07		0.8 ± 0.40
95% CI	-1.75, -1.41	62.31, 82.42	-2.38, -0.71	-1.44, -1.15	47.40, 67.19	-0.04, 1.54
≥30 <40 U (n)	126		126	117		117
Baseline	8.1		87.7	8.1		87.3
Week 30	6.4	100 (79)	—	6.6	85 (73)	—
LS mean change ± SE	-1.68 ± 0.07		-0.5 ± 0.32	-1.46 ± 0.07		1.0 ± 0.35
95% CI	-1.81, -1.55	72.30, 86.43	-1.10, 0.18	-1.59, -1.33	64.57, 80.73	0.29, 1.68
≥40 <60 U (n)	208		208	209		209
Baseline	8.2		95.5	8.2		96.0
Week 30	6.6	150 (72)	—	7.0	115 (55)	—
LS mean change ± SE	-1.5 ± 0.05		0.60 ± 0.26	-1.12 ± 0.05		1.94 ± 0.27
95% CI	-1.60, -1.40	66.02, 78.21	0.09, 1.10	-1.22, -1.02	48.28, 61.77	1.40, 2.47
<b>Final lixisenatide dose</b>						
≥5 <10 µg (n)	57		57	57		57
Baseline	7.8		79.1	—		—
Week 30	6.4	40 (69)	—	-1.71 ± 0.50		—
LS mean change ± SE	-1.44 ± 0.10		-2.70, -0.72			
95% CI	-1.64, -1.24	57.06, 80.87				
≥10 <15 µg (n)	131		131			
Baseline	8.0		85.7			
Week 30	6.4	101 (77)	—			
LS mean change ± SE	-1.63 ± 0.07		-1.07 ± 0.32			
95% CI	-1.76, 1.51	69.90, 84.29	-1.70, -0.44			
≥15 <20 µg (n)	275		275			
Baseline	8.2	200 (73)	—			
Week 30	6.6		—			
LS mean change ± SE	-1.54 ± 0.04		0.34 ± 0.22			1.94 ± 0.27
95% CI	-1.63, -1.45	67.46, 77.99	-0.09, 0.78			
<b>Adverse events</b>						
	Documented symptomatic hypoglycemia*	Nausea	Documented symptomatic hypoglycemia	Nausea		
<b>Final Gla-100 dose</b>						
<30 U n (%)	35 (26)	16 (12)	42 (30)	3 (2)		
Events/patient year	2.0	0.4	2.0	0.04		
≥30 U n (%)	85 (25)	29 (9)	68 (21)	14 (4)		
Events/patient years	1.2	0.2	0.9	0.07		
<b>Final lixisenatide dose</b>						
<10 µg n (%)	13 (22)	4 (7)				
Events/patient year	1.7	0.2				
≥10 <15 µg n (%)	41 (31)	17 (13)				
Events/patient year	1.8	0.4				
≥15 <20 µg n (%)	66 (24)	24 (9)				
Events/patient year	1.3	0.2				

Gla-100=insulin glargine; HbA<sub>1c</sub>=glycated hemoglobin; Lixilan=fixed-ratio combination of Gla-100 and Lixisenatide;U=units. \* Documented symptomatic hypoglycemia was defined as <70mg/dL. LS mean change was calculated only for categories with ≥5 patients; groups with <5 patients not shown.

Fig. 1 See text for description

**A79**  
Contraception habits and knowledge assessment in diabetic women of reproductive age

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**Introduction:** Pregnancy in women with Diabetes Mellitus (DM) is becoming more frequent and proper planning of pregnancy is especially important in this group to prevent adverse maternal and fetal outcomes related to hyperglycemia in early pregnancy. The education of these patients in family planning is critical, but given the complexity of diabetes treatment, it is often neglected by the health staff. The choice of the proper contraceptive method (CM) for the patient with diabetes is not always simple, since some are related to increased risk of vascular complications and worsening metabolic control.

**Objectives:** To evaluate the knowledge and practices of DM patients of childbearing age on contraception.

**Methods:** This is a descriptive, cross-sectional study with the application of a structured questionnaire in 66 women with diabetes, of childbearing age attending an outpatient practice on a referral service in the public health care system in Ceará, Brazil. For statistical analysis EpiInfo version 3.5.2 was used.

**Results:** The sample was 66 women, with a mean age of 36.5 years, 48% did not complete high school and 68% referred a stable marital status.

63% had type 1 DM, average years of disease of 11.4. 26% were nulliparous, and 29.1% had a history of previous abortion. 71.2% of the patients already used some CM, 39% used oral contraception (OC), 16.6% condoms and 18% injectable or subdermal implants and 4% IUDs. Behavioral methods were used by one patient. Among OC patients, 72.3% were unaware about any interference of the method on glycemic control and as only 51% of them used the OC with medical prescription, 8.9% were guided by friends or relatives. Among the existing CMs, it was observed that 97.0% knew the Male Condom, OC: 89.4%, IUD-Cu: 81.8% and 77.3 tubal sterilization. Behavioral methods such as the rhythmic method were known by 69.7%, Coitus Interruptus: 39.4% Cervical mucus: 7.6% and Spermicide: 7.6% and Basal Temperature, 6.1%.

**Conclusions:** Data show that in a high-risk population where family planning is critical, the issue is poorly discussed during medical care, and half the diabetic women of that sample were using hormonal contraception without medical advice. This situation certainly contributes to the high unplanned pregnancy rate in women with Diabetes. We also observed that behavioral methods are little used by these patients.

**A80**  
Correlation between adiponectin levels and homa-ir index in children and adolescents with overweight and obesity

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A80**

**Background:** Adiponectin is a major adipokine with insulin-sensitizing function, being an important mediator of insulin resistance (IR).

**Objective:** The purpose of this study is to study the correlation between IR and adiponectin concentrations in overweight and obese children and adolescents.

**Materials and methods:** It is a cross-sectional study involving overweight and obese children and adolescents. Anthropometric indices and laboratory evaluation were performed, including insulin, glucose, adiponectin, and IR by HOMA-IR determination. The mean adiponectin was 3.53 ± 5.86 mcg/mL. The HOMA-IR was elevated in 33.3% of overweight and 58.8% of obese. Adiponectin levels were higher in 16.7% overweight compared to 5.9% of obese subjects. The correlation between HOMA-IR elevation and adiponectin levels was statistically significant (P 0.0001).

**Conclusion:** Levels lower of adiponectin may be a biomarker for the presence of IR in overweight and obese children and adolescents, and constitute another predictive factor for the metabolic syndrome.

**A81**  
Correlation between leptin concentrations and insulin resistance by homa-ir in children and adolescents with overweight and obesity

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A81**

**Background:** The leptin have as function main the regulation of energy balance as well as regulation of glucose homeostasis and insulin sensitivity.

**Objective:** The purpose of this study is to study the correlation between leptin concentrations and insulin resistance (IR) by HOMA-IR in children and adolescents with overweight and obesity.

**Materials and methods:** It is a cross-sectional study involving overweight and obese children and adolescents. Anthropometric indices and laboratory evaluation were performed, including insulin, glucose, leptin, and IR by HOMA-IR determination.

**Results:** Forty-one subjects participated of study, 25 men and 16 women, mean age 11.68 (6 to 17) years, 24 with overweight (58.5%) and 17 obese (41.5%), 23 with normal HOMAIR (56.1%) and 18 with high HOMA-IR (43.9%). The mean leptin was 26.06 ± 11.025 ng/mL (48.8% normal and 51.2% high). The HOMA-IR was elevated in 33.3%

of overweight subjects and in 58.8% of obese subjects. The leptin was elevated in 58.3% of overweight subjects and in 41.8% of obese subjects. The correlation between HOMA-IR elevation and leptin levels was not statistically significant.

**Conclusion:** High concentrations of leptin and IR are present in children and adolescents with overweight and obesity. The presence of hyperleptinemia without hyperinsulinemia suggests a likely inherent genetic basis for increased leptin resistance.

#### A82

##### Correlation between neuropathic symptoms and sensitivity tests in the evaluation of diabetic neuropathy

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**Introduction:** Diabetic foot is a chronic complication of diabetes mellitus (DM) that may manifest as neuropathy, vasculopathy, osteoarticular involvement and infection. Neuropathy initially affects small nerve fibers, responsible for the thermic and pain sensitivity; later, the large nerve fibers are affected leading to changes in proprioception, vibration sensitivity and monofilament test. Nerve damage contributes to the development of lower limb areas with abnormal pressure favoring callosities, local trauma and consequently ulcer and amputation.

**Objective:** Evaluate the prevalence of neuropathic symptoms and clinical manifestations of peripheral neuropathy in DM patients in primary and secondary care.

**Method:** Cross-sectional analytic study evaluated 550 individuals with DM type 1 and 2, assisted in the public health service, 212 in primary and 338 in secondary care, with informed consent. The protocol applied was: Screening and early assessment of risk factors and prevention of diabetic foot. The study was approved by UNOCHAPECO's Ethic Board, approval number 162/14.

**Results:** Samples evaluated showed that diabetes duration average was  $11.2 \pm 8.4$  years; glycated hemoglobin (HbA1c) average was  $8.7 \pm 2.2\%$ , and 74.6% of individuals had a value above 7%. It was found that 32% of the patients presented loss of protective sensitivity (LPS) and 24.9% showed peripheral arterial disease (PAD). The most prevalent clinical findings were dry skin, cracks or fissures (68.4%), callosities (36.5%) and nail mycosis (35.3%). Neuropathic symptoms (burning, tingling, fatigue or pain) were reported by 74.5% of the individuals; this finding correlated with the involvement of nerve fibers observed by clinical examination ( $p < 0.001$ ). Patients with LPS had a longer duration of DM ( $p < 0.001$ ), but individuals with suggestive manifestations of only small fibers damage had a shorter time of disease than those who also had large fibers affected ( $p < 0.001$ ). Most of the individuals (53.1%) were classified as risk zero (without LPS  $\pm$  PAD) although some showed neuropathic symptoms, 17.5% as risk 1 (LPS  $\pm$  deformity), 18.5% as risk 2 (PAD  $\pm$  LPS) and 10.9% as risk 3 (previous ulcer/amputation).

**Conclusion:** Data confirms that there was a high prevalence of loss of protective sensibility, but the presence of neuropathic symptoms was higher than the alteration in the sensitivity tests, which highlights the importance of verification of these symptoms as an early sign of diabetic neuropathy.

#### A83

##### Correlation of distal diabetic polyneuropathy signs and symptoms with balance and strength of type 2 diabetic patients under insulin therapy: pilot study

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**Introduction:** the distal diabetic polyneuropathy (DDP) is one of the main complications of Diabetes mellitus type 2 (DM2) and it

contributes to atrophy and muscular weakness, bone deformations, impairment of foot mechanics, resulting in balance deficits and increased risk of falls in this population.

**Objective:** correlate the DDP signs and symptoms scores with strength and balance of DM2 patients under insulin therapy.

**Methods:** transversal study, with 6 type 2 diabetic patients (3 women e 3 men;  $59 \pm 4,7$  years;  $68,1 \pm 4,9$  kg;  $160.8 \pm 5,4$  cm;  $21,8 \pm 9,2$  years of DM2 diagnostic) under insulin therapy and DDP diagnosed by the DDP diagnostic scale (DDPDS). The DDPDS provided the Neuropathy Symptom Score (NSS) and the Neuropathy Disability Score (NDS) of each individual. The balance and risk of falls assessment was performed by Biodex Balance System (BBS) (Biodex Balance System, New York, USA) before and after the training period, by means of the modalities: Fall Risk Test (using the general instability index for the assessment of risk of falls), Limits of Stability Test (using the general limits of stability index and test duration to assess dynamic stability) and Postural Stability Test (using the general instability index, the anterior/posterior stability index and medial/lateral stability index for the assessment of static stability). The strength evaluation was performed by the 1 repetition maximum tests (1-RM), using the bench press and leg press machines to assess upper limb and lower limb, respectively. After the Kolmogorov-Smirnov normality test, the Pearson correlation index was calculated to describe the relation between the DDP scores and the balance and strength findings.

**Results:** The NDS showed negative correlations with the lower limbs ( $- 840$ ;  $p = 0.03$ ) and with the general limits of stability index ( $- 933$ ;  $p < 0.01$ ), while the NSS showed negative correlation with test duration on the dynamic stability assessment ( $- 864$ ;  $p = 0.02$ ). The balance, risk of falls and upper limb strength parameters did not show a significant correlation.

**Conclusion:** The increase of the signs caused by DDP are related to less lower limb strength and the increase of both signs and symptoms are related to with dynamic balance deficits of type 2 diabetic patients under insulin therapy.

#### A84

##### Cost-effectiveness of a clinical-educational intervention in patients with diabetic retinopathy

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A84**

**Introduction:** Diabetic retinopathy (DR) is related to inadequate metabolic and blood pressure control. Diabetics treated in primary care in Sorocaba and region are referral to Hospital Oftalmológico de Sorocaba (HOS) already in advanced stage of the DR, which requires ophthalmologic intervention. To perform these procedures, there is a need for clinical adjustment that occurs in the primary care, generating delay, low resolution and social, economic and individual losses.

**Objectives:** To offer a program of intensive clinical-educational adjustment to patients with DR attended at HOS; Evaluate changes in the level of understanding and metabolic control of this population; Evaluate the performance of the proposed procedures compared to a similar population that did not undergo the intervention; Analyze the costs of the alternative of clinicaleducational adjustment. Material and **Methods:** The program had four weekly individual medical visits with educational support. The adjustments were based on the clinical evaluation and analysis of glycemic monitoring with seven measures of 3-day intercalated that preceded care. One group underwent clinical-educational intervention ( $n = 24$ ) and for the other ( $n = 24$ ) only the medical records were evaluated. The intervention group was evaluated before and after regarding knowledge about DM, adherence to treatment and attitudes in coping with the disease. The evolution of the ophthalmologic picture in the two groups was compared with the performance of the indicated procedures and costs involved in the activities of each clinical adjustment process: usual and proposed by the study. The activities of each clinical adjustment process were mapped, their unit costs defined and the alternatives compared using the cost-effectiveness method.

**Results:** A significant difference was observed in the intervention group with improved glycemic control, a higher rate of scheduled procedures (96 vs 48%,  $p = 0.00$ ), shorter performance time (1.2 months vs 5 months), and Cost-effectiveness ratio. There was a significant increase in knowledge about the disease, adherence to treatment and improvement of the attitude towards the disease.

**Discussion:** Intensive clinical-educational adjustment program for advanced-stage DR patients offered in specialized service as an alternative to that currently practiced in primary care has a better cost-effectiveness, occurs in a shorter time and can minimize personal, social and institutional losses resulting from evolution of DR. Funding: There was no funding to the study. Sanofi provided editorial support through the hiring of a third part—Eurotrials.

**Ethics approval:** The project was submitted and approved by the Research Ethics Committee of Hospital Oftalmológico de Sorocaba/SP (CAAE 32784014.7.0000.0088) Consent to publish: Informed consent to publish has been obtained from these patients

#### A85

##### Cost-effectiveness of insulin glargine 300 units/ml (GLA-300) vs insulin degludec 100 units/ml (IDEG) in t2d

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**Objective:** A new generation of basal insulins has been developed in recent years to reduce hypoglycemic risk and provide steadier glycemic control in T2D. This study evaluated cost-effectiveness for two of these basal insulins, Gla-300 and IDeg, from a US payer perspective.

**Methods:** This modelling analysis simulated a cohort representing patients in the EDITION 2 and 3 trials using the IMS Core Diabetes Model with a time horizon of 50 years (lifetime) for 1,000,000 patients starting at 62 years old. Treatment efficacy parameters, measured as A1C reduction and hypoglycemia event (HE) rates, were estimated using a network meta-analysis: for Gla-300 vs IDeg, the A1C reduction over 24 weeks was 1.00 vs 0.98%; HE rates were estimated as 2.5 vs 4.0 severe HEs and 446 vs 555 non-severe HEs (NSHEs) per 100 patient years, respectively. The cost/unit of Gla-300 was set to \$0.22 to maintain dose-adjusted price parity with insulin glargine using data from the EDITION trials. The cost/unit of IDeg was set to \$0.296 from its US Wholesale Acquisition Cost. The treatment cost was \$1,561 per SHE and \$13.65 per NSHE (2015 \$). Utilities to estimate quality-adjusted life years (QALYs) for multiple comorbidities were applied using the minimum utility approach. A disutility of -0.0118 was applied for SHE, and method of diminishing marginal disutility for NSHE.

**Results:** Compared with IDeg, Gla-300 provided a total cost reduction per patient of \$8,998 (\$162,288 vs \$171,286) and a QALYs gain of 0.035 (7.677 vs 7.642) for lifetime in base-case analysis. One-way sensitivity analysis showed that 10% change in A1C, SHE/NSHE rates, and treatment costs did not change the incremental cost-effectiveness ratio (ICER) dominance for Gla-300. Probabilistic sensitivity analysis found that Gla-300 was less costly in 95.4% of cases and more effective in 60.1% of cases vs IDeg.

**Conclusion:** Gla-300 provides a dominant cost-effectiveness profile over IDeg, though real-world data needs to confirm this finding. This is an ENCORE abstract previously presented at ADA2017. Funding and editorial support provided by Sanofi.

#### A86

##### Critical evaluation of the food factor in a group of patients with type 1 diabetes of different age groups using continuous subcutaneous insulin infusion and inadequate glycaemic control

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**Introduction:** At present, insulin replacement with the continuous subcutaneous insulin infusion (CSII) is considered to be the therapeutic option closest to the physiological one for patients with type 1 diabetes (T1D) because it allows greater food flexibility and rapid corrections of hyperglycemia. However, a significant percentage of these patients remain outside the targets of good metabolic control (glycemia and lipids). One of the factors may be related to an inadequate distribution among the three main food groups.

**Objective:** Evaluate the intake of carbohydrate, proteins and fats in relation to the standard diet in a group of patients with T1D of different age groups using CSII and inadequate glycaemic control.

**Methods:** 53 patients with T1D, using CSII, were divided into 3 groups (PPGpre-pubertal: < 9 years), (PG-pubertal: 10–18 years) and (AG-adult: 19–35 years), BMI (kg/m<sup>2</sup>), CSII use time (years), A1c (%), total cholesterol (TC) and fractions, triglycerides (TG), and the relative percentage of carbohydrates, in relation to the standard diet.

**Results:** A1c was similar between the 3 groups (PPG:  $8.1 \pm 0.5\%$ , PG:  $9.3 \pm 1.3\%$  and AG- $8.2 \pm 1.1\%$ ). Carbohydrate intake below recommended age showed an inverse relationship with age (PPG < 63%, PG < 93% and AG < 100%  $p = 0.00$ ). However, the type of carbohydrate was inadequate, being above recommended in relation to processed juices at 100% (PPG), 66% (PG) and 25% (AG), fastfood at 21% (PPG), 46% (PG) and AG (66%) and in sweet 81% (PPG), 73% (PG) and 33% (AG). Protein (milk) intake was adequate in 80% (PPG) PG and 33% in AG, while fat intake was above 40% in the 3 groups studied. Alcohol was present in 1/4 PG and 62% AG, but in an adequate amount. The values of CT and TG were adequate in the 3 groups.

**Conclusion:** Patients with T1D using CSII had a carbohydrate intake below the recommended level and with an inverse relationship to age, but with inadequate content. The amount of fat was above the expected and protein within the recommended. The study emphasizes the need for a better orientation of the type of carbohydrate and the amount of fat for T1D patients using CSII. These aspects should be considered during optimization of the results obtained with this high cost therapy for T1D patients.

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#### A87

##### Curatella americana treatment during pregnancy of rats with mild diabetes: fetal repercussions

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**Introduction:** During pregnancy, hyperglycemia can lead to maternal and fetal complications, leading to reproductive changes and fetal impairment. considered to treat diabetes and prevent its complications, and one of these alternatives is the use of medicinal plants, such as *Curatella americana*. However, there is no scientific evidence on the safety of the plant use during gestation and its effects on fetuses.

**Objective:** To evaluate the effects of treatment with *Curatella americana* during pregnancy on the fetuses of rats with hyperglycemia of mild intensity.

**Method:** Diabetes was induced in newborn female Wistar rats, at 24 h after birth, by subcutaneous injection of Streptozotocin at a single dose of 100 mg/kg. At 110 days of age (adulthood), oral glucose tolerance test (OGTT) was performed to confirm the mild diabetes model. After confirmation of the diabetes, the rats were mated and distributed into 4 experimental groups (n = 12 animals/group): Control: Non-diabetic rats treated with water; Control Treated: Non-diabetic rats treated with the plant; Diabetic: Diabetic rats treated with water; Diabetic Treated: Diabetic rats treated with the plant. The administration of the *Curatella americana* leaves aqueous extract, at dose of 300 mg/kg, was done daily, by gavage, throughout pregnancy. On the morning of the 21st day of pregnancy, the rats were anesthetized and the uterus was removed. Fetuses and placentas were weighed and fetuses were analyzed for the presence of external, skeletal and visceral anomalies. Results: There was no difference among the experimental groups in the ossification sites, placental efficiency and in the frequencies of fetal abnormalities (external, skeletal and visceral). However, the Control Treated group present lower fetal and placental weight, with an increase of fetuses classified as small for pregnancy age. **Conclusion:** Treatment with *Curatella americana* caused intrauterine growth restriction in nondiabetic animals at the dose tested, but this weight loss did not translate into changes in skeletal development and anomalies. Therefore, more studies are needed to prove the safety of the use of this plant for the fetus.

**A88**  
**Dapaglifozin in loss and maintenance of weight over 3 years in a diabetic patient**

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A88**

**Introduction:** SGLT2 inhibitors are oral antidiabetic agents capable of altering independent cardiovascular risk factors, such as: blood glucose, blood pressure, weight, intrarenal hemodynamic and albuminuria. **Objective:** To describe a clinical case in which the use of dapaglifozin (DAPA) was effective in inducing and maintaining weight loss over 3 years. **Case report:** M.G.G.A, female, 65 years old, caucasian, married, sought an endocrinologist in 2014 due to the diagnosis of type 2 diabetes mellitus 3 years ago, she used glimeperide 4 mg/day and metformin (MTF) 1 g/day. She was hypertensive and dyslipidemic, already under treatment, and reported difficulty in losing and maintaining weight for several years. She denied physical activity (PA) practice for 1 month (before walking 3x/week) and in a 24-hour diet reminder there was an excess of simple carbohydrate (SC) intake and saturated fat (SF). The physical examination showed: arterial pressure (AP):130x80 mmHg, weight (W):78.6 kg, height:1.54 m, BMI:33.14 kg/m<sup>2</sup> and abdominal circumference (AC):108 cm. The patient was oriented to change her lifestyle and it was also requested exams. After 1 month: fasting glycemia (FG):169 mg/dl, postprandial glycemia (PPG):145 mg/dl, Hb1Ac:7.1%, total cholesterol (TC):253 mg/dl, HDL:55 mg/dl, LDL:129 mg/dl, triglycerides (TG):156 mg/dl, 25-hydroxy vitamin D(25-OHD):23 ng/dl, creatinine:0.6 mg/dl, glomerular filtration rate (GFR): > 60 ml/min/1.73 m<sup>2</sup> (MDRD), microalbuminuria, and the rest of the serum tests normal. At this time, due financial limitation, she was directed to maintain medications, prescribed vitamin D3 14,000 IU/week and stimulated lifestyle change (LC). She returned after 4 months with unchanged physical examination measures, HbA1c:7.8%, FG:166 mg/dl, PPG:163 mg/dl, being chosen to exchange oral antidiabetic regimen for DAPA 10 mg/day and MTF 1 g/day, with maintenance of the other guidelines for

LC. After 9 months: W:69.9 kg, AC:98 cm, BMI:29.47 kg/m<sup>2</sup>, and she reduced the consumption of SC and SF, but maintained the sedentary lifestyle. Exams: Hb1Ac:7.0%, FG:118 mg/dl, PPG:152 mg/dl, TC:242 mg/dl, LDL: 139 mg/dl, TG:127 mg/dl and irregularly using rosuvastatin 10 mg, guided regular use of medications. During 3 years of follow-up, patient maintained controlled HbA1c (around 6.8%) and W:69 kg, but she still did not perform PA. **Conclusion:** DAPA associated with MTF improved the glycemic levels, and it also helped in the weight loss and the weight maintenance of the patient over these 3 years. Informed consent to publish has been obtained from this patient.

**A89**  
**Day-to-day variability of fasting self-measured plasma glucose (SMPG) correlates with risk of hypoglycemia in adults with type 1 (T1D) and type 2 diabetes (T2D)**

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**Background:** The relationship between hypoglycemia and day-to-day variability of glycemic control has not been well established. **Aim:** A post hoc analysis was performed correlating day-to-day variability of fasting SMPG with hypoglycemia in two double-blind, treat-to-target, crossover trials that compared insulin degludec once daily (OD) with insulin glargine U100 OD in adults with T1D (SWITCH 1, n = 501) or insulin-experienced adults with T2D (SWITCH 2, n = 721). **Methods:** Available SMPG measurements were used to determine a weekly variance for each patient, using the log SMPG values to allow for relative comparisons. For each patient and treatment, the geometric mean of the weekly variance was calculated and these values were categorized into low, medium and high tertiles as a measure for day-to-day variability. The effect of having low or high variability compared with medium variability was analyzed in relation to overall symptomatic (severe or blood glucose [ $< 56$  mg/dL] confirmed), nocturnal symptomatic (00:01–05:59), and severe (requiring third-party assistance and confirmed by a blinded adjudication committee) hypoglycemia. **Results:** Day-to-day SMPG variability was a significant predictor for the risk of overall and nocturnal hypoglycemia in T1D and T2D, and severe hypoglycemia in T1D (Table). **Conclusion:** Day-to-day glycemic variability relates to hypoglycemia risk. Informed consent to publish had been obtained from the patient (Fig. 1).

Table. Effect of fasting SMPG variability on hypoglycemia in SWITCH 1 and 2: low and high tertiles compared with medium tertile

Hypoglycemia	Variability tertiles	SWITCH 1			SWITCH 2		
		Events	Estimate [95% CI]	p-value	Events	Estimate [95% CI]	p-value
Overall	Low	1113	0.71 [0.62; 0.81]	p<0.0001	63	0.32 [0.23; 0.45]	p<0.0001
	Medium	1971	1.00		199	1.00	
	High	2790	1.17 [1.05; 1.29]		587	2.25 [1.81; 2.81]	
Nocturnal	Low	129	0.40 [0.30; 0.54]	p<0.0001	16	0.27 [0.15; 0.48]	p<0.0001
	Medium	335	1.00		74	1.00	
	High	428	1.31 [1.04; 1.64]		190	2.15 [1.55; 2.98]	
Severe	Low	39	1.16 [0.68; 1.98]	p<0.0001	5	0.74 [0.23; 2.35]	p=0.1835
	Medium	34	1.00		8	1.00	
	High	130	2.52 [1.60; 3.96]		14	1.85 [0.74; 4.61]	

SWITCH 1: NCT02034513; SWITCH 2: NCT02030600  
 CI, confidence interval; SMPG, self-measured plasma glucose

**Fig. 1** See text for description

**A90****DDP4 inhibitor activity in partial family lipodystrophy- case report**

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Dunnigan type partial lipodystrophy is a rare autosomal dominant disease. In its classic form, it is resulting from a heterozygous missense mutation in the LMNA gene, which encodes the nuclear protein called A/C lamina(1). Changes begin at puberty, with enlargement of the labia majora, chin and face, as well as disappearance of subcutaneous tissue in upper and lower limbs. Affected women are particularly predisposed to insulin resistance and its complications, including signs of polycystic ovary syndrome. Case report: 35-year-old female diabetic, hypertensive, diagnosed with Kobbeling Dunnigan syndrome after the first gestation in 2001, began treatment with a plastic surgery team for changes in the classic fat distribution of her disease, with rhytidectomy and initiated follow-up in the team of endocrinology for diabetes control in the use of insulin therapy with poor glycemic control, after the initiation of DDP4 inhibitor initiated improvement of glycemic levels with maintenance of control.

Informed consent to publish had been obtained from the patient.

**A91****Depression, anxiety and stress in people with diabetes mellitus type2**

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The evidence of symptoms of depression, anxiety, and stress in the person with Diabetes Mellitus can relate to difficulties in modifying eating habits, suitability for therapeutic regimens and diabetic's quality of life. This study aimed to identify levels of anxiety, depression and stress of participants in a Health Promotion program for people with Diabetes Mellitus, performed in the city of Macapá, AP, Brazil. This is a descriptive study with a quantitative approach, carried out in November 2016 with 38 people participating in the program who accepted to answer the questionings of the Depression, Anxiety and Stress Scale—Short Form (DASS-21) involving a theoretical model which evidences the symptoms of depression, anxiety and stress, not always differentiated by other scales or instruments. The study, approved by the Ethics and Research Committee (Comitê de Ética e Pesquisa) (CEP) of the Federal University of Amapá (Universidade Federal do Amapá), opinion number: 861.456/2014. Of the participants, the majority (78.9%) were females with average age of 63 and males (21.1%) with average age of 47.5 years (Table 1). In relation to the DASS-21 scale of evidence of identified symptoms, (28.9%) presented changes in the depression symptoms, (10.5%) presented moderate symptoms, (7.9%) severe symptoms and (10.5%) very severe symptoms. For anxiety (52.5%) presented alterations, where (18.4%) presented moderate symptoms, (10.5%) severe symptoms and (23.6%) very severe symptoms. For stress, (34.0%) presented changes in symptoms, (13.1%) moderate symptoms, (7.8%) severe symptoms and (13.1%) very severe symptoms (Table 2). It was also identified in (23.6%) of participants alterations for depression, anxiety and stress concomitantly symptoms, (7.8%) for anxiety and stress, (5.2%) for stress and depression and (2.6%) depression and anxiety (Table 3). In addition, it was observed that (18.4%) of the patients had altered symptoms specifically for anxiety, while those with modified symptoms of depression or stress always had other aspects simultaneously, and (42, 1%) did not present alterations in the symptoms evaluated. Anxiety is the problem to be overcome by the participants, a factor that will be related to a worse glycemic control, an increase and a greater severity of the clinical complications, being also necessary to potentiate through

non-pharmacological treatments the symptoms of depression and stress that add up and interfere with social, economic and educational aspects (Fig. 1).

**Table 1** - Characterization of people with Diabetes Mellitus according to gender and average age. Macapá/AP/Brazil, 2017 (N = 38).

Sex Variable	N	%	Average age
Female	30	78.9	63 years
Male	8	21.1	47.5 years

Source: primary

**Table 2** - Identification of altered Symptoms of depression, anxiety and stress and its respective levels in people with Diabetes Mellitus. Macapá/AP/Brazil, 2017 (N = 38).

Symptoms	Total changed N /%	Moderate N /%	Serious N /%	Very serious N /%
Depression	11 (28.9)	4 (10.5)	3 (7.9)	4 (10.5)
Stress	13 (34.0)	5 (13.1)	3 (7.8)	5 (13.1)
Anxiety	20 (52.5)	7 (18.4)	4 (10.5)	9 (23.6)

Source: primary

**Table 3** - Identification of associations of symptoms of depression, anxiety and stress in people with Diabetes Mellitus. Macapá/AP/Brazil, 2017 (N = 38).

Associated Symptoms	N	%
Depression x Anxiety x Stress	9	23.6
Anxiety x Stress	3	7.8
Stress x Depression	2	5.2
Depression and Anxiety	1	2.6

Source: primary

**Fig. 1** See text for description

**A92****Design of an application for the evaluation of people's feet with diabetes mellitus**

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**Introduction:** Diabetes Mellitus is a challenge for Health, with a high potential for morbidity and mortality. Among its main complications is the diabetic foot, defined as a series of alterations that occur in the lower limbs, associated to the high amputation index, which affects the productivity and independence of the person. Proper examination of the feet is able to diagnose the problem early and prevent injuries and hospitalizations. However, the evaluation for prevention of diabetic foot is insipid and not fully incorporated in the health services. However, it is necessary to develop innovative tools that facilitate foot examination in order to save time and standardize evaluation.

**Objective:** To develop an application to evaluate the risk of diabetic foot, based on the Diabetic Foot Manual of the Brazilian Ministry of Health.

**Methods:** Methodological, descriptive, quantitative and multidisciplinary study that allowed the development of an application on the Android platform, with based on the evaluation of the feet of the person with Diabetes Mellitus advocated by the diabetic foot manual of the Ministry of Health. Java language was used for programming. For interaction between the researchers was used the Extreme Programming method that consisted of a cyclical process: select user stories; divide stories into tasks; plan release; develop/integrate/test; release version and evaluate the application, returning through the steps until it was suitable for foot evaluation.

**Results:** "Foot Care" application was developed with 19 main screens that contain icons for access to photos and help and videos that demonstrate the procedure of sensitivity and reflex tests. Screens are thus arranged: presentation screen with information about the application and instructions for use; screen with features of registration, data export and the list of people evaluated; screens of the assessment itself, which include the skin and attachment domains, sensitivity



assessment, vascular assessment and evaluation of foot deformities. Finally, the screen that presents the risk classification of the diabetic foot; the change that suggested such a risk; the recommendations, the evaluation frequency and the behaviors that should be taken by the health professional.

**Conclusion:** It is concluded that the application made in this study is an innovative tool and is an important tool to prevent early diabetic foot.

### A93

#### Detection of *strongyloides stercoralis* by PCR in stool samples among diabetes type 2 patients

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**Introduction:** *Strongyloides stercoralis* is an intestinal nematode that infects approximately 100 million people worldwide, mainly in tropical and subtropical regions. Most *S. stercoralis* carriers are asymptomatic or oligosymptomatic, which does not mean absence of pathogenic action. Extra-intestinal manifestations can lead to severe and life-threatening conditions, especially in immunocompromised patients. The medical literature has case reports of disseminated strongyloidiasis in diabetic patients, but no studies have determined the relationship between diabetes and strongyloidiasis.

**Objective:** The aim of this study was to evaluate the parasitological and molecular profile of strongyloidiasis in patients with type 2 diabetes mellitus (DM2) and to analyze their value in the detection of chronic asymptomatic infection in these patients.

**Method:** The study population were patients seen in the Diabetes Education and Control Program Jataí—GO and other non—diabetic individuals living in the city. A total of 149 individuals were collected from three fecal samples on alternate days, these were characterized in two groups: Group I (97) patients with DM2, Group II (52) individuals not carrying DM2. The fecal samples provided were submitted to parasitological methods of Hoffman, Rugai and agar plate culture, and subsequently, to molecular analysis by Polymerase Chain Reaction (PCR), and all positive samples were confirmed by DNA sequencing. Data were analyzed using Chi square and logistic regression tests.

**Results:** The overall positivity of *S. stercoralis* by parasitological techniques was 2.6% (4/149), and only one DM2 patient was positive for the infection. With PCR, the positivity was 16.1% (24/149), being 9.3% (9/97) in the group I, and 28.8% (15/52) in the group II. DM2 showed to be a protective factor for strongyloidiasis (OR 0.252 IC95% 0.101 a 0.628  $p = 0.003$ ). There was no agreement between the parasitological methods and PCR in the detection of *S. stercoralis*.

**Conclusion:** The PCR technique using primer species-specific for *S. stercoralis* showed a superior ability to detect infection in asymptomatic diabetic and non-diabetic patients.

### A94

#### Determinants to weight loss in outpatients with obesity

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Several strategies can be used to obesity treatment by the multidisciplinary team: diet, physical activity, behavioral therapy, medications and surgery. The dietary adherence has been associated with weight loss, however determinants to weight loss in the individual approach of treatment with nutritionist are not clarified yet. To know these determinants can support the strategies adoption in clinical practice. In this way, the aim of this retrospective cohort is to evaluate the factor determinants to weight loss of outpatients with obesity follow by nutritionist. Obese outpatients who were follow out dietary counselling by

registered nutritionist from the Endocrinology Division of HCPA, Porto Alegre-RS were select consecutively. All procedures involving patients were approved by the Hospital Ethics Committee (n°15.0138) according to Declaration of Helsinki. The protocol were five visits: anamnesis (clinical, lifestyle, and anthropometric evaluation); diet visit with delivered a prudent diet with calorie restriction; and three bimonthly visits (described as visit one, two and three) to dietary approaches. The dietary adherence was ranked (0-100%). Patients were grouped into those who achieved the goal of at least weight 3% loss from initial weight in 6 months (achieved the goal) and those who cannot achieved the weight loss goal and their characteristics were compared using appropriate tests. Poisson regression models were performed to evaluate the possible association between determinants and weight loss. One hundred and forty-seven patients were included and 47 patients (26%) achieved the weight loss goal [ $\Delta$  weight—5.9(—21.5 to —2.3)kg]. A higher proportion of patients which achieved the goal also attended the visit one (83% vs. 66%,  $p = 0.040$ ) and visit two (83% vs. 56%,  $p = 0.001$ ) as compared to patients without weight loss. Dietary adherence was not different between groups, as well as the other characteristics (social, clinical and medications use). The attendance in the visit two was associated with more chance of weight loss when comparing with those who did not go to the visit: OR 4.44 (95% IC 1.6<sup>1</sup>12.25);  $p = 0.004$ ) after adjust to physical activity, drugs use and dietary adherence. In conclusion, the patients who achieved the weight goal were more assiduous than the other patients. The visit absence maybe a negative determinant to weight loss. The reasons for that need to be investigated.

### A95

#### Development and cultural adequacy of a tool to evaluate the level of knowledge from users of continuous insulin infusion system (CIIS-Brazil)

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**Background:** The Continuous Insulin Infusion System (CIIS) is increasingly being used in Brazil, with trained professionals actively involved in the initiation and monitoring of diabetes treatment. However, there are not any tools that have been adapted to measure the level of knowledge of diabetes patients using CIIS. The elaboration of reliable tools that make possible to measure effects of the teaching-and-learning process, before and after an intervention, can only be useful and able to present scientific results when those tools have valid psychometric qualities in order to not implicate the quality of acquired data.

**Objective:** To elaborate and to adequate culturally a tool to evaluate the knowledge from users of CIIS.

**Methods:** Methodological study, comprising two steps: 1) Elaboration of the tool, based on both national and international diabetes guidelines, followed by evaluation by a committee of experts, including endocrinologist, nutritionist, nurses and statistician, to generate the first version (V1); 2) V1 was sent via the e-survey platform to a committee of judges, comprising endocrinologists with experience in therapy, certified instructors employed by the companies that sell the CIIS in Brazil, and linguists from different regions of the country, who evaluated the tool for clarity and relevance. Based on this evaluation, the Content Validity Index (CVI) and the judges' percentage score for the adequacy of the tool's components were calculated, with changes which generate a second version (V2). After each of these phases, there was discussion of the Expert Committee to evaluate suggestions, to identify problems and pertinent changes.

**Results:** V1 of the tool was highly scored by the judges' committee with respect to clarity and relevance, with a CVI of 0.97, from which V2 was generated, comprising 17 questions (Table 1).

**Conclusion:** The tool CIIS-Brazil is considered culturally adequate to evaluate the knowledge from its users. This tool proceeds to the validation process (Fig. 1).

**Table 1.** Questions of CIIS-Brazil.

1. Do you know the meaning of the word below?
2. About adjustment of time and date of the pump, sign the answer with which you identify yourself.
3. When an alarm of the pump shoots, what do you do?
4. In case of alarm of occlusion or of no administration of insulin, what do you do?
5. Do you do hands' hygiene before changing disposable objects?
6. Do you do skin' hygiene before placing the cannula?
7. Before aspirating the insulin, how many times do you move the piston in order to lubricate the o reservoir/cartridge?
8. During the disposable objects' changing, do you note and eliminate the air bubbles from the infusion kit?
9. Do you do the changing of the cannula with which frequency?
10. Do you do rotation of the application places of the cannula?
11. After the beginning of insulin pump' use, did you note hardening or any other change in the places of cannula application?
12. Do you need help to configure the insulin basal doses in the pump?
13. Do you know how to activate and to program the function of temporary basal dose?
14. Do you know how to configure without help the bolus (ratio insulin/carbohydrate, sensitivity factor, glycemic goal and active insulin time)?
15. Do you know how to program without help the special bolus (double/multiwave and squared/lengthy)?
16. Where do you discard needles, lancets, cannulas, kits of infusion and insulin bottles?
17. In case of necessity, do you have always available the emergency kit (syringes or application pens, fast and slow insulin, battery, materials to change the disposable objects and candies or sugar)?

**Ethics Approval**

The study was approved by Santa Casa of Belo Horizonte Institution's Ethics Board, approval number 1.962.869 and consent was obtained from all participants.

**Fig. 1** See text for description

**A96****Diabetes care center in the municipality of Blumenau—SC**

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**Introduction:** In the region of Blumenau, the prevalence of Diabetes Mellitus (DM) is approximately 25,000 people, of which 3,249 are insulinized and are enrolled in the program of distribution of inputs for the treatment of the disease by SUS. In 2012, the Coordination of the Adult Health Policy and the Management of the Health Department of the Municipality of Blumenau elaborated the implementation of a Diabetes Care Center (NAD).

**Objective:** To describe the actions performed by the NAD team, whose main objective is to provide specialized interdisciplinary care to people with decompensated DM.

**Methodology:** This is a descriptive study about the experience of professionals working at the Diabetes Care Center of the Municipality of Blumenau. The reporting period is from the year of its implementation to date.

**Results:** In the implementation of the NAD in 2012, the activities started with a team with a minimum structure, however, with the increase in the demand of patients, it was necessary to hire more professionals and the construction of a new headquarters, with a bigger physical structure. Today 2,688 users are already registered with NAD. A total of 320 consultations in endocrinology, 80 nutrition consultations, 60 consultations in psychology and 40 nursing consultations are carried out per month for foot evaluation, insulinization and acquisition of special footwear for free. To ensure psychological support, meetings of therapeutic groups are also held. Since its implementation, it has been established as an Assistance Teaching Unit and serves as a research field for scholarship recipients and health course volunteers, who work in the FURB PET-HEALTH GRADUASUS group. Online marriages in endocrinology and training for network professionals are conducted through an event entitled Debates Mellitus. In November, actions related to the Municipal Diabetes Prevention Week are carried out, among them: Seminars, background work, preventive actions in squares with capillary glycemia tests, and, finally, the "Blue Walk".

**Conclusions:** We believe that through a policy of care the person with DM develops educational, preventive and diagnostic actions, that guarantees the free supply of medicines and supplies for self-control and that makes the user aware of their co-responsibility in the treatment through of Supported Self-Care, it is possible to minimize the complications of DM and improve the quality of life of users.

**A97****Diabetes flatbush: from cetoacidose and full insulinotherapy to anti-diabetes oral and diet**

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A 42-year-old male patient with obesity and hypertension was brought to the emergency department of Hospital Conjunto do Mandaqui in São Paulo with adinamy, weight loss, polyphagia, polydipsia and polyuria 3 weeks ago. On physical examination, the patient had sleepiness, dehydration (3 +/4 +), ketone breath, tachycardia 136 BPM, hypotension, 75 × 50 mmHg, oxygen saturation of 99% and respiratory rate of 20/min. The initial laboratory tests indicated high capillary blood glucose, leukocytosis of 18,400 (neutrophilia of 90%), haemoglobin level of 15.1 g/dl, hematocrit of 49.9%, urea of 173 creatinine of 3,36 sodium of 146 potassium of 5,1. The arterial gasometry showed a significant metabolic acidosis. The urinalysis was marked by glycosuria (2 +) and leukocyturia (176,000). The diagnosis of diabetic ketoacidosis was made, and the patient was treated with venous hydration and continuous intravenous insulin infusion. The patient showed a satisfactory response to treatment, with good control of the dehydration and blood pressure. An hyposodic and diabetic diet was introduced, and the patient showed an increase in appetite. Normal values of the C—4,6 peptide were obtained and indicated no pancreatic injury. Two consecutive tests were negative for the autoantibodies against GAD, islet cells, insulin and IA2. The patient was discharged from the hospital with full insulin therapy. During the follow-up, the insulin dose was gradually reduced due to few episodes of hypoglycemia. After 2 months the patient had good glycemic control, and reported adequate lifestyle and dietary habits. metformin use XR 1500 mg/day establishing as most likely diagnosis flatbush diabetes. Flatbush diabetes is one of the several variations of the type 2 DM, and is also referred to as idiopathic type 2 DM and ketosis-prone type 2 DM. Here, a misleading diagnosis of DM 1 is common, due to the total autoimmune destruction of the T cell-mediated pancreatic beta cells, without antibodies associated with the type 1 DM. In DM flatbush, diabetic ketoacidosis, but in this case it is possible the weaning of insulin therapy and the drug adoption proposed for DM 2, in addition to the non-medicament measures, since it was observed that preservation and recovery of pancreatic function is possible. The case report aimed to raise awareness of this rare condition and avoid misdiagnosis and unnecessary treatments.

Informed consent to publish had been obtained from the patient.

**A98****Diabetes patients' adherence who went through education group in a clinical program from a private institution in São Paulo**

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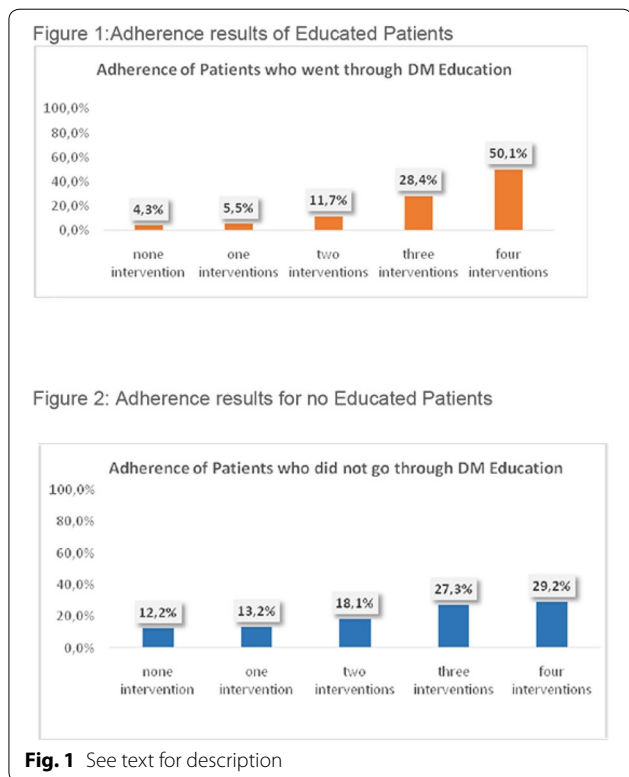
**Introduction:** Diabetes Mellitus (DM) is a chronic, complex, not transmissible disease that requires continuous medical care and strategies to decrease multifactorial risks besides glycemic control; to improve patients' treatment and prevent possible complications. From 1980 s diabetes' treatment has becoming even more complex with incorporation of new medications and technology within reach of patients being part of their daily lives. From the beginning of the diagnosis, patients and their relatives must get knowledge about the disease and

develop necessary skills for patients' self-care. It is called, education in diabetes. The process that develops these skills incorporates tools that reach results in each stage of the treatment. Therefore, education in diabetes is the main tool to guarantee patient's self-care, leading them to self-control. The present study aims to describe the importance of promoting education for type 1 and type 2 diabetic patients for the purpose to promote treatment adherence and encourage self-monitoring.

**Study population:** Patients from Diabetes Clinical Program in a Private Outpatient Institution (POI) in São Paulo (TOTAL CARE) who passed through education in comparison to diabetic patients who did not pass through diabetes education (N = 1673). The average age is mainly between 41 and 80 years old, 50% both sexes; in the two groups, 50% with more than 20 years of diagnosis.

**Methods:** The Patients from Diabetes Clinical Program—Total Care (N = 2152) were evaluated regarding adherence to multi-professional intervention (nutrition, eye examination, foot examination, dentist consultation). Patients who were seen by the diabetes Educator were compared with those who did not pass through this developing process as a stage of their treatment.

**Results:** Among evaluated patients the best adherence was found in the group who passed through Diabetes Education process (Fig. 1).



correspond to a heterogeneous group of pathologies, especially when it occurs in adults. Among these pathologies we have ketosis-prone diabetes (KPD), initially described by Banerji et al. 1994 in African Americans. KPD is a rare form of Diabetes Mellitus (DM) which presents with DKA and after initial glycaemic compensation may evolve into insulin exogenous independence. In recent years, cases of KPD have been reported in Africa, Japan, Spain, China and Pakistan, suggesting a global distribution. In Brazil, there is only one case report in the literature.

**Patients:** Here we report a prospective study of 4 cases of Brazilian KPD. The diagnosis of KPD was based on the occurrence of spontaneous DKA after the age of 30 years in individuals with newly diagnosed DM and not classifiable according to the classic types. The data during the presentation and follow-up of the KPD are summarized in the table Discussion The patient diagnosis age during the 4th and 5th decade of life is compatible with the studies described in the literature. The mean BMI of the group was 31.23 kg/m<sup>2</sup>, comparable to previous studies (28.9 kg/m<sup>2</sup> reported by Banerji, 37 kg/m<sup>2</sup> by Umpierrez, 30.3 kg/m<sup>2</sup> by Maldonado). The presence of family history of DM2 was 80% higher than that seen by other groups (Chihaoui (56%), Banerji (67%) and Mauvais Jarvis (67.6%). Significant recovery of beta cell function and time of insulin dependence in the group was reported to be close to 1 year, consistent with studies reporting a period of 1 to 2 years.

**Conclusion:** This is the first series of cases of KPD described in Brazil being characterized by DKA at diagnosis, absence of autoimmunity, recovery of beta cell function and evolution to insulin independence. Further studies are needed to verify the true prevalence of KPD in our population. The diagnosis of KPD should be considered in patients who, despite having the first manifestation in DKA and requiring a period of insulin therapy to resolve the glycototoxicity, may evolve to treatment with oral hypoglycemic agents (Fig. 1).

Characteristics	Case 1	Case 2	Case 3	Case 4
<b>Clinical features</b>				
Age	44	38	34	31
Gender	Male	Male	Female	Male
Weight (kg) loss history	7	12	NA	12
HFDM2	Yes	Yes	Yes	Yes
BMI (kg/m <sup>2</sup> )	38.4	36.0	26.8	32.0
Acanthosis nigricans	Yes	Yes	Yes	Yes
SAH	Yes	Yes	Yes	No
At Diagnostic Glycemia (mg/dl)	922	400	600	NA
C-Pep.(ng/dl)	NA	<0.1	1.9	NA
HbA1c at diagnosis (%)	14.3	8.9	10.5	NA
GAD antibodies	negative	negative	negative	negative
TDDM(years)	2	7	5	2
Time on Insulin	5 months		1 year	6 months
<b>Biochemical Characteristics</b>				
Triglycerides (mg/dL)	693	227	83	130
LDL (mg/dL)		256	40	208
C-Peptide (ng/mL)	2.59	11.0	2.44	ND
<b>Current Treatment</b>				
	Metformin	Metformin/Insulin	Diet and physical activity	Metformin
Insulin dose (U/kg)	Não	0,2U/kg	Não	Não
HbA1c current (%)	6.4	6.5	6.1	6.7

\*HDM2: family history of DM2 /TDDM: time of diagnose DM/TID: time of insulin dependence/ NA:note available

**Fig. 1** See text for description

**A99**

**Diabetes with ketosis tendency (flatbush diabetes) in Brazil: clinical features and evolution**

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A99**

**Introduction:** Until now it is known that diabetes presenting as ketoacidosis (DKA), in the absence of a detectable precipitating factor, may

**A100**

**Diabetes without borders: insertion of digital media into diabetes education actions developed within the state of Minas Gerais**

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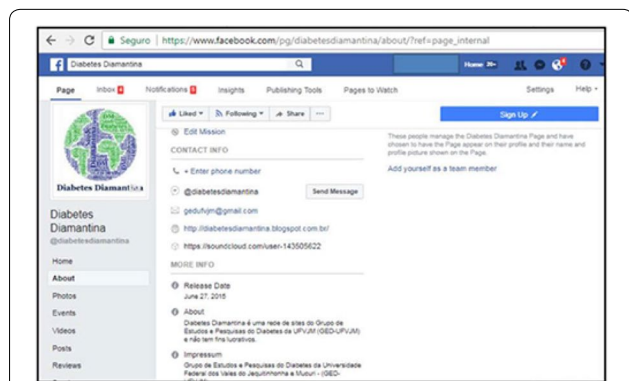
<sup>1</sup>UFVJM, Minas Gerais, Brazil; <sup>2</sup>Secretaria Municipal de Saúde de Diamantina, Minas Gerais, Brazil; <sup>3</sup>UNIMONTES, Minas Gerais, Brazil

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A100**

**Background:** Diabetes Mellitus (DM) is a chronic disease with increasing worldwide prevalence. Therefore, it is relevant to use digital media resources in diabetes education, especially to educate people living in the interior regions of the country, in which patients deal with limitations of access to health services

**Objective:** In this study, our aim was to report the insertion of digital media in diabetes education actions developed in a project of University extension.

**Materials and methods:** The project was developed by the Diabetes Study Group of the Federal University of Jequitinhonha and Mucuri Valleys (UFVJM) with the support of the Campus Radio (99.7 FM). The main educational actions were developed through the creation of the radio program entitled "Em sintonia com o diabetes" (In tune with diabetes). Between May 2016 and February 2017, different programs with about 90 s of duration, were transmitted 6 times a day, 6 programs unpublished every fortnight. The programs were written and recorded by students (undergraduate and postgraduate) under the supervision of UFVJM professors. After each fortnight of transmission the programs were converted into podcasts for posting on Diabetes Diamantina websites (SoundCloud, Facebook, Blogger and Google +). The Fanpage Diabetes Diamantina (FDD) was widely used as an online education strategy, in which various educational contents about DM were published or shared (Figs. 1 and 2).

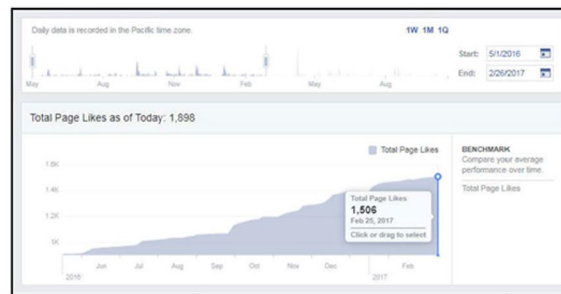


**Figure 1.** Image with general information about the Fanpage Diabetes Diamantina from the Facebook database. The page was used in the diabetes education of the present study and remains available and updated with public access to internet users. Downloaded from: <<https://www.facebook.com/diabetesdiamantina/>>. Accessed on 10.19.2017.



**Figure 2.** Image with monthly registration of the total number of Fanpage Diabetes Diamantina followers during the project (1,503 followers). Illustrative image taken from Fanpage database. Downloaded from: <<https://www.facebook.com/diabetesdiamantina/>>. Accessed on 10.19.2017.

**Fig. 1** See text for description



**Figure 3.** Image with monthly registration of the total number of likes received at Fanpage Diabetes Diamantina during the project (1,506 likes) and the current data (1,898). Illustrative image taken from Fanpage database. Downloaded from: <<https://www.facebook.com/diabetesdiamantina/>>. Accessed on 10.19.2017.

Country	People Reached	City	People Reached	Language	People Reached
Brazil	20,670	Diamantina, MG, Brazil	2,378	Portuguese (Brazil)	20,670
Portugal	281	São Paulo, SP, Brazil	1,500	Portuguese (Portugal)	679
Colombia	188	Belo Horizonte, MG, Br...	1,285	Spanish	565
Spain	111	Rio de Janeiro, RJ, Brazil	793	English (US)	337
Mexico	103	Montes Carlo, MG, Br...	634	Spanish (Spain)	187
Peru	87	Tefilo Otoni, MG, Brazil	578	English (UK)	58
United States of America	84	Salinas, MG, Brazil	478	French (France)	31
Argentina	78	Vijosa, MG, Brazil	406	Italian	16
Angola	40	Salvador, BA, Brazil	348	German	15

**Figure 4.** Image with registration of the number of people reached by Fanpage Diabetes Diamantina by country, city and language in the last 28 days. Illustrative image taken from Fanpage database. Downloaded from: <<https://www.facebook.com/diabetesdiamantina/>>. Accessed on 10.19.2017.

**Fig. 2** See text for description

**Results:** Our search identified a total of 128 unpublished radio programs that were produced and broadcast, reaching about 100,000 people from Diamantina and 10 other municipalities in the region. The FDD received more than 1,500 likes/followers and its publications reached 375,647 views in Brazil and in 44 other countries (Figs. 1 to 4). Diabetes Diamantina on SoundCloud shared 25 podcasts, which were reproduced online 1,196 times, and received 37 likes. The Diabetes Diamantina Blog hosted 42 posts about DM, with weekly frequency and the total of 49,040 views by people from Brazil and other 9 countries. In addition, 25 educational games were developed from the texts used in the radio programs.

**Conclusion:** The University extension actions of the project have been a high social relevance, given the scope of the sharing of educational content and the use of digital media. There was an admirable contribution to the academic formation and greater integration among those involved in this proposal for online diabetes education. The authors are grateful to the CNPq, FAPEMIG, Rádio 99.7 FM and UFVJM for the support.

**A101**  
**Diabetes mellitus evolution in two brothers with berardinelli-seip congenital lipodystrophy (BSCL), one R**

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**Case presentation:** Two brothers with neonatal diagnosis of Berardinelli-Seip Congenital Lipodystrophy (BSCL), born in Caculé-Bahia, without cases of diabetes or similar diseases in their family. Clinically, both present muscular hypertrophy and acromegaloid features. Case 1: MJFA, 17 years old, at 11 with hyperglycemia (fasting 108 mg/dL; HbA1C 6.4%), moderate hepatic steatosis and hypertriglyceridemia between 200 and 350 mg/dL. Serum leptin 1 ng/mL (reference range: 2–18). In July 2017, in use of Metformin 1.5 g, Fenofibrate 160 mg and Losartan 50 mg/day, with HbA1C 7.6% and triglyceride level of 453 mg/dL. Case 2: LJFA, 16 years old, at 10 with hyperglycemia (fasting 73 mg/dL; HbA1C 7%), left ventricle hypertrophy detected by echocardiography and hepatomegaly. Leptin 1.3 ng/mL. In 2016, HbA1C 7.8%, in use of Metformin 2 g/day, pioglitazone and vitamins E, A and D supplementation. 2017 Fibroscan revealed Hepatic Fibrosis F3. In April 2017, HbA1C 6.1% and triglyceride level 151 mg/dL. By that time, Metreleptin was initiated at a 5 mg/day dose (0.07 mg/kg/day) and Metformin was maintained. After 3 months, the patient has HbA1C 5%, triglyceride level 70 mg/dL, TGO 42 U/L and TGP 32 U/L.

**Discussion:** BSCL is characterized by the absence of functional adipocytes and leptin diminution. Major clinical criteria for diagnosis are: lipoatrophy (trunk, limbs and face), acromegaloid features, hepatomegaly, hypertriglyceridemia and insulin resistance. Minor criteria are: hypertrophic cardiomyopathy, psychomotor retardation, hirsutism, precocious puberty in women, bone cysts and phlebomegaly. Diagnosis is established in an individual with 3 major criteria or 2 major plus 2 or more minor criteria, and/or by detection of biallelic pathogenic variants in genes BSCL-2 and/or AGPAT-2. In the presented cases, diagnosis was established solely by clinical criteria. After 60 years of BSCL's first description and of unsuccessful management with general use drugs, metreleptin, a recombinant leptin analog, emerged with significant impact on metabolic parameters of BSCL, notably on insulin resistance and type 2 diabetes mellitus, lipid profile and liver enzymes, as noted here in the comparison between the two brothers, one in use of Metreleptin, and the other not.

**Final comments:** Metreleptin has been shown as pivotal in improving diabetes mellitus status in BSCL patients, and therefore it is necessary to spread its use by this population. Informed consent to publish has been obtained from these patients.

#### A102

##### Diabetic gustatory sweating as a manifestation of diabetic autonomic neuropathy: a case report

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**Case report:** We present a case of a 63-year old, female patient, who had been diagnosed with Type 2 Diabetes Mellitus (T2DM) 20 years ago, poorly controlled, as well as chronic kidney disease stage V. Patient has been undergoing hemodialysis for 3 years already listed for renal transplantation, with a history of diabetic retinopathy submitted to extensive photocoagulation, and also had a long-standing diagnosis of hypertension. She was referred to an endocrinology center with a seven-month complaint of profuse sweating, extending from the neck to the scalp. It was triggered by chewing any kind of food and lasting up to 20 min after ingestion without associated symptoms. She had initially been treated for Panic Disorder in another department. After evaluation and exclusion of other diagnoses (medication use, trauma, or facial surgery) as well as exclusion of another kind of diabetic neuropathy, such as sensitive or cardiac autonomic neuropathy,

the hypothesis of diabetic gustatory sweating (DGS) was established. A starch-iodine test was performed, which was positive, revealing an extensive area of sweating after eating a small amount of food. In the absence of contraindications, systemic treatment with oxybutynin was proposed due to the size of sweating area and involvement of the scalp. Patient experienced an excellent response as early as week 1 of medication use, with mild side effect of xerostomia; lower intensity sweating only occurred with the ingestion of large amount of food.

**Discussion:** DGS is considered a type of diabetic autonomic neuropathy, usually associated with other diabetic neuropathies and/or diabetic nephropathy. It is characterized by the appearance of sweating during and/or shortly after a meal, and its intensity depends on the amount of food ingested. It usually affects the upper thorax and face and may be accompanied by erythema. DGS seems to be underdiagnosed because of different intensities of symptoms and also due to the fact that it may not be a patient's primary complaint nor a physician's question. It is observed, however, that patients affected by DGS have worse quality of life. Therapeutic options include oral anticholinergics (oxybutynin, glycopyrrolate, scopolamine), alpha-blockers (clonidine), topical agents (glycopyrrolate), or botulinum toxin application. The onset of treatment improves the quality of life and decreases the intensity and frequency of sweating.

**Conclusion:** Even though underdiagnosed, diabetic gustatory sweating is a common condition among patients with long-term T2DM, which treatment provides an extensive improvement in the quality of life of those patients. Informed consent to publish the case report has been obtained from this patient.

#### A103

##### Diabetic ketoacidosis complicated with urinary tract infection in children: case report

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**Case report:** A 12-year-old female, previously diagnosed with type 1 diabetes mellitus, on regular insulin use, presented with lowered level of consciousness and increasing abdominal pain which first started a week before. The patient was then referred to Hospital de Mairinque. At the admission the patient presented hyperglycemia (capillary blood glucose = 453 mg/dL), metabolic acidosis (pH 7.01) and hypokalemia (potassium = 3.4 mEq/L). It was performed administration of intravenous (IV) saline solution containing 4U of regular insulin. Subsequently, administration of saline solution with insulin 0.1 U/g/h and replacement of HCO<sub>3</sub> were performed. She was intubated due to a decrease in the level of consciousness and bronchoaspiration. The patient was transferred to Conjunto Hospitalar de Sorocaba presenting leukocytosis (20,100/mm<sup>3</sup>). She was diagnosed with urinary tract infection (UTI) by *Candida* sp, and then admitted to the pediatric intensive care unit (PICU). The patient remained in the PICU for 14 days and had difficulty maintaining hydroelectrolytic and glycemic control, then she evolved with severe dehydration, acute renal failure and septic shock.

**Discussion:** Diabetic ketoacidosis (DKA) is characterized by dehydration, abdominal pain, Kussmaul breathing (a deep and labored breathing pattern), lowered level of consciousness, hyperglycemia (glycemia > 250 mg/dL), metabolic acidosis (arterial pH < 7.3 or plasma bicarbonate (HCO<sub>3</sub>) < 15 mEq/dL), ketosis and ketonuria. Common DKA complications are hydroelectrolytic disorders and cerebral edema (mainly in pediatric cases). In this case report we present a case of a

patient with type 1 DM who presented a non-specific UTI with atypical symptoms which usually occur in children who evolved with diabetic ketoacidosis. We emphasize the importance of the discussion of the case about the non-specific symptoms of UTI in children presenting with a complication which was diabetic ketoacidosis.

**Final comments:** It's possible that UTI promoted increase in pro-inflammatory cytokines, these may cause insulin resistance which decreases the use of glucose, increases lipolysis and, consequently, increases fatty acids in plasma. The oxidation of fatty acids leads to the production of ketone bodies in the liver. The case presented several complications caused by difficulties in maintaining hydroelectrolytic and glyceamic control, resulting in shock, long period of hospitalization and great risk to life.

Informed consent to publish had been obtained from the patient.

#### A104

##### Diabetic retinopathy in participants of a health promotion program in the north/Brazil region

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**Background:** Diabetes Mellitus (DM) is considered a worldwide public health problem. It is estimated that there are 415 million adults with DM by 2015 and this number is estimated to increase to 642 million by 2040 (IDF, 2015). Diabetic retinopathy (RD) is one of the main complications related to DM and the main cause of blindness in people aged 20-74 years (KLEIN; KLEIN, 2000). Thus, the duration of diabetes and glyceamic control are respectively the two most important factors related to the development and severity of RD (DSBM, 2016).

**Objective:** To evaluate the RD rate of people participating in a health promotion program for people with Diabetes Mellitus (GPSDM).

**Method:** A cross-sectional and descriptive study developed with 16 members of the Group of Health Promotion of People with Diabetes Mellitus (Grupo de Promoção da Saúde de pessoas com Diabetes Mellitus) (GPSDM) of the Federal University of Amapá (Universidade Federal do Amapá) (UNIFAP). The study was approved by the Ethics and Research Committee (Comitê de Ética e Pesquisa) (CEP) from UNIFAP, with Postal Code/CEP number: 39488114.6.0000.0003.

**Results:** Demographic and socio-economic background information: female gender predominance (56.2%), average age 58.5 (SD  $\pm$  11.7) years. CLI laboratory profile: 100% present Type 2 DM, of these, 7 (41.1%) carry the disease less than 5 years, 6 (37.5%), 5 to 10 years and 3 (18.7%) over 10 years; Hypertension is 68.7%, average Systolic Blood Pressure (SBP): 128.1 (DP  $\pm$  13.7) mmHg and Diastolic: 76.8 (DP  $\pm$  7.04) mmHg and HbA1c average 6.8% (PD  $\pm$  1.8) (Table 1).

**Conclusion:** After the socio-demographic and clinical-laboratory analysis of the study participants, it was verified that they did not present manifestations of microvascular complications due to DM, such as RD. This is due to the weekly monitoring and observance of their anthropometric values with intense health promotion and specialized consultations in the Health Promotion Group for people with Diabetes Mellitus. Therefore, according to the IDF (2015), good metabolic control or prevents the onset or delays the progression of its complications, especially microangiopathic ones (Fig. 1).

Table 1 - Characterization of people with Diabetes Mellitus as the clinical and laboratory profile. Macapá/AP/Brazil, 2017 (N = 16).

COMORBITIES	N	%
Diabetes Mellitus	16	100
Arterial hypertension	11	68.7
DM TIME DIAGNOSTIC	N	%
Less than 5 years	7	41.1
5 to 10 years	6	37.5
Above 10 years	3	18.7
CLINICAL AND LABORATORY PROFILE	M	DP
Mean Systolic Blood Pressure	128.1	$\pm$ 13.7
Mean Diastolic Blood Pressure	76.8	$\pm$ 7.04
Mean HbA1c	6.8	$\pm$ 1.8

Source: Data collection instrument

Funduscopy results: 13 (81.2%) people with DM without DR, of these, 1 (7.1%) need to investigate glaucoma and 1 (7.1%) have pterygium; 2 (11.7%) had cataracts in one eye, and only 1 (5.8%) has severe RD (Table 2).

Table 2 - Characterization of people with Diabetes Mellitus as to the Funduscopy Examination. Macapá/AP/Brazil, 2017 (N = 16).

RESULT OF FUNDUSCOPY	N	%
Presence of Cataract	2	11.7
No Diabetic Retinopathy	13	81.2
With Serious Diabetic Retinopathy	1	5.8

Source: Data collection instrument

Fig. 1 See text for description

#### A105

##### Diagnosis of diabetes mellitus type 1 before 1 year

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**Case report:** Patient, 1 years and 2 months, Diabetes Mellitus Type 1 (DM1) diagnosed at the age of 11 months. In this case the child presented polydipsia, polyuria, vomiting and dyspnea. It was hospitalized in the ICU dehydrated in diabetic ketoacidosis. The examinations have shown metabolic acidosis with an 825 mg/dl glycemia index. In the etiological investigation, the decarboxylase antibody of the glutamic acid (anti-GAD) and the antiisland were positive. The patient has used the glargine and the ultrafast insulin, but has evolved with a huge glyceamic variability. This way, he has started the therapy with the continuous infusion of insulin system and has improved the glyceamic control.

**Discussion:** The Diabetes diagnosis in children younger than 1 year old must include the pancreas malformation and auto immune diabetes, specially during the 6 first months. Between 6 months and 1 year, the auto immune DM1 is more common. The treatment with insulin in this age group leads to hypoglycemia risks. The continuous infusion of insulin system permits a glyceamic control with less glyceamic variability and glycemia reduction.

**Final considerations:** The Diabetes and its diagnosis in children younger than 1 year old is a challenge. The continuous infusion of insulin system permits a glycemic control with less glycemic variability. Informed consent to publish had been obtained from the patient.

#### A106

##### Differences in sedentary behavior measured by triaxial accelerometry between type 1 and type 2 diabetes patients

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**Introduction:** Sedentary behavior (SB) is defined as behavior that generates low energy expenditure (1.0-1.5 MET) in a sitting or reclining position during the waking time. SB has been the new focus for research in the field of “physical activity for health”. Therefore, it is necessary to establish a better understanding about SB profile among patients with type 1 (DM1) and type 2 (DM2) diabetes.

**Objective:** To compare SB between DM1 and DM2 groups.

**Method:** This is a cross-sectional study in which 100 patients DM1 and 150 DM2 were evaluated; > 19 years, both genders and at least 1 year of diabetes diagnosis. Patients with severe cardiovascular disease or functional disability were excluded. The study was approved by the local Ethics Committee. SB was measured by tri-axial accelerometers fixed with an elastic belt on the right side of the hip for 7 consecutive days, except in activities in the water or during nighttime sleep. Data were recorded at 60-s intervals and analyzed using ActiLife software version 6.13.3. Wear time validation was defined according to the following criteria: (A) 1 day was considered valid if it had at least 600 min (10 h) of use, without excessive counts (> 20,000 counts.min<sup>-1</sup>); (B) Only data that had at least 1 valid day was included in the analysis. SB was considered as time spent in activities ≤ 200 counts min<sup>-1</sup> of vector magnitude. Data were standardized for 17 h of use. Comparisons of means between groups DM1 and DM2 were performed using t-test for independent samples through IBM SPSS software, version 24. Data are showed as mean ± SD.

**Results:** DM1 group: 59% were women; Age (y): 37.07 ± 12.12; Diagnostic time (y): 17.21 ± 10.25; BMI (Kg.m<sup>-2</sup>): 25.14 ± 4.78; Waking time (h): 16.80 ± 1.44; A1C (%): 8.70 ± 1.96; SB (min): 533.72 ± 103.15. DM2 group: 60.7% were women; Age: 57.54 ± 9.27; Diagnostic time: 13.14 ± 7.88; BMI: 29.97 ± 5.41; Waking time: 16.34 ± 1.47; A1C: 8.21 ± 1.68; SB: 495.02 ± 115.04. When comparing the groups, all variables above showed statistical significance (p < 0.05). However, despite presenting statistically different BMI, both are still classified as overweight/pre-obese. DM1 group presented more SB than DM2 group (p = .007). DM1 were 38.69 min (7.25%) more sedentary than DM2 group.

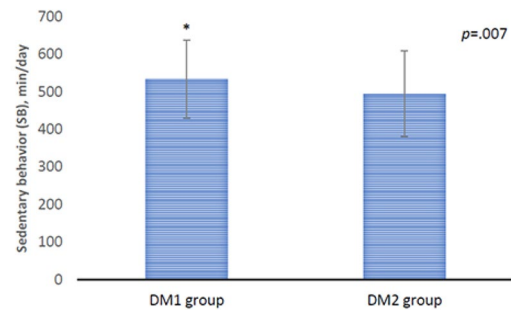
**Conclusion:** Although we already know that DM1 and DM2 have distinct etiological characteristics, this study is the first to demonstrate by objective measures that DM1 group presents more time in SB than DM2 group. Funding: CNPq and FAPERJ (Fig. 1).

**Table 1.** Characteristics of groups

	DM1 group	DM2 group
Age (y)	37.07±12.12	57.54±9.27 <sup>*</sup>
Diagnostic time (y)	17.21±10.25 <sup>*</sup>	13.14±7.88
BMI (Kg.m <sup>-2</sup> )	25.14±4.78	29.97±5.41 <sup>*</sup>
Waking time (h)	16.80±1.44 <sup>*</sup>	16.34±1.47
A1C (%)	8.70±1.96 <sup>*</sup>	8.21±1.68

Legend: BMI = Body mass index, y = years, h = hours. Data are showed as mean and standard deviation (SD). <sup>\*</sup>t-test (p<0.05).

**Figure 1.** Differences in sedentary behavior between DM1 and DM2 groups



**Key words:** Actigraph wGT3X-BT; Sedentary time; Diabetes

**Fig. 1** See text for description

#### A107

##### Dipeptidyl peptidase-4 inhibitors, pancreatic cancer and acute pancreatitis: a meta-analysis with trial sequential analysis

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**Background:** The use of dipeptidyl peptidase-4 (DPP-4) inhibitors may be associated with increased risk for pancreatic cancer and acute pancreatitis. Recent meta-analyses have reported conflicting findings. Therefore, we performed a meta-analysis to assess the risk of both pancreatic cancer and acute pancreatitis associated with the use of DPP-4 inhibitors. In addition, we investigate if the number of patients included in the trials was enough to establish definitive conclusions.

**Methods:** PubMed, EMBASE, Cochrane Library, and clinicaltrials.org were reviewed up to February 2017. We included randomized controlled trials, lasting 24 weeks or more, that compared DPP-4 inhibitors versus placebo or other antihyperglycemic agents. We also performed trial sequential analysis (TSA) to estimate if meta-analysis was powered for firm conclusions and a metaregression using duration of trial as a covariate to access if it interfered in the results found.

**Results:** A total of 59,404 patients were included. There was no relationship between the use of DPP-4 inhibitors and pancreatic cancer (Peto odds ratio 0.65; 95% CI 0.35–1.21), and the optimal sample size was reached to determine a number needed to harm (NNH) of 1000 patients. DPP-4 inhibitors were associated with increased risk for acute pancreatitis (Peto odds ratio 1.72; 95% CI 1.18–2.53), with a large NNH (one case for 1066 patients treated). Trial duration had no impact on the incidence of both outcomes.

**Conclusion:** In conclusion, there is no association between DPP-4 inhibitors and pancreatic cancer, and a small risk for acute pancreatitis was observed with DPP-4 inhibitors use. PROSPERO registry: CRD42016953346. Funding: Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) and Fundo de Incentivo à Pesquisa e Eventos – Hospital de Clínicas de Porto Alegre (FIPE-HCPA) (Fig. 1).

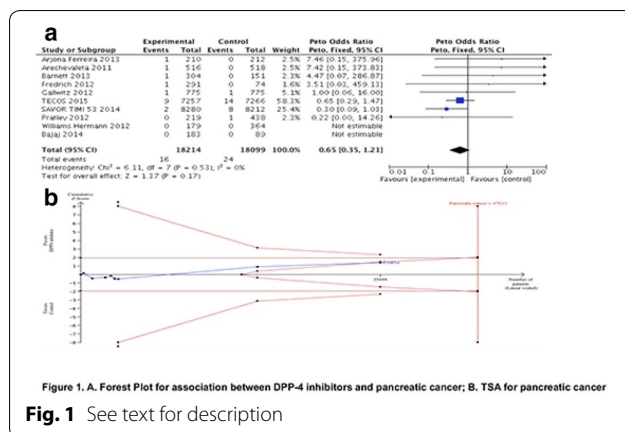


Figure 1. A. Forest Plot for association between DPP-4 inhibitors and pancreatic cancer; B. TSA for pancreatic cancer

Fig. 1 See text for description

### A108

#### Distribution of body fat in eutrophic diabetic individuals

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**Introduction:** The Body Mass Index (BMI) is a widely-applied method of diagnosing the nutritional status in clinic analyses, differentiating individuals in underweight, eutrophic, overweight or obese. However, the literature has demonstrated that those considered underweight or eutrophic are not always with the adequate percentage of body fat. Considering that the accumulation of fat in the abdominal region is considered a risk factor for endocrine, metabolic and cardiovascular diseases, even if BMI is within the limits of normality, it is essential to evaluate body composition in order to reduce the risk of new coronary incidents in diabetic individuals, who are already considered high-risk cardiovascular patients.

**Objective:** Identify the presence of inadequate body fat distribution in eutrophic diabetic individuals.

**Methods:** A retrospective study of data from patients hospitalized at a cardiology hospital during the period of 2010 to 2014 was carried out. Diabetic patients under 21 years old and of both sexes were included. Healthy BMI ranged between 18.5 and 24.9 kg/m<sup>2</sup> for adults (WHO, 1997) and 22–26.9 kg/m<sup>2</sup> for the elderly (Lipschitz, 1994). The variables taken into consideration were: gender, age, BMI and Abdominal Circumference (AC). Body fat distribution was assessed by CA ( $\geq 88$  cm for women and  $\geq 102$  cm for men). The study was approved by the Ethics and Research Committee (protocol number 346,129/2013) of the Universidade de Pernambuco hospital. The data were analyzed in the SPSS software, v. 13.0, adopting a significant value of  $p < 0.05$ .

**Results:** From 49 patients with mean age of  $66.4 \pm 9.2$  years with homogeneous distribution between genders, the prevalence of poor body fat distribution in eutrophic diabetic patients was 40.8%. It was found higher in females ( $p < 0.001$ ) and similar in adults and elderly ( $p = 0.301$ ).

**Conclusions:** Eutrophic diabetic patients exhibited an inadequate distribution of body fat, especially women, indicating that BMI should not be adopted as an isolated assessment resource. Abdominal obesity should be evaluated in diabetics since it represents an additional risk factor for cardiovascular diseases.

### A109

#### Drug interactions in elderly adults with vestibular disorders and consequences on glycemia

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**Background:** Aging can support a multiplicity of diseases that lead to polypharmacy and drug interactions, increasing health risks among elderly adults, including those with balance disorders and their associated comorbidities.

**Objective:** The aim of the study was to analyze drug interactions in elderly people with vestibular diseases and their consequences on glycemia.

**Materials and methods:** A retrospective study was carried out involving 131 elderly patients with a medical diagnosis of vestibular disease, at the research laboratory of a private university in São Paulo, Brazil. The study was approved by the Institution's Research Ethics Committee, approval number CAAE 24995713.6.0000.5493. We collected sociodemographic, clinical, and pharmacological data. The identification and classification of drugs were made according to the Anatomical, Therapeutic and Chemical Classification System (ATC code); analysis of drug interactions and their consequences were carried out using specialized software. A significance level of 5% was used for association analysis.

**Results:** There was a prevalence of women (86%) in the study population, and mean age was 70.5 years. Dizziness was the most frequent vestibular complaint (97%). There was concomitant use of 3–5 drugs (45%) and 6 or more drugs (27%). The most prevalent drugs were for treatment of cardiovascular (29%), nervous (23%), and digestive system disorders and metabolism disorders (14%), among others. Of the total, 71 elderly patients (54%) had some type of drug interaction, especially women and those aged 65–70 years (32%). The most frequent consequences of these interactions included hyperglycemia (13%) owing to a reduced insulin effect, and increased hyperglycemic effect of thiazides, and hypoglycemia (11%) due to an increased hypoglycemic effect, and increased risk of hypoglycemia. The Chi square test showed a significant association between concomitant use of 6 or more drugs and hyperglycemia ( $p < 0.001$ ). There was no association of these consequences with the most common vestibular symptoms (dizziness, body imbalance, and tinnitus) or the occurrence of falls ( $p > 0.05$ ).

**Conclusions:** Polypharmacy increases drug interactions and the use of 6 or more drugs may result in hyperglycemia, a serious condition associated with vestibular disorders. It is important to monitor insulin therapy and thiazide diuretics to avoid this therapeutic consequence. Glycemic control is relevant in the treatment of vestibular disorders and contributes to the control of body balance in elderly patients with vestibular complaints.

### A110

#### Educational intervention on self care with diabetic foot: study methodology

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**Introduction:** Among the chronic complications of diabetes mellitus (DM), there is the diabetic foot. This condition requires great investment of care and permanent educational interventions that can contribute to reduce this complication. In Nursing, there are different technologies that promote the emancipation of the people involved in the care process. In the classification of technologies highlighted in this study the construction of an educational technology, the primer type.

**Objective:** To describe the process of building an educational booklet on self-care to the diabetic foot.

**Method:** Methodological approach, in which the steps are followed: the content and type of technology selection to be built, imaging, typesetting and composition of the layout. Among the selected and addressed care in the booklet, the highlights: daily foot inspection to detect early minor trauma, care such as washing and drying the feet,



particularly the interdigital spaces to avoid injury, hydration of the feet to prevent drying of the skin with moisturizer use, cutting the toenails with clippers and nail scissors with rounded tip, and others. The ethical and legal aspects of research involving human beings were respected in accordance with Resolution 466/2012 and the project was approved by the Ethics Committee of the State University of Ceará (UECE) under Opinion No. 728464/2014.

**Results:** The work resulted in the production of the final version of the booklet, which was entitled "Healthy Foot's Foot Well Care". The construction process of the booklet was based from the items of the Accession Questionnaire Self Care Patients with Diabetic Feet (QPED) Silva (2014).

**Conclusion:** The feature is facilitator for the improvement of knowledge and self-care practices with diabetic foot.

#### A111

##### Educational strategies on insulin therapy for young people with diabetes mellitus: systematic review

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**Introduction:** Brazil is the third country with the highest number of Type 1 Diabetes (T1D) new cases per year in young people. Treatment requires the development of skills and knowledge for self-care. Among behaviors that are expected, taking medication is challenging, since insulin therapy is a highly complex subject and requires an adequate educational approach according to age group.

**Objective:** To identify evidence from the literature about educational strategies on insulin therapy targeted at young people with T1D.

**Method:** A systematic review was led in October 2016. Searches were conducted at Medline via PubMed, EMBASE, CINAHL, LILACS and ERIC databases. MeSH terms used were Insulin/therapeutic use, Patient Education as Topic, Diabetes Mellitus Type 1, Child, Infant, Adolescent and other keywords. Primary studies on educational strategies for insulin therapy targeted to young people with T1D were included. Studies regarding insulin pump therapy were excluded.

**Results:** 226 references were identified of which 12 met the inclusion criteria. Studies were published between 1991 and 2013. Educational strategies aimed at young people (from 8 to 24 years old) were described. These strategies were implemented in a large variety of.

**Methods:** One-on-one sessions, in groups, by telephone, by a text messages, through role play and diabetes camps. Studies did not focus solely on insulin therapy education, but rather on general aspects of diabetes education. Positive results were described regarding quality of life, reduction of hypoglycemia episodes and number of hospitalizations. No significant results were described in terms of the improvement of metabolic control.

**Conclusions:** The development of educational strategies for young people with T1D is needed. Educational strategies should be tailored by using appropriate language, and focusing specifically on insulin therapy and its complexity. The development of interventions to promote self-care behaviors related to insulin therapy contributes with teaching guidelines to young people with T1D, with promoting adherence to drug therapy, and with improving metabolic control.

#### A112

##### Alpha-linolenic acid supplementation effects on endoplasmic reticulum stress in visceral adipose tissue from morbid obese patients

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Alpha-linolenic acid supplementation effects on endoplasmic reticulum stress in visceral adipose tissue from morbid obese patients. 2017.

Tese (Doutorado)—Faculdade de Medicina de Ribeirão Preto, Universidade de São Paulo, Ribeirão Preto, 2017. Currently, obesity is considered a worldwide epidemic. It is associated with chronic inflammation and stress activation of the endoplasmic reticulum (ERE), related to the pathogenesis of various diseases such as type 2 diabetes mellitus, cardiovascular diseases, cancer, hypertension, among others. In this context, studies are needed to find alternatives that improve the inflammatory process. Several studies in humans and animals have already demonstrated the anti-inflammatory properties of omega-3 fatty acid. The objective of our study was to evaluate the effects of alpha-linolenic acid (ALA) supplementation on the metabolism and stress of the endoplasmic reticulum in obese patients. A prospective, randomized, placebo-controlled, double-blind study was conducted. In total, 52 patients were randomized to supplementation with 3 g/day of ALA or placebo, 27 individuals from the omega-3/ALA group and 25 from the control group. Lipid, glycidic and inflammatory profile were evaluated before and after supplementation. Visceral adipose tissue (TAV) was collected during bariatric surgery after supplementation. The fatty acid profile incorporated in the TAV was evaluated by gas chromatography. Genes were evaluated by real-time PCR. There was no change in serum levels of IL-6 ( $p = 0.2201$ ), TNF- $\alpha$  (0.7703) and CRP ( $p = 0.57$ ) after supplementation with ALA, but we observed a decrease in serum Leptin levels ( $P = 0.0154$ ) and IP-10 ( $p = 0.0410$ ), inflammatory cytokines, and increase in IL-4 ( $p = 0.0211$ ), anti-inflammatory cytokine. Significant incorporation of ALA ( $p = 0.0002$ ), EPA ( $p < 0.0001$ ) and DHA ( $p = 0.0005$ ) into the TAV was observed. Molecular evaluation showed an increase in the gene expression of XBP1 ( $p = 0.0013$ ), sXBP1 ( $p < 0.0001$ ), EIF2- $\alpha$  ( $p = 0.0063$ ), GADD34 ( $p = 0.0117$ ) and CCT4 chaperone ( $p = 0.0001$ ), decrease in the gene expression of leptin ( $p = 0.0410$ ) and ATF-6 ( $p = 0.0305$ ) and a tendency to decrease the gene expression of CHOP. We can conclude that ALA can modulate ERE through the IRE1/XBP, PERK and ATF-6 pathways, leading to increased chaperones (CCT4), which may demonstrate a therapeutic potential of ALA in obese patients.

#### A113

##### Effect of dapagliflozin in energetic and glycemetic homeostasis in the brain and hypothalamic functionality in humans

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**Background:** In type 2 diabetes mellitus, sodium-glucose co-transporter inhibitors type 2 (SGLT-2) reduce the renal glucose reabsorption threshold, resulting in glycosuria, lower glycototoxicity and insulin resistance, improved beta-cell function, loss of body weight and consequent improvement of glycemetic control. Glucose is the main source of energy for the brain and, in the hypothalamus where the mechanisms of hunger and satiety are regulated, the expression of SGLTs may be important in the detection of glucose and a possible therapeutic target for obesity. So, the aim of this study was to evaluate the effect of SGLT-2 inhibitor (dapagliflozin) on glycemetic and energetic homeostasis and the hypothalamic functionality of healthy people.

**Methods:** Twenty healthy and non-diabetic women (19–37 years old) were evaluated at baseline and 7 days after dapagliflozin (10 mg/day), maintaining their regular lifestyle. Body mass index (BMI), sagittal abdominal diameter, body composition by electrical bioimpedance and energy expenditure of resting and oxidation of energetic substrates in fasting by indirect calorimetry were analyzed. Functional magnetic resonance imaging detected the activation of brain areas against the stimulation of glucose and dapagliflozin. From the oral glucose tolerance test (TTOG), insulin sensitivity, hepatic insulin extraction and beta-cell function were assessed by mathematical modeling. Moreover, glucose, insulin, peptide C, glucagon, glycated hemoglobin, adiponectin and free fatty acids were measured.

**Results:** After the intervention, there was no reduction in BMI ( $21.7 \pm 2.0$  vs.  $21.5 \pm 2.0$  kg/m<sup>2</sup>,  $p = 0.05$ ), sagittal abdominal diameter ( $15.1 \pm 1.1$  vs.  $14$ , ( $p = 0.05$ ) and fat percentage ( $28.4 \pm 6.3$  vs.

27.6 ± 4.0%,  $p = 0.46$ ). Calorimetry did not identify significant changes in energy expenditure and respiratory quotient. There was a reduction in glycemia (75 ± 7 vs. 71 ± 7 mg/dL,  $p = 0.02$ ), a trend to reduce insulinemia (5.7 ± 3.6 vs. 3.9 ± 3.5 mU/mL,  $p = 0.05$ ) and increased adiponectin levels (3.2 ± 1.4 vs. 5.7 ± 3.3 µg/mL,  $p = 0.02$ ) and free fatty acids (0.6 ± 0.2 vs. 0.3 mmol/L,  $p = 0.02$ ). In TTOG, after intervention, there was better efficiency in the glycemic curve decay ( $p = 0.028$ ) without accompanied changes in the curves of insulin, peptide C and glucagon. Also, there was an increase in insulin sensitivity index with oral glucose-OGIS ( $p = 0.048$ ), reduction of beta-cell sensitivity to glucose, greater efficiency in the first phase of insulin secretion and reduction in the rate of insulin secretion to a glycemia of 90 mg/dL. Functional magnetic resonance imaging examined correlation and connectivity among the hypothalamus and other brain regions, such as insula and primary gustatory cortex, suggesting that the use of dapagliflozin may alter these connections.

**Conclusions:** The intervention with dapagliflozin in healthy women did not alter energetic homeostasis and provided a set of metabolic adaptations to maintain normal glycemic levels and to prevent hypoglycemia against the glycosuric effect of the drug. The use of dapagliflozin may alter the connections among the hypothalamus and specific regions of the brain, which are related to food intake. Thus, dapagliflozin can act similarly to glucose and play a possible role in hunger control.

#### A114

##### Effect of insulin on renal maximum glucose transport capacity in healthy volunteers and patients with type 2 diabetes

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**Background:** Most studies, though not all, indicate that the maximum glucose transport capacity of the proximal tubule (TmG) is increased in patients with type 2 diabetes (T2D). Furthermore, one study from 1951 suggested that insulinization may reduce TmG. In contrast, in human embryonic kidney 293T cells insulin increases the activity of transfected human SGLT2. To assess these issues de novo, we examined the effect of physiological hyperinsulinaemia on TmG and urinary glucose excretion (UGE) in healthy subjects (NGT) and T2D patients under steady-state conditions of plasma glucose and insulin concentrations. Subjects and.

**Methods:** 13 T2D (7F/6 M; 54 ± 6 years, mean ± SD; BMI = 29.5 ± 5.0 kg/m<sup>2</sup>; HbA1c = 7.6 ± 0.6%) and 12 NGT (6F/6 M; 36 ± 10 years; 24.2 ± 3.0 kg/m<sup>2</sup>) received a IV 7-h constant somatostatin (400 µg/h) and a variable glucose infusion to achieve steady-state glycaemias of ~ 22 mmol/L in 1 h and to maintain this level for the next 3 h (CT period). Then, a constant insulin infusion (1 mU min<sup>-1</sup> kg<sup>-1</sup>) was started and maintained for additional 3 h (INS period) while clamping glycaemia at CT levels with the use of an ad hoc algorithm. Urines were collected separately for the two study periods for the measurement of glucose and creatinine.

**Results:** Plasma glucose plateaus were similar across group and study periods. Exogenous glucose infusion rate (GIR) was similar in T2D and NGT during the CT period (26 ± 12 vs 36 ± 16 µmol kg MM<sup>-1</sup> min<sup>-1</sup>;  $p = ns$ ); during the INS period, GIR rose much higher in NGT than T2D (157 ± 46 vs 71 ± 47 µmol kg MM<sup>-1</sup> min<sup>-1</sup>,  $p < 0.0001$ ). Creatinine clearance was similar between groups and study periods. During the CT period, UGE was significantly lower in T2D than in NGT (490[280] vs 690 [180] µmol min<sup>-1</sup>, median and [IQR],  $p = 0.03$ ) whereas fractional glucose excretion (FEG) tended to change (17 ± 6 and 20 ± 5%, respectively;  $p = 0.0502$ ). During the INS period, both UGE and FEG rose above CT levels in NGT (to 770 [320] µmol min<sup>-1</sup> and 24 ± 3%, respectively,  $p < 0.005$  for both vs CT), whereas UGE tended to change in T2D (530[310] µmol min<sup>-1</sup>;  $p = 0.0546$ ) and FEG was unchanged

(17 ± 7%,  $p = ns$ ). In the pooled data of T2D and NGT participants, FEG was positively associated with GIR during the INS period ( $Rho = 0.462$ ,  $p = 0.0008$ ).

**Conclusions:** Acute physiological hyperinsulinaemia during steady-state hyperglycaemia increases urinary glucose excretion in NGT subjects. This insulin effect is impaired in patients with type 2 diabetes, and may be related to insulin resistance.

#### A115

##### Effect of sglt-2 inhibition by dapagliflozin on mice hypothalamus

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**Background:** The balance between eating behavior and energy expenditure is coordinate by specialized neurons in hypothalamic nuclei. In the arcuate nucleus, NPY/AgRP and POMC/CART neurons respond to peripheral signals regarding energetic status. Variations in blood glucose levels generate a hypothalamic response that is still poorly understood, however the transporters GLUT and SGLT play an important role in this process. The sodium-glucose co-transporter type 2 (SGLT-2) is expressed in the kidney and brain and its inhibition leads to glycosuria and caloric loss concomitantly with a decrease in body weight and an apparent increase in food intake. Thus the aims of this study were to evaluate (i) the effect of SGLT-2 inhibition by dapagliflozin in the hypothalamus of mice; (ii) the potential effect of dapagliflozin on body weight, food intake and glycemic homeostasis; (iii) to characterize the hypothalamic expression of neurotransmitters involved on the regulation of food intake and energy expenditure.

**Methods:** C57BL/6 mice received vehicle or dapagliflozin (1, 5 or 10 mg/kg) by gavage once a day for 2 weeks. Body weight and food intake were evaluated at treatment times 0, 7 and 14 days. At the end of the treatment, glucose tolerance was evaluated by ipGTT as well as epididymal adipose tissue weight and neurotransmitters by immunofluorescence.

**Results:** SGLT-2 is expressed in the arcuate nucleus and colocalizes with POMC and NPY neurons. The treatment with dapagliflozin did not alter food intake significantly, although there was a decrease in body weight gain (mean = 0.56 ± 1.1 g,  $p < 0.05$ ) and a trend to reduce epididymal adipose mass (mean = 0.15 ± 0.02 g,  $p = 0.13$ ). There was increased glycosuria (mean = 307.2 mg/dL, min = 30 mg/dL, max = 1221 mg/dL,  $p < 0.05$ ), improved fasting glycemia (mean = 165.6 ± 28.8 mg/dL,  $p < 0.05$ ) and reduction in the area under glucose curve during the glucose tolerance test (mean = 28,078 ± 5623.5 arbitrary units,  $p < 0.05$ ).

**Conclusions:** SGLT-2 is expressed in the hypothalamic arcuate nuclei and colocalizes with neurons that control energetic homeostases. The treatment with dapagliflozin for 2 weeks improved fasting glycemia and glucose tolerance, promoted glycosuria and reduced body weight gain without altering food intake. Understanding the mechanisms involved in body weight control promoted by dapagliflozin could guide strategies to enhance weight loss in obesity concomitantly with diabetes treatment.

#### A116

##### Effect of weight loss induced by bariatric surgery on male gonadal function

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Functional hypogonadism in obese male patients is considerably higher if compared with the general population, fact that is widely reported in literature. One of the ways to study this condition is to analyze gonadal hormonal changes after the weight loss resulting from bariatric surgery, being this approach employed in this study. The present work comprises a longitudinal and observational investigation of 27 men, aged between 30 and 64 years, body mass index (BMI) greater than 35, that underwent to bariatric surgery (Roux-en-Y gastric bypass and the sleeve gastrectomy). The clinical data were recorded, for all subjects, before and after 6 months of the surgical procedures. After 6 months of the surgery, a substantial weight loss from  $158.5 \pm 25.8$  to  $119.4 \pm 20.8$  kg ( $p < 0.0001$  for both) was verified. The BMI and total testosterone (TT) level ranged from  $51.9 \pm 6.6$  to  $39.2 \pm 5.6$  ( $p < 0.0001$ ) and  $225.5 \pm 96.9$  ng/dl to  $394.4 \pm 160.9$  ng/dl ( $p < 0.001$ ), respectively. The hypogonadism ( $TT \leq 300$  ng/dl), verified in 85% of the subjects before the surgery, persisted in only 26% of these patients after 6 months. There were no statistical differences in hypogonadism neither between the two surgical techniques, nor between the patient groups with and without diabetes. The results point out that the weight loss induced by bariatric surgery leads to an important recovery of the gonadal function in a significant number of male patients.

#### A117

##### Effect on the reproductive performance of *Curatella americana* treatment during the pregnancy of rats with mild diabetes

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**Introduction:** During pregnancy, hyperglycemia can lead to maternal and fetal complications, causing reproductive changes. Alternatives are considered to treat diabetes and prevent its complications, and one of these alternatives is the use of medicinal plants, such as *Curatella americana*. However, there is no scientific evidence on the safety of this plant effect during gestation.

**Objective:** To evaluate the effects of the aqueous extract of *Curatella americana* in the reproductive performance of pregnant rats with mild intensity hyperglycemia.

**Methods:** Diabetes was induced in newborn female Wistar rats, at 24 h after birth, by subcutaneous injection of Streptozotocin at a single dose of 100 mg/kg. At 110 days of age (adulthood), oral glucose tolerance test (OGTT) was performed to confirm the mild diabetes model. After confirmation of the diabetes, the rats were mated and distributed into 4 experimental groups ( $n = 12$  animals/group): Control: Non-diabetic rats treated with water; Control Treated: Nondiabetic rats treated with the plant; Diabetic: Diabetic rats treated with water; Diabetic Treated: Diabetic rats treated with the plant. The administration of the *Curatella americana* leaves aqueous extract, at dose of 300 mg/kg, was done daily, by gavage, throughout pregnancy. The maternal weight was verified at the beginning and end of pregnancy. On the morning of the 21st day of pregnancy, the rats were anesthetized and the uterus was removed. Pre- and post-implantation loss rates were calculated.

**Results:** Both diabetic groups exhibited higher pre-implantation loss rates and lower maternal weight gain. The treatment with the plant change no others reproductive parameters.

**Conclusion:** The reproductive alterations showed in the present study were caused by hyperglycemia, and treatment with *Curatella americana* did not cause any maternal impairment at this dose.

#### A118

##### Effectiveness of gestational diabetes mellitus screening in the central region of Rio Grande do Sul

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**Background:** One of the most observed pathologies in pregnancy is Diabetes Mellitus (DM). When Gestational Diabetes Mellitus (GDM) is not identified and treated can lead to complications during gestation and/or delivery, besides woman with GDM may develop Type 2 DM in the future, and their children can become obese and have DM as adults. In Brazil, according to the Ministry of Health (MH), the screening should be universal with assessment of risk factors and fasting glycemia (FG) at the first prenatal visit, ideally in the first trimester. If negative, FG should be repeated in the second trimester. If positive, oral glucose tolerance test (OGTT) should be requested. The cut-off point of normal glycemia in pregnancy of 4.72 mmol/L was standardized by a Brazilian multicenter study using parameters from the World Health Organization with sensitivity of 94%.

**Objective:** The aim of this study was to evaluate the effectiveness of GDM screening according to the MH guideline, using FG criteria in postpartum women in the public health care who had their deliveries at the University Hospital of Santa Maria-RS.

**Methods:** In a cross-sectional study, postpartum women over 18 years of age who underwent prenatal care at the health units and had the pregnant woman's card at the time of the interview were included. Data were collected through interviews, analysis of the pregnant women's card and evaluation of medical charts between January and April of 2015. Informed consent to publish has been obtained from patients. The study was approved by University of Santa Cruz do Sul Institution's Ethics Board, approval number 37290714700005343.

**Results:** Of the total of 283 postpartum women studied 85.5% performed a FG, 14.5% did not perform the test. Negative screening was observed in 74.8% of postpartum women, while 25.2% had positive test. Of the postpartum women with negative screening, only 50.3% continued research. Of the women with positive screening who should progress in the investigation performing the OGTT, only 37.7% did it.

**Conclusion:** In this group was observed that GDM screening process, through FG was not performed effectively in 59.7% of the women, as recommended by MH. Therefore, it is necessary to identify the factors responsible for ineffectiveness and promote awareness and training of the health team in the basic care to improve the screening and diagnosis of this pathology, aiming to reduce maternal-fetal morbidity and mortality and its future consequences.

#### A119

##### Effects of acute elevation of plasma NEFA on incretin-stimulated insulin secretion

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**Background:** Plasma nonesterified fatty acids (NEFA) are an important source of energy during fasting and postprandial periods but their excess could have an inhibitory effect on insulin secretion (IS). Information on in vivo effects of NEFA on incretin-stimulated IS is lacking.

**Aim:** Assess the effects of acute hyperlipidaemia on incretin-stimulated IS in healthy subjects (HS).

**Methods:** 10 HS,  $34 \pm 3$  years, BMI  $24 \pm 2$  kg/m<sup>2</sup> were studied in 2 sets of experiments. First, each subject received a 75-g oral glucose tolerance test (CT-OGTT) and, a week later, an isoglycaemic intravenous

glucose infusion (CT-IIGT) matching glycaemic profile from CT-OGTT. Both tests were repeated during a 20% Intralipid infusion (60 mL/h) plus a primed continuous heparin infusion started 2 h before either test (L-OGTT and L-IIGT). The dynamics of IS were assessed by mathematical model of glucose and C-peptide responses.

**Main parameters:** insulin secretion rate (ISR); glucose sensitivity ( $\beta_{GS}$ —the mean slope of the IS/plasma glucose dose–response curve); glucose-induced potentiation (PGLU), a time-dependent modulation of the dose–response during IIG; incretin-induced potentiation (PINCR), which quantifies the time-course of the incretin effect, IE. The IE was also indexed as the oral-to-IV ratio of IS. Results NEFA rose from  $0.19 \pm 0.03$  to  $3.55 \pm 0.53$  mmol/L on the L-OGTT, and from  $0.23 \pm 0.03$  to  $3.77 \pm 0.45$  mmol/L on the L-IIGT ( $p < 0.005$  for both). Plasma triglycerides increased from  $0.7 \pm 0.1$  to  $3.2 \pm 0.6$  mmol/L on L-OGTT and from  $0.6 \pm 0.1$  to  $3.2 \pm 0.5$  mmol/L on L-IIGT ( $p < 0.005$  for both). While lipid infusion raised glycemia only marginally ( $p = ns$ ), it increased total ISR from 61 [26] to 78 [31] nmol  $m^{-2}$ , median [IQR] on the OGTT ( $p = 0.005$ ), and from 29 [26] to 57 [30] nmol  $m^{-2}$  on the IIGT ( $p = 0.02$ ). While neither  $\beta_{GS}$  nor PGLU was significantly affected ( $p = ns$ ), PINCR decreased from 1.6 [1.1] to 1.3 [0.2] units,  $p = 0.05$ . Moreover, during Intralipid infusion IE was significantly decreased between 0 and 90 min ( $p = 0.001$ ). The time-courses of GLP-1 and GIP did not change significantly, while the plasma ghrelin response to the OGTT declined from  $12.3 \pm 2.6$  to  $8.2 \pm 1.2$  ng/mL,  $p = 0.005$ . Lipid infusion also induced mild insulin resistance during the OGTT (as the oral insulin sensitivity index [OGIS] decreased from  $402 \pm 22$  to  $355 \pm 28$  mL  $min^{-1} m^{-2}$   $p = 0.05$ ).

**Conclusion:** An acute increment in plasma lipids stimulates total insulin secretion but selectively impairs incretin-stimulated insulin secretion.

#### A120

##### Effects of Bisphenol-A consumption on insulin secretion in ovariectomized female mice fed with hyperlipidic diet

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**Introduction:** Bisphenol-A (BPA) is used as a raw material in the production of everyday utensils, but there is evidence that it may have estrogenic, antiestrogenic and antiandrogenic actions related to increased adiposity and type 2 diabetes.

**Objective:** The effects of BPA on the development of obesity and glucose homeostasis in ovariectomized (OVX) and high fat diet (HFD) female mice.

**Methods:** Female Swiss mice with 80–100 days of life were OVX, after 2 weeks females in anestrus were distributed in the control groups (CTL): fed with normolipid diet and water containing 0.01% ethanol (vehicle); BPA control (CBPA): normolipid diet and water containing 0.01% ethanol and 1  $\mu$ g/mL BPA; HFD: diet containing 36 g% fat and vehicle; and (HBPA): HFD and BPA. After 3 months, glucose tolerance test (GTT) and islet isolation for insulin secretion were performed (CEUA UFRJ-Macaé: MAC035 approval). Data were analyzed for the distribution of normality (Shapiro–Wilk), followed by analysis of variances: parametric (ANOVA followed by Newman–Keuls) or non-parametric (Kruskal–Wallis followed by Dunns;  $P < 0.05$ ).

**Results:** HFD females had higher body weight (BW,  $57.3 \pm 2.3$  g) when compared to female CTL ( $47.8 \pm 1.8$  g). The HBPA group had higher CP ( $63.4 \pm 2.1$  g) when compared to HFD. During the GTT, HFD females presented hyperglycemia at 15 and 30 min of the test ( $444 \pm 13$  and  $453 \pm 23$  mg/dL) in relation to CTL ( $332 \pm 19$  and  $361 \pm 24$  mg/dL, respectively). HBPA female presented hyperglycemia similar to the HFD group ( $427 \pm 17$  and  $450 \pm 22$  mg/dL) at 15 and 30 min of GTT. AUC area in GTT was higher in HFD females ( $33,049 \pm 2931$  mg/dL  $min^{-1}$ ) than in CTL females ( $21,658 \pm 1910$  mg/dL  $min^{-1}$ ). However, HBPA

females had AUC area in GTT ( $32,409 \pm 1992$  mg/dL  $min^{-1}$ ) similar to HFD and CTL. Insulin secretion in response to 2.8 and 22.2 mM glucose did not differ between HFD islets ( $1.2 \pm 0.14$  and  $4.0 \pm 0.7$  ng/islet h) and CTL ( $0.88 \pm 0.1$  and  $2.0 \pm 0.3$  ng/islet h). However, islets isolated from HFD females secreted more insulin compared to 11.1 mM glucose ( $1.0 \pm 0.3$  ng/ilhota h) relative to CTL islets ( $0.5 \pm 0.2$  ng/islet h). Females consuming BPA and HFD hypersecreted insulin in response to 2.8 and 11.1 mM glucose ( $1.8 \pm 0.2$  and  $1.0 \pm 0.3$  ng/islet h).

**Conclusion:** Data to date demonstrate that the HFD diet causes glucose intolerance, when associated with BPA, elevates BW and generates impaired insulin secretion.

#### A121

##### Effects of educational strategy on sleep hygiene and light exposure on sleep quality, emotional stress and glycemic control in type 2 diabetes mellitus: randomized controlled trial

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**Background:** The relationship between type 2 diabetes mellitus (DM2) and sleep is already established and studies indicate that this relationship is bidirectional. Measures to improve sleep quality may reduce the emotional stress related to diabetes and consequently improve glycemic control.

**Aim:** To evaluate the effects of educational strategy of sleep hygiene and light exposure on sleep quality, emotional stress and glycemic control in people with T2DM.

**Methods:** Randomized Controlled Trial (RCT), unicego, involving 91 participants with DM2, attended in primary care service, in a municipality in the south of Minas Gerais, Brazil. Participants were randomized into two groups: intervention (IG), who received the educational strategy of sleep hygiene and exposure to light and control (CG), who received guidance on foot care and were followed for a period of 3 months. Both groups received face-to face counseling at 1-month intervals and telephone reinforcements each week, with the exception of the last month. The variables related to sociodemographic and clinical characterization, sleep quality, diabetes-related distress (DRD) and glycated hemoglobin (HbA1c) were performed at the baseline and at the 3rd month of follow-up. The primary endpoint was the assessment of sleep quality observed after 3 months of follow-up. The Consolidated Statement of Reporting Trials (CONSORT) was followed for randomization, masking, group tracking and data analysis. Linear mixed effects models were used to compare the variables over time and the linear regression model to correlate the variables with the primary outcome. The level of significance was set at 5%. Ethics Approval: The study was approved by the University of Campinas' Ethics Board, approval number 1.183.930/2015 and conducted according to the recommendations of the Declaration of Helsinki.

**Results:** Comparison over time, between groups, showed that IG presented better sleep quality (mean of 5.02 versus 6.30 points,  $p = 0.0272$ ). For the IG, over time, there was an improvement in sleep quality ( $p < 0.0001$ ) and in the mean of DRD score ( $p = 0.0001$ ). Through a linear regression model, it was observed that the variables of DRD, gender and type of group had influence, with significant statistical difference on sleep quality. Being male and showing improvement in DRD levels contributed significantly to sleep quality improvement ( $p = 0.0314$  and  $p = 0.0202$ , respectively). In relation to the groups, belonging to the IG contributes to the improvement of sleep quality ( $p = 0.0024$ ).

**Conclusion:** This study demonstrated that measures of sleep hygiene and exposure to light have a positive effect on the improvement of sleep quality, emotional stress and glycemic control in individuals with T2DM.

**A122****Effects of nurse telesupport on transition between specialized and primary care in diabetic patients**

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**Introduction:** The prevalence of diabetes mellitus type 2 (T2DM) is increasing and the primary health care (PHC) plays an important role in its management. In an attempt to improve the training of PHC team, the National Telehealth Program was created. One of the aims of this program is to stimulate the transition of care, increasing the safety of outpatient discharge from specialized services.

**Objectives:** To evaluate the effectiveness of a telehealth strategy in T2DM patients who were discharged from a tertiary hospital outpatient clinic.

**Methods:** Randomized clinical trial open-label (randomization 1:1). Were included T2DM patients on treatment at Endocrinology Service of Hospital de Clínicas de Porto Alegre, with glycated hemoglobin (HbA1c) < 8% and indication of discharge. The exclusion criteria were: glomerular filtration rate < 30 mL/min, symptomatic ischemic heart disease, severe peripheral and autonomic neuropathy. Both groups were discharged and were followed-up in PHC. The intervention group received phone-calls for education in T2DM by a trained nurse every 3 months and a free phone number (0800) for resolution of any doubt. The control group received calls without intervention. After 1 year of follow-up, both groups returned for clinic evaluation.

**Results:** To date, 145 patients were included in the study (target 150), with 2 follow-up losses. The sample consisted of 62.3% women, 67.2% white, with median age of 65.3 ± 11.2 years-old, BMI 31.1 ± 7.4, with a DM duration of 15.4 ± 10.8 years. Medium HbA1c (%) at discharge was 7.01 ± 0.68, fasting glucose (mg/dl) was 127.37 ± 42.33 and creatinine (mg/dl) was 0.91 ± 0.29, without differences between groups at baseline. To date, 67 patients were evaluated after 1 year. There were no differences between groups (control and intervention, respectively) in terms of HbA1c (7.6% × 6.9%, p = 0.16), systolic blood pressure (129 mmHg × 129 mmHg, p = 0.85), diastolic blood pressure (77 mmHg × 75 mmHg, p = 0.35) and total cholesterol (161 mg/dL × 160 mg/dL, p = 0.48).

**Conclusions:** In a preliminary analysis of the data, after 1 year of follow up, the patients maintained a good glycemic control, with no differences between the groups. These findings need to be confirmed in the final analysis of the study.

**A123****Effects of physical exercise on adiponectin transduction signal in hypothalamus of obese animals**

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**Introduction:** Physical exercise is one of the main interventions capable of modulating energy homeostasis, but little is known about the relationship between physical exercise and adiponectin in the energy balance of regulatory mechanisms.

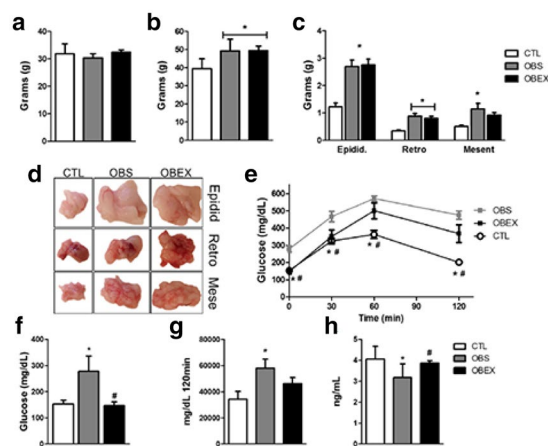
**Objective:** Verify the acute physical exercise effect on the adiponectin signaling pathway modulation in the hypothalamus of obese mice and its action on energetic homeostasis.

**Methods:** Swiss mice, 6 weeks old, were divided into 3 groups exposed to different diets: CTL-standard diet; OBS-hyperlipidic diet; OBEX-hyperlipidic diet and submitted to the protocol of acute physical exercise (3 sessions of 45 min at treadmill with break of 15 min between each session). Serum adiponectin, glucose tolerance, food intake and energy expenditure were analyzed. For the molecular analyzes, the animals received stimulation of intraperitoneal leptin. Signaling pathway of leptin proteins, adiponectin and PI3K-Akt in the hypothalamus and UCP1 in brown adipose tissue were analyzed.

**Results:** It was demonstrated that the OBEX group did not present alteration in the total body mass compared to the OBS. However, an increase in glucose tolerance and serum adiponectin of OBEX were observed compared to OBS (Fig. 1). There was a reduction in food intake in OBEX when compared to OBS, and APPL1 mRNA levels correlated negatively with food intake (Fig. 2). In addition, OBEX showed increased oxygen consumption and heat production compared to OBS. At the molecular level, OBEX presented an increase in UCP1 compared to the other groups (Fig. 3). In addition, physical exercise was not able to modulate the leptin pathway (Fig. 4). However, the exercise had a positive effect on the APPL1, key protein in the adiponectin transduction pathway. It was observed that OBS group presented reduction in the hypothalamic APPL1 in relation to the CTL group and the OBEX animals showed APPL1 increased compared to OBS (Fig. 5). The animals exercised showed increased protein content in the PI3K-Akt signaling pathway in the hypothalamus (Fig. 6). Finally, in both animal and human bioinformatics analyzes, there was a strong correlation between the levels of mRNA of APPL1 and hypothalamic PI3K (Fig. 6).

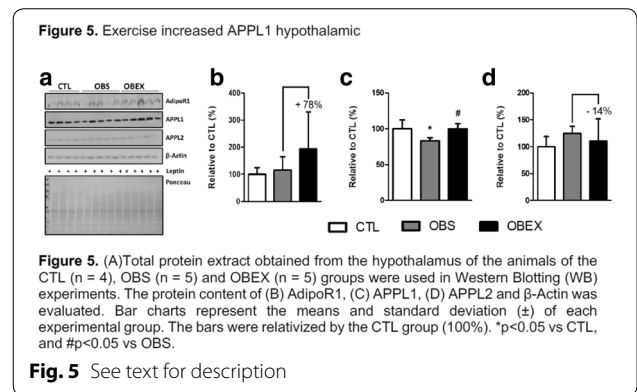
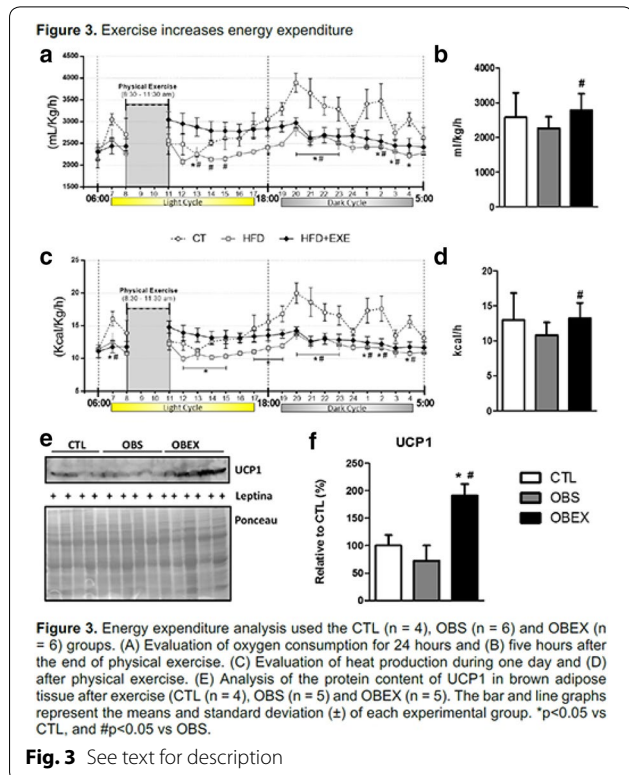
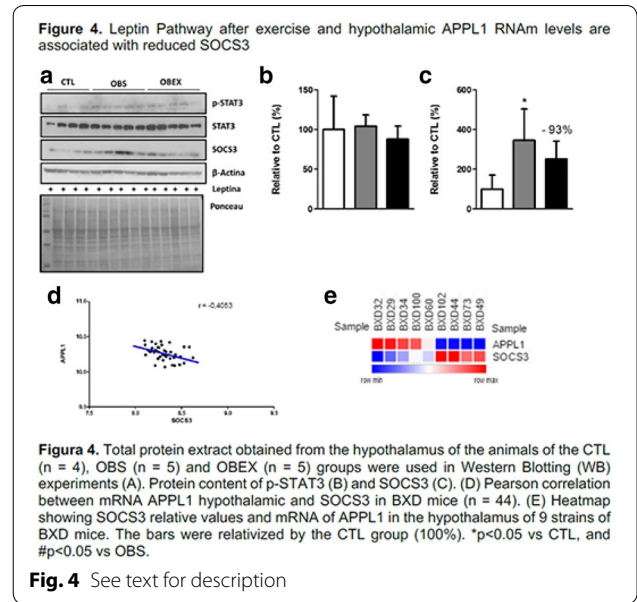
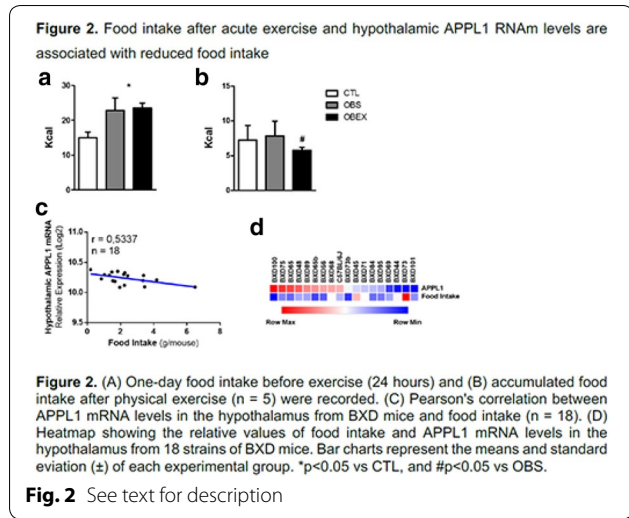
**Conclusion:** Physical exercise is able to increase the protein content of APPL1 in the hypothalamus of obese mice, increase energy expenditure and reduce food intake.

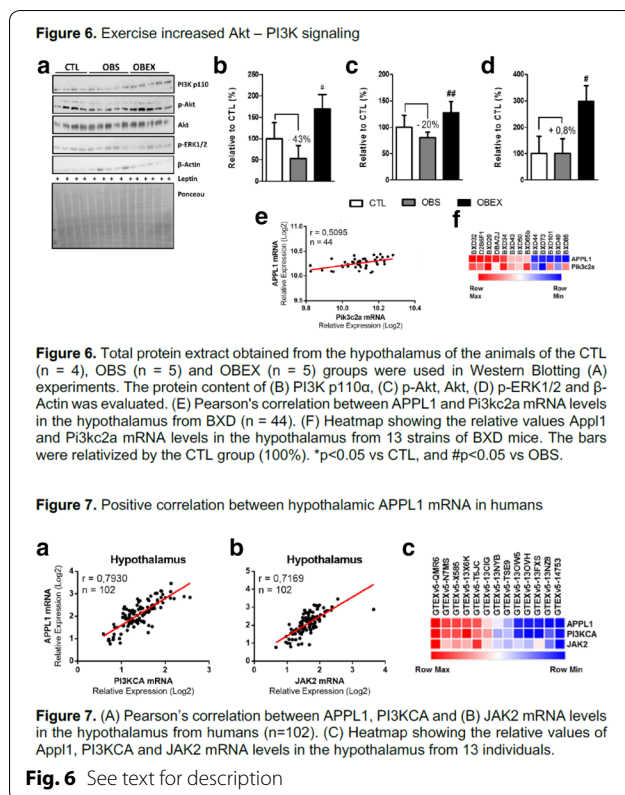
**Figure 1. Physiological parameters**



**Figure 1.** Swiss mice were distributed in three groups: Control (CTL) n = 10, high-fat diet (OBS) n = 10 and high-fat Diet Exercised (OBEX) n = 10. (A) Initial body mass, (B) body mass after dietary intervention and (C) intra-abdominal fat mass at the end of the experimental protocol, (D) representative image from different adipose tissue (Epididymal, retroperitoneal and mesenteric). (E) The glucose tolerance test curve was performed, and (F) the area under the curve was calculated for each experimental group, and (G) fasting glucose evaluated in the first point of GTT. (H) Finally, the analysis of serum adiponectin was performed. Bar charts represent the means and standard deviation (±) of each experimental group. \*p<0.05 vs CTL, and #p<0.05 vs OBS.

**Fig. 1** See text for description





## A124

### Effects of regular physical exercise on the levels of flexibility of diabetics type 2

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**Introduction:** Collagen is the main protein responsible for resistance to flexibility, and in connective tissue disorders of glucose metabolism in the diabetic can produce a superglycolization of specific collagens, thus reducing levels of flexibility.

**Objective:** To verify the effects of regular physical exercise on the flexibility levels of type 2 diabetics.

**Method:** Characterized as a quasi-experimental study. The sample was non-probabilistic; 11 female subjects with type 2 diabetes, with a mean age of  $66.5 \pm 1.6$  years, participated in the study. The training protocol was composed of resistance and aerobic training, the flexibility assessment was performed before and after the intervention that lasted 6 weeks. To assess flexibility, a Tera Flex 1.8 digital flexometer was used by Tera Science. For the comparison of the means of the variables, a variance analysis was used with repeated measures, and multiple comparisons using Fisher's least significant difference method and Wilcoxon's nonparametric test. For all tests a significance level was adopted  $p < 0.05$ .

**Results:** There was an increase from  $87.7 \pm 12.5$  to  $102.4 \pm 14.6$  ( $p = 0.003$ ), in the thoracic joint amplitude of the diabetics evaluated.

**Conclusion:** The training protocol used in this study showed a significant increase in the levels of flexibilities of type 2 diabetics, of this sample.

## A125

### Effects of resistance training on signs and symptoms of distal diabetic polyneuropathy in type 2 diabetic patients: pilot study

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**Introduction:** The distal peripheral polyneuropathy (DPP) is one of the main Diabetes complications and physical exercise can be an alternative to minimize the signs and symptoms.

**Objective:** Assessment of resistance training effects on signs and symptoms of DPP on type 2 diabetic patients.

**Methods:** Randomized controlled trial with 10 diabetic patients (7 women and 3 men  $58.8 \pm 3.8$  years;  $71.9 \pm 9.1$  kg;  $158 \pm 5.5$  cm;  $15.6 \pm 10.6$  years of DM2 diagnostic) with DDP diagnosed by the DDP diagnostic scale (DDPDS). They were randomized in two groups, the control group (n = 4) received education sessions about diabetes, and the exercise group (n = 6) besides the education sessions, followed a moderate exercise training for upper and lower limbs 3 times a week, during 12 weeks. The DDPDS provided the Neuropathy Symptom Score (NSS) and the Neuropathy Disability Score (NDS) of each individual. The tactile sensibility was evaluated with the Semmes-Weinstein monofilament (10 g). After the Kolmogorov-Smirnov normality test, the paired t test was used for intragroup comparisons. For the intergroup comparison, the t test was used for independent samples both on pre and post intervention phases.

**Results:** The results showed significant improvements on the NDS, on both intragroup comparison of the exercise group ( $p < 0.01$ ) and intergroup comparison on the post-intervention moment. The other parameters assessed did not show significant difference.

**Conclusion:** The resistance training was effective on the improvement of the Neuropathy Disability Score of type 2 diabetic patients with distal diabetic polyneuropathy.

## A126

### Effects of the nutritional transition in women with pregestational diabetes

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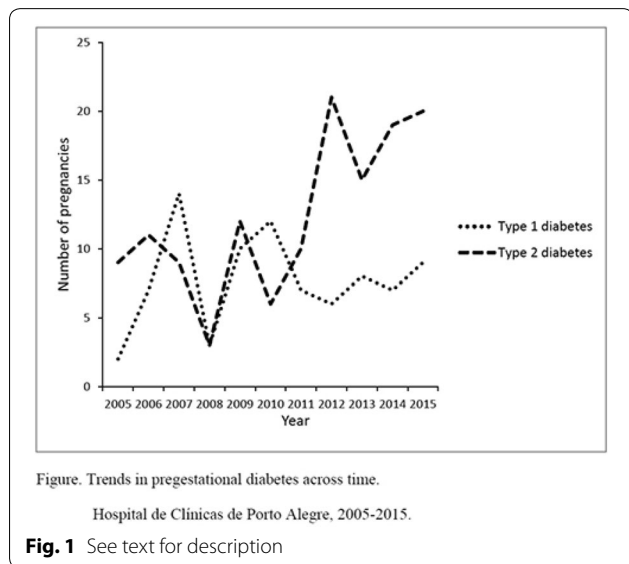
**Introduction:** Pregestational diabetes is associated with adverse outcomes for the mother and the newborn. This may further depend on the epoch women were treated, due to changes in standards of care and maternal clinical characteristics. Our objective was to study characteristics of pregnant diabetic women across two periods of time.

**Methods:** We evaluated 220 women, 85 with type 1 diabetes (DM) and 135 with type 2 DM, attended at a specialized prenatal care. Clinical characteristics as weight, body mass index (BMI), preeclampsia, cesarean section and newborn outcomes were evaluated. Epoch of care was stratified in two periods: from 2005 until 2010 (period 1) and after 2010 (period 2). Analyses were performed applying the Student's t test and the Chi square test in SPSS version 18.

**Results:** Type 1 DM was more frequent in period 1 (56.5% vs. 43.5%), but was surpassed by type 2 DM in period 2 (63.0% vs 37.0%) ( $p = 0.005$ ). The Figure presents the number of patients with type 1 and type 2 diabetes taking prenatal care at each year. Previous macrosomia (8.2% vs. 20.5%,  $p = 0.011$ ) and previous preeclampsia (PE) (9.2% vs 21.3%;  $p = 0.015$ ), as well as pregestational BMI  $\geq 25$  kg/m<sup>2</sup> (59.1% vs 78%,  $p = 0.003$ ) were more frequent in period 2. There was

a trend to a lower diagnosis of PE (37.0% vs 24.8%;  $p = 0.055$ ) in the second period. We stratified data of the two periods according to type of diabetes: in women with type 2 diabetes, previous PE and macrosomia were more frequent and pfamily history of diabetes, less frequent, in the second period. Conversely, women with type 1 diabetes presented higher pre-pregnancy weight and higher A1c test in the second period.

**Conclusion:** Nowadays, women of reproductive age are frequently diagnosed as having type 2 diabetes, in parallel to the escalating rates of obesity; even those with type 1 DM presented higher pre-gestational weight in the second period. The effects of nutritional transition are also reflected in women with pre-gestational diabetes (Fig. 1).



#### A127

##### Effects of the physical training in different intensities on the balance of elderly with type 2 diabetes

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**Introduction:** In diabetes mellitus, changes in skeletal muscle, associated with age muscle mass loss, contribute to a decrease of muscle strength, balance and control.

**Objective:** To investigate the effects of physical training after 3 months of intervention in the balance of elderly with type 2 diabetes.

**Method:** Characterized as quase-experimental. Twenty-four elderly with type 2 diabetes were enrolled in a supervised physical exercise

program. Two groups of moderate intensity ( $n = 11$ ) and high intensity ( $n = 13$ ) were organized. The physical training protocol was composed of aerobic and strength training. The strength group was divided into moderate intensity of 20–25 repetitions and high intensity of 8–15 repetitions, both with 1' interval. The aerobic group, which used the treadmill, used the protocol with 10' in the moderate intensity, scale 13 on the Subjective Effort Perception, and 5' for high intensity, in the scale 15. For balance evaluation we used the sit and stand test. Multiple comparisons were made using Fisher's least significant difference method. Nonparametric Kruskal-Wallis test was also performed and a significance level of  $p < 0.05$  was used for all tests.

**Results:** There was an improvement in the balance at moderate intensity (pre  $4.9 \pm 2.0$  versus post  $6.2 \pm 2.2$   $p = 0.04$ ) and at high intensity (pre  $3.7 \pm 2.6$  vs. post  $5.0 \pm 2.6$   $p = 0.03$ ).

**Conclusion:** The physical training used in this study was effective in improving the balance of elderly with type 2 diabetes.

#### A128

##### Efficacy and safety across the final dose ranges in patients with T2DM receiving insulin glargine/lixisenatide fixed-ratio combination in the LixiLan-L trial

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In the 30-week LixiLan-L trial, LixiLan, a novel titratable fixed-ratio combination of insulin glargine (Gla-100) and GLP-1RA lixisenatide, showed superior glycemic control over Gla-100 alone, both optimized to FPG 80–100 mg/dL (maximum 60 U/day), in patients with T2DM inadequately controlled on basal insulin  $\pm \leq 2$  oral drugs. In this post hoc analysis, safety and efficacy of LixiLan were evaluated in final dose categories of Gla-100 (both groups) and lixisenatide (LixiLan group). At week 30 (study end), reductions in HbA1c and proportions of responders achieving HbA1c  $< 7\%$  were similar across dose categories. Across all dose levels, LixiLan induced body weight loss or prevented weight gain. Incidence of documented symptomatic hypoglycemia (SMPG  $\leq 70$  mg/dL) was numerically higher in patients receiving final Gla-100 dose  $< 30$  U vs. those receiving  $\geq 30$  U. This is also shown by final lixisenatide dose level. Incidence of nausea was low in the LixiLan group (Table), potentially due to slow increase of lixisenatide component in the combination. Efficacy and safety of LixiLan were generally consistent across final dose categories of its Gla-100 and lixisenatide components and consistent with overall treatment groups. These results support clinically based dose titration of a fixed-ratio combination of insulin glargine and lixisenatide. Study code: NCT02058160. This is an ENCORE abstract previously presented at ADA2016. Funding and editorial support provided by Sanofi (Fig. 1).



**Table 1**

	LixiLan (fixed-ratio combination, QD)			Gla-100 (insulin glargine, QD)		
	HbA <sub>1c</sub> , %	HbA <sub>1c</sub> <7%, n/N (%)	Body weight (kg)	HbA <sub>1c</sub> , %	HbA <sub>1c</sub> <7%, n/N (%)	Body weight (kg)
<b>Final Gla-100 dose</b>						
210 - <20 U (n)	2		2	3		3
Baseline	8.2		7.3	8.1		82.0
Week 30	7.3	1/2 (50)		7.4	2/3 (67)	
LS mean change (SE)						
220 - <30 U (n)	43		44	39		39
Baseline	8.1		77.5	7.7		78.9
Week 30	7.3	22/44 (50)		7.4	14/39 (36)	
LS mean change (SE)	-0.81 (0.124)		-1.40 (0.495)	-0.54 (0.133)		-0.29 (0.435)
95% CI	-1.05, -0.57		-2.38, -0.43	-0.80, -0.28		-1.15, 0.56
230 - <40 U (n)	96		96	87		87
Baseline	8.0		83.9	8.1		83.9
Week 30	6.9	47/97 (49)		7.5	28/87 (32)	
LS mean change (SE)	-1.13 (0.095)		-1.69 (0.333)	-0.60 (0.088)		0.57 (0.285)
95% CI	-1.30, -0.96		-2.35, -1.04	-0.78, -0.43		0.01, 1.31
240 - <50 U (n)	222		222	235		235
Baseline	8.1		91.7	8.1		89.7
Week 30	6.9	131/222 (59)		7.5	64/232 (27)	
LS mean change (SE)	-1.17 (0.054)		0.16 (0.215)	-0.59 (0.053)		1.18 (0.173)
95% CI	-1.27, -1.06		-0.26, 0.58	-0.70, -0.49		0.84, 1.52
<b>Final lixisenatide dose</b>						
25 - <10 µg (n)	3		3			
Baseline	8.3		79.9			
Week 30	7.2	2/3 (67)				
LS mean change (SE)						
95% CI						
210 - <15 µg (n)	107		108			
Baseline	8.1		82.4			
Week 30	7.0	57/108 (53)				
LS mean change (SE)	-1.04 (0.081)		-1.38 (0.318)			
95% CI	-1.20, -0.88		-2.00, -0.75			
215 - <20 µg (n)	250		250			
Baseline	8.1		90.3			
Week 30	6.9	139/251 (55)				
LS mean change (SE)	-1.13 (0.051)		-0.12 (0.202)			1.18 (0.173)
95% CI	-1.24, -1.03		-0.51, 0.28			
<b>Safety</b>						
	Documented symptomatic hypoglycemia		Documented symptomatic hypoglycemia		Nausea	
<b>Final Gla-100 dose</b>						
<30 U (n)	22 (48)		21 (50)		1 (2)	
Events/patient year	4.9		8.1		0.09	
230 U (n)	124 (39)		134 (42)		1 (0.3)	
Events/patient year	2.8		3.7		0.01	
<b>Final lixisenatide dose</b>						
<10 µg (n)	1 (33)		1 (33)			
Events/patient year	1.1		0.6			
210 - <15 µg (n)	55 (51)		16 (15)			
Events/patient year	5.3		0.4			
215 - <20 µg (n)	88 (35)		21 (8)			
Events/patient year	2.2		0.2			

Gla-100=insulin glargine; HbA<sub>1c</sub>=glycated hemoglobin; LixiLan=fixed-ratio combination of Gla-100 and lixisenatide; LS=least-squares; SE=standard error; U=units; LS mean change was calculated only for categories with ≥5 patients; groups with <5 patients are not shown

**Fig. 1** See text for description

**A129**

**Efficacy and safety of insulin degludec/liraglutide (IDegLira) vs basal-bolus (BB) therapy in patients with type 2 diabetes (T2D): dual VII trial**

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**Introduction:** The efficacy and safety of insulin degludec/liraglutide (IDegLira) has been demonstrated in patients with type 2 diabetes uncontrolled on several treatments.

**Objective:** To demonstrate non-inferiority of IDegLira in A1c reduction from baseline as compared to basal-bolus insulin therapy.

**Methods:** 26-week open-label trial comparing IDegLira with Basal-bolus insulin therapy in type 2 diabetes.

**Results:** 506 patients (pts) with T2D uncontrolled on metformin and 20-50 units (U) of insulin glargine U100 (IGlar) were randomized 1:1 to IDegLira or BB therapy (IGlar + insulin aspart up to 4 times a day). Mean A1C decreased from 8.2% at baseline to 6.7% at end of trial in both arms; non-inferiority (by < 0.3%) for IDegLira was confirmed (p < 0.0001; Table). A similar proportion of pts achieved A1C targets with IDegLira vs BB (66.0% vs 67.0% for < 7%/49.6% vs 44.6% for ≤ 6.5% respectively). Total daily insulin dose was lower for IDegLira (40.4 U) vs BB (84.1 U) (p < 0.0001). Body weight decreased with

IDegLira and increased with BB (p < 0.0001); the rate of hypoglycemic episodes (HEs) was lower with IDegLira vs BB (p < 0.0001). More pts achieved a triple composite endpoint (A1C < 7% with no HE in the last 12 weeks and no weight gain) with IDegLira vs BB (38.2% vs 6.4%; odds ratio 10.39 [5.76; 18.75] p < 0.0001). Mean pre- to postprandial plasma glucose increment decreased more with BB vs IDegLira (p = 0.0032). SF-36 (mental component summary) and TRIM-D (total scores) improved more with IDegLira vs BB (p = 0.0074 and p < 0.0001 respectively). Adverse event rates were similar.

**Conclusion:** In conclusion, in pts with A1C > 7% on metformin and IGlar, IDegLira vs BB resulted in similar A1C reductions, lower insulin dose, weight loss and lower risk of HEs (Fig. 1).

**Table 1:** Change in A1C and body weight, and week-26 FPG and hypoglycemic episodes at end of trial.

	IDegLira + met (n=252)	IGlar U100 + IAsp + met (n=254)	Treatment contrast [95% CI]	p-value
Δ A1C, % <sup>a</sup>	-1.49 (0.93)	-1.48 (0.91)	ETD -0.02 [-0.16; 0.12] <sup>†</sup>	<0.0001*
Week 26 FPG, mg/dL <sup>a</sup>	109.7 (32.0)	115.1 (39.6)	ETD -5.55 [-12.0; 0.94] <sup>†</sup>	0.0936
Δ Body weight, kg <sup>a</sup>	-0.92 (3.23)	2.64 (3.72)	ETD -3.57 [-4.19; -2.95] <sup>†</sup>	<0.0001
Overall hypoglycemic episodes, episode/PYE	1.07	8.17	ERR 0.11 [0.08; 0.17] <sup>‡</sup>	<0.0001

Nocturnal hypoglycemic episodes, episode/PYE	0.13	1.66	ERR 0.08 [0.04; 0.17] <sup>‡</sup>	<0.0001
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<sup>†</sup>Two-sided p-value test for non-inferiority with non-inferiority margin 0.3%; <sup>‡</sup>MMRM analysis values based on on-treatment observed data at planned scheduled visits. The model includes treatment, region and visit as fixed factors, and baseline response as covariate. Interactions between visit and all factors and covariates were also included in the model.  
<sup>a</sup> data are mean (SD); <sup>b</sup>Negative binomial regression model with log link and log exposure + 7 days as offset. The model includes region and treatment as factors. <sup>c</sup>Hypoglycemia defined as severe (requiring the assistance of another person) or BG-confirmed (<56 mg/dL) hypoglycemic episodes with symptoms consistent with hypoglycemia. Severe or BG-confirmed symptomatic hypoglycemic episodes with onset between 00:01 and 05:59 h (inclusive) were classified as nocturnal. Efficacy endpoints are based on FAS and hypoglycemia data summaries are SAS, hypoglycemia statistical analyses are based on FAS.  
 A1C, glycated hemoglobin; BG, blood glucose; CI, confidence interval; ERR, estimated rate ratio; ETD, estimated treatment difference; FAS, full analysis set; FPG, fasting plasma glucose; IAsp, insulin aspart; IDegLira, insulin degludec/liraglutide; IGlar U100, insulin glargine 100 units/mL; met, metformin; MMRM, mixed-effect model repeat measurement; pts, patients; PYE, patient-year of exposure; SAS, safety analysis set; SD, standard deviation.  
 DUAL VII trial: NCT02420262

**Fig. 1** See text for description

**A130**

**Efficacy of group education for carbohydrate counting in a public diabetes center in Belo Horizonte**

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**Background:** Carbohydrate counting (CC) is considered the nutritional therapy of choice for patients with type 1 diabetes (T1DM), since it allows greater food flexibility and adjustment of insulin treatment as intake. However, it is a strategy little used in the public health service because there are very few specialized team, resources and appointments times for the correct training of the therapy. Since 1970, teaching people in groups has been an effective intervention for diabetes education.

**Objective:** To evaluate the efficacy of nutritional education groups for the treatment of CC in patients with T1DM from a public referral service in Belo Horizonte, Minas Gerais, Brazil.

**Methods:** Forty-one adult patients underwent to a group nutritional education program with 3 meetings: 1st healthy eating and introduction to the CC; 2nd CC for extra snacks or substitutions; 3rd full CC (at all meals with food amount required). The evolution to this stage was made based on an evaluation of the 24-h food recall, with quantification of carbohydrate grams by nutritionists, and insulin/carbohydrate ratio prescribed by endocrinologists. In addition, this evolution was the patients' free choice because they felt or not safe. A fourth meeting was held for patients with doubts about the progression to full CC. A 3-day food record with the quantification of carbohydrate grams per meal, together with glycemic control, was requested after beginning the therapy. The study was approved by Institution's Ethics Board,

approval number 1.064.985 and written consent was obtained from all participants.

**Results:** The sample consisted of 66% women, ages  $39.8 \pm 16.4$  years old, with incomplete elementary school and complete high school education (24.4 and 36.6%, respectively). 49% of the patients evolved for the full carbohydrate counting treatment (3rd meeting), with observation in 51% of the participants not learning the therapy, or of their own choice in not counting the carbohydrates daily, maintaining fixed dose of food amount. Lower schooling ( $r^2 = 0.34$ ,  $p < 0.001$ ) and advanced age ( $r^2 = 0.45$ ,  $p < 0.001$ ) showed a positive correlation with non-evolution for full therapy, being independent of gender ( $p > 0.91$ ).

**Conclusion:** The carbohydrate counting groups were effective for patients with T1DM of a public service, with optimization of time and greater involvement of patients in the discussions. However, low schooling and older age are barriers to the broader choice of therapy.

### A131

#### Elaboration and cultural adequacy of the adherence test to healthy diet in carbohydrate counting (TAHC)

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**Background:** Carbohydrate counting are indicated for patients with type 1 diabetes mellitus as an effective strategy in optimizing food intake and should be inserted in the context of healthy eating. There is a lack of instruments adapted to the Brazilian population to evaluate the adherence to healthy eating by patients who use this nutritional therapy.

**Objective:** To elaborate and adapt culturally the instrument of evaluation of adherence to healthy diet in carbohydrate counting (TAHC).

**Methods:** Methodological study, including three steps: First: Preparation of the instrument, based on national and international guidelines for diabetes and nutrition, followed by the evaluation of a committee of experts, composed of endocrinologists, nutritionists, linguists, and statisticians-Version 1 (V1). Second: The V1 was sent, via an e-survey platform, to the judges committee of nutritionists and endocrinologists experienced in carbohydrate counting, where the clarity and relevance of the questions were evaluated for each item of the instrument. Based on this evaluation, the Content Validity Index (IVC) and the percentage of acceptance of the judges were calculated in relation to the adequacy of the evaluated items, with changes generating the version (V2). Third (pre-test); With the participation of 20 individuals with type 1 diabetes with more than 12 years of age, with changes and adaptations generating version 3 (V3). After each phase described, an interdisciplinary meeting was held by researchers and the committee of experts evaluated the suggestions. At all stages, the methodology followed the recommendations established in the literature and for each problem identified, improvements were suggested, and changes were made.

**Results:** The V1 of the instrument presented a good agreement among the Judges Committee, with a valid content index of 0.954, being considered appropriate the value  $\geq 0.78$  for new instruments (Table 1).

**Conclusion:** It is considered that the TAHC instrument is culturally appropriate to evaluate the adherence to a healthy diet in the carbohydrate counting, which goes into the validation process. Ethics Approval The study was approved by Santa Casa of Belo Horizonte Institution's Ethics Board, approval number 1.962.869 and consent was obtained from all participants (Fig. 1).

**Table 1.** TAHC and IVC questions of the instrument.

Number	Question	CVC	
		Clarity	Relevance
1	How many times do you eat per a day?	0.958	0.983
2	How many portions of fruit do you eat per a day? One portion of fruit is equal to 1 medium slice or 1 medium piece or 1 cup 200 ml. of juice of a fruit diluted in water.	0.875	0.975
3	How many tablespoons of vegetables do you eat per day, adding up to all meals? Do not count potatoes, cassava, yam and corn.	0.875	0.966
4	How many times a day do you eat leafy vegetables, adding up to all meals?	0.925	0.983
5	How many portions of milk and/or dairy products do you eat per a day? A portion of milk and dairy products is equal to: 1 large slice of fresh cheese or 2 slices of ricotta or mozzarella or 240 ml. of milk or 1 jar of 200 ml. yogurt or 2 bottles of fermented milk.	0.950	0.975
6	How many portions of the meat/egg/fish group do you eat per a day? A portion of meat is equal to: 1 medium steak, 3 tablespoons ground beef, 1 thigh or overcooked chicken, 2 eggs or 2 slices of ham.	0.916	0.983
7	Do you eat fried foods? Examples: Fried potato or fried cassava or fried egg or Milanese or gnaty or snacks.	0.966	0.975
8	How many times a week do you eat fish? One portions of fish is equal to: 2 steaks medium or 2 tablespoons of tuna or 1 unit of canned sardines.	0.891	0.991
9	Do you eat whole foods?	0.960	0.991
10	Do you eat industrialized foods rich in fats? Examples: Stuffed biscuit, packaged snacks, instant noodles, sausage, mortadella, pizza or hamburger.	0.958	0.983
11	How many cups of 250 ml water do you take a day? Include in your calculations tea without added sugar.	0.975	1
12	For you to follow your food prescription, do you plan your meals either by taking the snacks in the bag or planning to purchase the food you need?	0.958	0.958
13	Do you know the amount of carbohydrate per meal in your meal plan, that is, your target carbohydrate per meal?	0.933	0.975
14	When you eat pasta, potatoes, yams, cassava, corn or flours, do you take away or decrease the amount of rice to maintain the same amount of carbohydrate per the meal?	0.950	0.991
15	When you eat sweets or foods that contain sugar, do you take another carbohydrate-rich food out of your food plan?	0.941	0.975
16	When you eat sweets or foods that contain sugar, do you limit the amount allowed by your doctor or nutritionist?	0.933	1
17	When you exceed the amount of carbohydrates in your meal plan, do you apply the extra dose of insulin?	0.925	0.883
18	When you eat more than one portion of meat in the meal, you consider those portions more in the total amount of carbohydrates?	0.950	0.983
19	Do you give preference to low-fat foods or low in fat?	0.950	1
20	Check what you look like on food labels? You can mark more than one question.	0.866	1
21	Do you drink alcohol? If so, when you drink alcohol, do you limit yourself to the use of the allowable dose per day? Permissible daily dose: 2 doses for men and 1 dose for women. One serving is equal to: 150 ml. of wine (1 cup) or 350 ml. of beer (1 small can) or 45 ml. (1 dose) 45 ml. of distillates (vodka, rum, rum, tequila).		
<b>IVC Total</b>		<b>0.954</b>	

#### Ethics Approval

The study was approved by Santa Casa of Belo Horizonte Institution's Ethics Board, approval number 1.962.869 and consent was obtained from all participants.

**Fig. 1** See text for description

### A132

#### Endogenous hyperinsulinism in a patient with diabetes mellitus

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M.C.F., a 56 year-old female, diagnosed with type 2 diabetes (T2DM) at 22 years old, using insulin for 22 years. Eight years ago, she started to present frequent episodes of symptomatic hypoglycemia, preferably in fasting periods. There was no cessation of the episodes even with the suspension of all insulin and antidiabetic drugs, which lead to an investigation with a prolonged fasting test (Table 1). The test confirmed endogenous hyperinsulinism (EH). Endoscopic ultrasound and abdominal magnetic resonance imaging showed no masses. She was then submitted to a selective arterial calcium stimulation test (SACST), whose results excluded insulinoma. Acarbose was prescribed 2 years ago, with no improvement. Verapamil (80 mg/day) was initiated along with dietary changes, with good response.

**Discussion:** In the presence of hypoglycemia and serum levels of non-suppressed insulin/C-peptide, rare causes such as pancreatic beta (β) cell disease and autoimmune hypoglycemia should be excluded. EH is confirmed by the prolonged fasting test through the findings: glycemia  $< 55$  mg/dL with symptoms, associated with insulinemia  $\geq 3$  IU/mL, peptide C  $\geq 0.60$  ng/mL, proinsulin  $\geq 5$  pmol/L. In adults, the main cause is insulinoma, but when a mass is not identified, the diagnosis of non-insulinoma pancreatogenic hypoglycemia syndrome (NIPHS) should be considered. NIPHS is a hyperfunctional pancreatic disorder characterized by the diffuse involvement of islets with nesidioblastosis. Its incidence in patients with previous T2DM is rare, with only 4 cases being documented. In these cases, T2DM can be reversed by

dysfunctioning hypertrophic  $\beta$  cells, which is a reactive process to the destruction of  $\beta$  cells or existing functional failure in diabetic patients, leading to hypoglycemia and confirmed by the prolonged fasting test. The diagnosis is established by exclusion of insulinoma and histopathological and immunohistochemical findings in the pancreas. Patients with EH with inconclusive noninvasive imaging are candidates to perform SACST, which is important for the therapeutic definition. Treatment consists of dietary changes, medications and, in refractory cases, surgery. Surgical extension should be evaluated to avoid recurrence of hypoglycemia and, at the same time, the risk of exocrine and endocrine complications.

**Final comments:** We illustrate a rare case of EH after discontinuation of insulin therapy in a long-term T2DM patient. Verapamil blocks the  $\beta$ -cell membrane, inhibiting insulin secretion. The treatment improves quality of life and possibly reduces mortality. Informed consent to publish had been obtained from the patient (Fig. 1).

Tempo (segundos)/Localização	Insulinemia microU/mL Artéria Esplênica distal	Insulinemia microU/mL Artéria Esplênica média	Insulinemia microU/mL Artéria Esplênica proximal	Insulinemia microU/mL Artéria Mesentérica superior	Insulinemia microU/mL Tronco cellaco
0 (basal)	3,7	5,0	5,0	3,8	2,4
30	3,5	5,4	4,6	4,4	4,7
60	6,0	5,2	8,6	4,8	5,3
90	6,5	4,4	6,6	5,8	5,9
120	5,4	4,2	4,1	5,3	5,1
180	4,7	5,0	5,0	5,6	4,2

Tabela 2: Resultado do cateterismo seletivo com estímulo de cálcio – sendo insulina em microU/mL e tempo em segundos.

Fig. 1 See text for description

**A133**  
**Epidemiological profile of diabetic patients with sepsis admitted in intensive care unit**

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**Introduction:** Sepsis is the leading cause of death in critically ill patients treated in an intensive care unit (ICU). According to the new consensus of 2016, sepsis is defined as “the presence of life-threatening organic dysfunction secondary to the body’s unregulated response to infection”. Being the infectious process—infectious agent—the main question that, in itself, is able to injure tissues and lead to death. Both inflammation and immunosuppression are present as part of the response to the microorganism.<sup>1</sup> Around the world every 6 s a person dies as a result of diabetes or its complications, with an average of 5 million deaths a year. In 2015, in Brazil, there were 130,000 adult deaths, in the age group of 20–79 years, due to complications of DM.<sup>2</sup> We know that infections are among the main causes of diabetes mellitus decompensation, altering the metabolic control of the diabetic patient. Once the infectious process is installed, with the possible worsening of the metabolic control we will have a patient at risk and more susceptible to sepsis. 3 While infection is suspected, cultures should be obtained in the relevant foci, since they are the most important sources of information for the investigation of hospital infection and correct and effective treatment of the etiological agent.<sup>3</sup>

**Objective:** To determine the epidemiological profile of infections of septic patients treated in the ICU.

**Methodology:** Cross-sectional study through 1623 antibiograms collected from diabetic patients admitted to ICUs that met criteria for SIRS/SEPSE between January 2014 and March 2017. Six sites were considered susceptible to infection (pulmonary, urinary, operative wound, catheter tip, blood and drained liquids), and the prevalences for each one were analyzed, as well as the registry of the most frequent microorganisms.

**Results:** A total of 387 patients (83.2% DM2) were studied, with an average length of hospital stay of 27 days, mean hospital infection rate of 44.8%, and mortality rate of 23.5%. Infection prevalence rates for each site were as follows: 32.5% respiratory, 27.8% urinary, 22.1% surgical wound, 7.8% catheter tip, 5.5% secretions/fluids drained, 4.3% blood.

**Conclusion:** The growth of microorganisms in culture does not guarantee that they have a pathogenic role, and it is fundamental to recognize the most probable pathogens that affect the diabetic population and to disseminate it periodically, since the local epidemiological profile leads to the rationalization of the use of antibiotics, avoiding excessive spectrum, which predisposes to infections caused by multiresistant germs and fungi. However, the prevalence and mortality rates found in our study were extremely high, making it essential to prevent diabetes-associated infections through adequate metabolic control and specific preventive measures for each primary site of infection (Fig. 1).

Methods	
<b>STUDY DESIGN</b>	Retrospective Cross-sectional Study - January 2014 through March 2017.
<b>METHODS</b>	A total of 1623 antibiograms of diabetic patients admitted to the ICU with SIRS / SEPSE criteria were analyzed. Six infectious sites were considered: - Urinary - Respiratory - Operative wound - Catheter tip - Blood - Drained liquids.
<b>PATIENTS</b>	- 387 diabetic patients (83.2% DM2) - Average Length of Stay: 27 days - Average Hospital Infection Rate: 44.8% - Mortality Rate: 23.5%
Results	
<b>RESPIRATORY, 32,5%</b>	- Staphylococcus aureus (30,4%) - Klebsiella sp (26,0%) - Pseudomonas aeruginosas (11,6%)
<b>URINARY, 27,8%</b>	- E. coli (69,2%) - Enterobacter sp (15,4%)
<b>SURGICAL WOUND, 22,1%</b>	- Gram Negative (Pseudomonas, Serratia, Proteus, Enterobacter)
<b>CATHETER TIP, 7,8%</b>	- S. epidermidis (29,6%) - Klebsiella sp (22,2%) - S. aureus (40%)
<b>SECRETIONS / FLUIDS DRAINED 5,5%</b>	- S epidermidis (40%)
<b>BLOOD 4,3%</b>	- Klebsiella sp (31,5%) - S. epidermidis (13,1%) - S. aureus (26,3%)

Fig. 1 See text for description

**A134**  
**Epidemiological profile of patients admitted with acute hyperglycemic crises in tertiary hospital**

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**Introduction:** Diabetes Mellitus (DM) is a chronic syndrome characterized by hyperglycemia, due to absolute or relative insulin deficiency. It can present acute complications: diabetic ketoacidosis (DKA) and hyperosmolar hyperglycemic state (HHS), which are potentially fatal if not promptly treated. DKA is characterized by hyperglycemia > 250 mg/dl, ketonemia or ketonuria and metabolic acidosis. HHS is characterized by hyperglycemia > 600 mg/dl, pH > 7.3, serum osmolality > 320 mOsm/kg. The identification of triggering factors may aid in the prevention of hyperglycemic crises.

**Objectives:** The objective of this study was to trace the epidemiological profile of patients treated with hyperglycemic crises (DKA and HHS)

in a tertiary hospital, seeking to identify the main triggering factors. Search.

**Methods:** Medical data records from patients admitted to the Medical Clinic Sector of a Tertiary Hospital with diagnosis of acute hyperglycemic crisis (DKA or HHS) after implantation of Endocrinology Reference Service at the same hospital from February to July 2017 Preliminary.

**Results:** In the first 6 months of the Endocrinology Reference Service, 13 patients with acute hyperglycemic crisis (DKA or HHS) were treated. Of the 13 patients treated, only 1 had the diagnosis of HHS and the others had DKA. The average age of the patients was 37.45 years. The HHS patient was 67 years old, while the age of patients with DKA ranged from 14 to 59 years. The patient with HHS was male. Among patients with DKA, 84% were female and 16% male. The glycated hemoglobin average (HbA1c) was 12.67%. The patient with HHS had 13.3% HbA1c while patients with DKA ranged from 8.9 to 16.9%. The HHS patient had DM type 2. Among the patients with CAD, 1/3 had the diagnosis of DM type 1, 1/3 had the diagnosis of DM2 and in 1/3 it was done presumptive diagnosis of LADA. At the time, it was not possible to dose anti-GAD for confirmation. In 11 of the 13 patients treated, an infectious cause was observed as a factor of decompensation, with pyelonephritis being the most frequent.

**Conclusion:** DKA can affect both DM1 and DM2 patients, but it is more common in patients with DM1. The incidence of DKA is higher than that of HHS. The main triggering factor are episodes of bacterial infection, notably urinary tract infections.

Informed consent to publish had been obtained from the patient.

### A135

#### Epidemiological profile of patients with gestational diabetes mellitus in a tertiary care service

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**Introduction:** The prevalence of Gestational Diabetes Mellitus (GDM) is associated with increased risk factors such as advanced age, overweight, obesity, excessive weight gain in pregnancy and family history of diabetes in first-degree relatives.

**Objective:** To characterize epidemiologically and clinically pregnant women with GDM accompanied in the Endocrinology department of a University Hospital.

**Methods:** Cross-sectional, observational and descriptive study with 83 pregnant women with Gestational Diabetes Mellitus (GDM) attended from February 2016 to April 2017. Data collected from charts and statistical analysis performed using Excel. Variables studied: age, gestational age at the first visit, BMI, gestational weight gain at the first visit, family and personal history of diabetes, previous and current obstetric conditions, other associated conditions and treatment.

**Results:** At the first visit, the mean age was 31 years; the mean gestational age 28 weeks; 35.29% were overweight and 36.76% were obese; 6.02% presented alterations in the current gestation. Associated conditions were hypothyroidism (45.16%), chronic hypertension (29.03%) and hypertensive disorder during pregnancy (16.13%). Only 36.4% had previous obstetric complications such as macrosomia and abortion; 62.7% were multiparous; 44.58% had a positive family history for Diabetes Mellitus and 2.41% had family history of GDM. The diagnostic test used was oral glucose tolerance test in 79.52% of the cases and fasting plasma glucose in 20.48%. The diagnosis of GDM was given in the first trimester in 16.87% of patients, 43.37% in the second trimester and 39.76% in the third trimester. The goals of weight gain during pregnancy were exceeded in 20.83% of overweight pregnant women at the first visit and in 11.11% of obese women. The treatment established at the first consultation and subsequent consultations was, respectively, dietary change (59.26, 40.28%), metformin (22.22; 18.06%), combination of metformin and insulin (4.94, 12.50%) and insulin alone (13.58, 29.17%).

**Discussion:** The population had a late arrival at the service and frequent weight changes. The most frequent initial treatment was dietary change, achieving good control in 68% of the cases.

**Conclusion:** The choice of monotherapy with metformin decreased throughout pregnancy, but it proved to be a good option when in combination with insulin at more advanced gestational ages due to better control of insulin resistance.

### A136

#### Epidemiological profile of women with altered fasting glycemia in first trimester of pregnancy

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**Introduction:** According to the IADPSG and WHO criteria, the presence of fasting glucose (FG)  $\geq 92$  and  $< 126$  mg/dL at any time during pregnancy is diagnostic of gestational diabetes mellitus (GDM). However, there are few studies with pregnant women diagnosed by this method in the first trimester.

**Objective:** To evaluate epidemiological profile of pregnant women diagnosed with GDM by FG  $\geq 92$  and  $< 100$  mg/dL in 1st trimester.

**Method:** Observational study, with pregnant women attended at the prenatal care of Maternidade Escola (ME) of UFRJ, between 11/2016 and 07/2017, with 1st trimester FG  $\geq 92$  and  $< 100$  mg/dL (cases) or  $< 92$  mg/dL (controls). Exclusion criteria were those with permanent DM, GDM already under treatment, multiple gestation or bariatric surgery. Those with FG  $\geq 92$  mg/dL performed a 2nd FG to confirm GDM. They were divided in 3 groups: 1 (2 FG  $\geq 92$  mg/dL-GDM confirmed), 2 (only the 1st FG  $\geq 92$  mg/dL-GDM not confirmed) and 3 (FG  $< 92$  mg/dL-control). A semi-quantitative food frequency questionnaire (used in ME) and physical activity questionnaire (short IPAQ) were applied. Other data were collected in medical records. G2 and G3 pregnant women perform oral glucosetolerance test (75-g OGTT) between 24 and 28 weeks. The analysis was done in EPI INFO and p value  $< 0.05$  was considered significant.

**Results:** 64 pregnant women were interviewed, with the following results [consecutively exposed by groups 1 (n = 20), 2 (n = 28) and 3 (n = 16): mean of 1st FG 95.6 ( $\pm 2.7$ ), 94.7 ( $\pm 2.1$ ) and 84.7 ( $\pm 3.6$ ) mg/dL; of 2nd FG (G1 and G2 only) 97.0 ( $\pm 4.6$ ) and 84.1 ( $\pm 5.4$ ) mg/dL; age 29.8 ( $\pm 7.3$ ), 27.3 ( $\pm 6.6$ ) and 27.3 ( $\pm 6.1$ ) years; BMI 29.6 ( $\pm 0.2$ ), 26.1 ( $\pm 5.4$ ) and 29.5 ( $\pm 5.2$ ) kg/m<sup>2</sup>; median TEV 1570 (766–3986), 1620 (687–5669) and 1841 (1190–3164) kcal/day. Frequency analysis showed that 45, 54 and 37% were nonwhite; 90, 86 and 87% had  $> 8$  years of study; 75, 82 and 75% were active or irregularly active; 18, 7 and 0% had history of GDM; 40, 18 and 25% were chronic hypertensive; 35, 39 and 19% had family history of DM. The OGTT was performed in 19 pregnant women from G2 and 8 from G3, with averages FG 85.7 and 78.9 mg/dL, with statistical significance (p  $< 0.01$ ). The comparison of other variables did not present significance, except for the BMI between group 1 and 2 (p = 0.04).

**Conclusion:** No demographic differences were found between groups, except for the presence of higher BMI in Group1 (xG2). This suggests that the probability of confirming an altered FG is greater in those with a higher BMI.

### A137

#### Epidemiological, clinical and obstetrical profile of pregnant women with diabetes at a public reference center

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**Introduction:** Diabetes Mellitus (DM) is the most common metabolic problem of pregnancy. The most frequent presentation is gestational

DM (GDM), which estimated prevalence varies between 3 and 25% of pregnancies, depending on the population and the diagnostic criteria used. The others are represented mainly by pre-gestational DM1 and DM2. Due to the importance of the issue, the screening and identification of maternal hyperglycemia, as well as the knowledge about the epidemiological profile of the patients, are fundamental for the adequate management and reduction of undesirable maternal-fetal outcomes.

**Objective:** The primary objective of this study was to evaluate the epidemiological, clinical and obstetric characteristics of patients diagnosed with DM accompanied at the State Institute of Diabetes and Endocrinology Luiz Capriglione (IEDE).

**Methodology:** It was a retrospective observational study. A sample of 100 patients from IEDE or referred by the National System of Regulation (SISREG) was analyzed. Inclusion criteria were newly or previous diagnosis of DM and, at least a prenatal and postnatal evaluation. Exclusion criteria were lost of follow-up and co morbidities that could influence at the metabolic parameters.

**Results:** The majority of IEDE patients had DM1, were younger, had a longer time to diagnose DM, had a higher rate of chronic microvascular complications, more previous pregnancies with fetal macrosomia, used higher doses of insulin during pregnancy and the time of delivery was earlier. Those from SISREG were mostly diagnosed with GDM and had a higher pre-gestational Body Mass Index (BMI). Both groups had mean pre-gestational hemoglobin (HgA1c) and in each trimester, but after delivery, the HgA1c of patients from the SISREG was lower than the IEDE patients (Table 1). 55% of the patients presented undesirable maternal-fetal outcomes, despite the better glycemic control during pregnancy, with preterm birth being the most frequent (Table 2). We found no correlation between pre-gestational HgA1c and throughout the trimesters with the height and weight of the newborn or gestational age at delivery.

**Conclusion:** Inadequate glycemic control in pregnant women with DM is a high risk factor for undesired maternal-fetal outcomes. Preventive measures and appropriate treatment before conception, both in those with risk factors for GDM, and in those diagnosed with DM, constitute the mainstay for changing this scenario (Figs. 1, 2).

Table 1: Baseline Characteristics of the Patients

Variable	IEDE	SISREG	Total	P-value
Reference Origin (%) #	46	54	100	0,208
Age (years)	27,7 (± 7,09)	30,5 (± 7,36)	29,2 (± 7,33)	0,022*
Time of diagnosis of DM	9,21 (± 6,81)	1,79 (± 0,23)	5,14 (± 2)	< 0,001*
Type of DM (%) #				< 0,001*
Type 1 DM pregnant	82,4	8,8		
Type 2 DM pregnant	4,4	31,2		
LADA	2,9	1,2		
Gestacional DM	10,3	58,8		
Pregestacional Body Mass Index (kg/m <sup>2</sup> )	24,9 (± 5,23)	30,4 (± 6,42)	28 (± 6,51)	< 0,001*
Chronic Complications (%) #				0,003*
None	76,8	96,1		
Retinopathy	14,3	3,9		
Nephropathy	5,4	0		
Neuropathy	3,6	0		
Hypertension (%) #				0,518
Yes	25,8	19,3	22,8	
No	74,2	80,7	77,2	
Abortions (%) #				0,110
0	73,8	61		
1	16,2	32,2		
2	8,8	6,8		
3 or more	1,2	0		
Newborns with more than 4 kg (%) #				0,014*
Sim	17,8	3,6		
Não	82,2	96,4		

Fig. 1 See text for description

Table 2: Undesirable Outcomes

	N = 55	DM1 (N = 31)	DM2 (N = 14)	DMG (N = 8)	LADA (N = 2)
Abortion or Neonatal Death	12	10	1	0	1
Malformations	6	3	2	1	0
Congenital Cardiopathy	3	1	2	0	0
Duodenal Atresia	1	0	0	1	0
Non-perforated Anus	1	1	0	0	0
Bilateral Hydronephrosis	1	1	0	0	0
Precocious Delivery	18	13	4	0	1
Polidramnia	1	0	0	1	0
Gestational Hypertension	2	0	1	1	0
Macrosomia	10	2	4	4	0
Non-compatible Weight for Gestational Age	2	1	1	0	0
Neonatal Hypoglycemia	4	2	1	1	0

Fig. 2 See text for description

**A138**

**Errors in self-application of insulin in a youth group**

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**Introduction:** Misinformation about the correct techniques for self-application of insulin is a constant and the consequences are of great concern, since incorrect application results in substantial changes in the pharmacokinetics and pharmacodynamics of insulin.

**Purpose:** To evaluate quantitatively the various mistakes made by young people in the self-application of insulin.

**Method:** Observational study, performed at a reference center for diabetes care in the Unified Health System, located in Porto Alegre. The youngsters answered a specific questionnaire about self-administered insulin practices, with a practical demonstration of the aspiration and insulin self-injection technique.

**Results:** The sample consisted of 20 insulinized adolescents older than 6 months, of both sexes, from 6 to 20 years of age, with type 1 diabetes. A high percentage of errors were observed during aspiration of the prescribed doses of insulin with the use of and 100 UI syringes, ranging from 50 to 60% of incorrect doses. However, using 30 and 50UI syringes, a significant reduction of errors was observed, varying from 0 to 5% of correct doses. This can be explained by the fact that young people do not use 100 UI syringes in their daily lives, only having contact with this type of syringe in the study. The application rotation technique was considered inadequate in 30% of the young and 10% of them did not perform it, which can cause the development of complications in the application sites; the skin fold was not performed in 15% of the young, which increases the risk of intramuscular injection and ineffective metabolic control. The presence of lipodystrophy was found in 50% of the young.

**Conclusion:** Significant errors were observed, showing a very worrying situation that could compromise the success of the treatment of type 1 diabetes totally dependent on insulin, especially with the use of the 100 UI syringe for application, when the guidance on the graduation scale of material of unusual use is not realized. There is, therefore, an immediate need for implementation of effective and continuous

educational strategies, which provide the young diabetic and their family the knowledge necessary to reduce the potential risks of insulin self-injection.

**Ethics approval:** The study was approved by UNIFESP's Ethics Board, approval number 1698/11. Informed consent was obtained from all patients this study.

### A139

#### Estimation of use and reimbursement for point-of-care blood glucose test strips with implementation of a hospitalar glycemic control committee: study of costs

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**Background:** Proper management of hyperglycemia and hypoglycemia in hospitalized patients can reduce complications and inpatient length of stay. Investments are necessary and institutional support is essential.

**Aims:** To estimate the consumption and reimbursement related to point-of-care blood glucose test strips (TS) after implementation of a Hospital Glycemic Control Committee (GCC) as a form of pre-implementation planning in a hospital.

**Methods:** In a teaching Hospital, Salvador, Bahia, we evaluated the number of inpatient admissions between 01/2016 and 07/2017, TS performed at admission and during the first 24 h and the reimbursed blood glucose test strips. Data related to consumption of blood glucose test strips and blood glucose test results were collected from medical account department and electronic medical health records, respectively. We estimated implementation costs of a GCC only considering the monitoring of blood glucose, consumption of TS and exchange of previous glucose meters for equipments in accordance with RDC302. The estimate of use of TS considered the blood glucose tests performed in accordance with national guideline recommendations: blood glucose test in more than 90% of admitted patients, inpatient hyperglycemia prevalence of 35%, repetition of, at least, one blood glucose for confirmation and four blood glucose tests for monitoring in the first 24 h in those who tested positive at screening.

**Results:** The hospital has 492 beds and, in the study period, there were 37,624 hospitalizations, averaging 1985 hospitalizations per month. A total of 361,345 blood glucose tests had been performed in the study period. Glycemia screening was realized in 13,574 patients (4%) and most tests occurred within the first 24 h of hospital admission (54%). Considering the average monthly reimbursement of 21,560 test strips, the screening test would consume 842 test strips, with 469 in the first 24 h. The goal, after GCC implementation will be performing glycemia screening on admission in more than 90%, which will result, considering monthly hospital admission, in a consumption of 1786 TS for glycemia screening, 625 TS for confirmation of positive cases (prevalence of 35% of in hospital hyperglycemia) and 2500 TS for monitoring positive cases in the first 24 h (Table 1). The cost of a single previous point-of-care blood glucose test strip was R\$ 0.82 and would be R\$ 1.48, and the reimbursement from supplementary health system was R\$ 42.50 and would be R\$ 48.50. We estimated that following glycemic protocol at admission and monitoring blood glucose in the first 24 h will increase test strips consumption (21,560–26,472) and the monthly reimbursement related to test strips in 22.8%.

**Conclusion:** Implementation of GCC is therefore likely to increase the reimbursement and consumption of test strips in the first 24 h for the hospital (Fig. 1).

	Before GCC implementation	Estimation after GCC implementation
Number of blood glucose tests for screening (first glycemia test)	862*	1786
Number of confirmatory TS†	302	625§
Fours TS performed for monitoring in first 24 hours	1208	2500
Total of TS consumption per month	21,560	26,472

TS blood glucose test strips

\*A total of 361,345 blood glucose tests had been performed in the study period and glycemia screening was realized in 13,574 patients (4%). Among the 21,560 monthly reimbursed TS, 4% (n=862) would be for screening.

† performed in 35% of patients who tested positive in the glycemia screening test considering prevalence of in-hospital hyperglycemia

§ estimation considering a TS performed as glycemia screening in 90% of 1985 hospitalizations per month

**Fig. 1** See text for description

### A140

#### Estimative of liver fibrosis in type-2 diabetic patients candidate to bariatric surgery who presented hepatic steatosis

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**Introduction:** Non-alcoholic fatty liver disease (NAFLD) has its origin related to two highly prevalent conditions in the world population: type-2 diabetes mellitus (DM-2) and obesity; it can present itself as hepatic steatosis and steatohepatitis (NASH)—which can evolve to cirrhosis and hepatocellular carcinoma. Some studies estimated that this disease will be the major cause of liver transplant in 2020.

**Objective:** To analyze the application of score systems that estimate liver fibrosis in diabetic patients candidate to bariatric surgery who presented hepatic steatosis in abdominal ultrasound.

**Methods:** This study was approved by Hospital Santa Marcelina's Ethic Board (n. 06545/17), and was based on the review of patient files attended in Hospital Santa Marcelina's Endocrinology service between September/2009 and April/2017. Criteria for inclusion were: type-2 diabetic individuals who presented NASH in abdominal ultrasound; and who had registered levels of HbA1c, AST, ALT, platelets and serum albumin. Anthropometric and laboratorial data were registered in our research protocol and submitted to descriptive statistical analysis. Posteriorly, each patient had their liver fibrosis levels esteemed through three scores: • BARD: Results  $\geq 2 = F3-F4$ , with negative predictive values of 97%. • NAFLD: Results  $< -1455 = \text{Metavir F0 (no fibrosis), F1 (minimal fibrosis) or F2 (moderate fibrosis)}$ ; values  $> 0675 = \text{Metavir F3 (advanced fibrosis) and F4 (liver fibrosis)}$ ; intermediary levels = undetermined fibrosis. • FIB-4: Values  $< 1.3 = F0-F1$ ;  $> 2.67 = F3-F4$ ; intermediary levels = undetermined fibrosis.

**Results:** 43 patients were analyzed, being 88% female; their data (mean values and standard deviation) were: age  $44 \pm 10.6$  years; BMI  $47.4 \pm 6.6$  kg/m<sup>2</sup>; HbA1c:  $6.45 \pm 0.72\%$ ; AST:  $21.7 \pm 17$  U/L; ALT  $21.5 \pm 9.1$  U/L; platelets  $253.326 \pm 63.196$ ; and serum albumin  $4.25 \pm 0.4$  U/L. Mean BARD score was  $2.67 \pm 0.47$ , estimating fibrosis in all patients. Mean NAFLD was  $0.56 \pm 1.33$ , assessing advanced fibrosis in 41.8% of the sample, and 55.8% with fibrosis of indeterminate levels. Mean FIB-4 was  $0.85 \pm 0.53$ , implying 2.32% of the patients with advanced fibrosis and 6.99% with undetermined results.

**Conclusion:** None of the analyzed scores presented valid individual specificity or sensibility to estimate liver fibrosis in obese diabetic patients, having more value as negative predictive tests. This fact, allied with the lack of clinical-laboratorial manifestations of the disease, denote that its suspicion levels must be high when studying this group of patients—and that it must be tracked very early, even before transaminases become elevated. Informed consent to publish has been obtained from all 43 patients.

**A141****Euglycemic diabetic ketoacidosis (EDKA) associated with dapagliflozin in type 2 diabetes—a case report**

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Dapagliflozin (Farxiga; Aztrazeneca) is a drug used to treat type 2 diabetes by inhibiting Sodium-glucose cotransporter 2 (SGLT-2), increasing urinary glucose excretion and lowering plasma glucose, which may improve the glycaemic control. Some cases of eDKA have been associated with others SGLT2 s inhibitors, like empagliflozin and canagliflozin, but there are few cases reported of eDKA associated with dapagliflozin. Here, we report one of them. A 47-year-old overweight man (BMI 37.4 kg/m<sup>2</sup>) with a 9-year history of type 2 diabetes had been taking metformin (1 g/day), glyburide (10 mg/day) and vildagliptin (100 mg/day) for 7 years. He was admitted for elective bariatric surgery and stopped his medications a day before. He did well postoperatively and started to use dapagliflozin after 5 days of surgery. Within 48 h using dapagliflozin, he was readmitted with prostration, nausea and hyperventilation. Laboratory showed glucose of 165 mg/dl; bicarbonate, 5 mEq/L; arterial pH, 7.23 and serum sodium of 141 mmol/L. Venous lactate was normal. The endocrinology team were consulted, and started to treat him with intravenous insulin and fluids. After 24 h, new laboratory evaluation showed glucose of 185 mg/dl; bicarbonate 17.5 mEq/L and arterial pH, 7.49, meaning clinical improvement. His anti-glutamic acid decarboxylase was negative and he had a normal C-peptide (1.98 ng/ml). As eDKA has been reported in other studies with others SGLT-2 inhibitors, it is concluded to be an adverse event of this drug class. To be aware that DKA can occur in euglycemia is important to avoid this serious complication of diabetes. It is known that there are some factors that contribute for DKA, like decreasing in-carbohydrate intake, infection or reduction of insulin therapy. Therefore, in circumstances listed, patients should consider interruption of SGLT-2 inhibitors at least 24 h prior an elective surgery, like the case reported, or immediately if any extreme stress event. Also, the patient should contact an endocrinologist for better instructions or even go to an ER if there are symptoms related to DKA like nausea, vomiting, weakness, headache or hyperventilation. We would like to suggest in cases like the one reported, which there were lower carb intake beyond the surgery, to not continue the medication after this kind of surgery.

Informed consent to publish had been obtained from the patient.

**A142****Evaluating the carbohydrate counting method related to blood glucose monitoring habits in type 1 diabetes mellitus patients**

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**Introduction:** As a measure which consists of the pre-prandial insulin adjustment according to the amount of consumed carbohydrate, carbohydrate counting is important to the success of the nutritional therapy of type 1 diabetes mellitus treatment, due to the close correlation between carbohydrate consumption and blood glucose concentration. This method is made possible by blood glucose self-monitoring, for it allows the possibility of self adjusting the insulin dose according to the pre-prandial blood glucose values. Therefore, it is important for patient to be able to understand the information obtained in blood glucose monitoring and be capable of taking the correct action to achieve the treatment goal.

**Objective:** To evaluate the blood glucose monitoring habits in a group of type 1 diabetes mellitus patients attended in secondary health service.

**Methods:** Cross-sectional study, descriptive, with convenience sample of type 1 diabetes mellitus patients enrolled in the blood glucose monitoring program during the period of 2016 and 2017 in a secondary referral service in the state of Ceará. Data was collected by means of questionnaires applied with patients present for outpatient care during the period of the research.

**Results:** In the 95 type 1 diabetes mellitus patients sample, with mean age of 17 years old, 60.2% females and 67% with 1 to 5 years of diagnosis, we observed that 35.1% of the patients were doing carbohydrate counting, of which 68.24% are treated with insulin analogues, in the basal-bolus scheme. Also, 98.2% of the sample were monitoring blood glucose daily, 97.3% of it were doing it in fasting, while only 16.22% were doing postprandial, 20.59% were doing more than four times a day. Furthermore, 45.5% of all patients could not tell the adequate objective of postprandial blood glucose measurement. Patients distribution according to their behavior and knowledge about the blood glucose monitoring. Patients doing carbohydrate counting 35.1% Patients monitoring blood glucose daily 98.2% Patients monitoring in fasting blood glucose daily 97.3% Patients monitoring postprandial blood glucose daily 16.22% Patients who could tell the adequate objective of postprandial blood glucose measurement 54.5%.

**Conclusion:** The adherence to the carbohydrate counting technique was observed in one-third of the patients evaluated. The postprandial glucose control was evaluated by the minority of the group, and some of them are not aware of the normal glucose range, which greatly compromises the efficacy of the method. Although we know that the availability of the supplies for capillary blood glucose monitoring is an important limiting factor to the method, we also consider that the ability to understand the process limits the proper use and compromises the treatment outcome. Ethics Approval: The study was approved by Centro Universitário Christus – UNICHRISTUS Institution's Ethics Board, approval number 5049.

**A143****Evaluation and prevention of injuries and amputation in diabetic patient in the nursing school—UNESC**

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**Introduction:** This is the result of a nursing extension project at a university in the far south of the state of Santa Catarina, the main objective of this project was evaluate the lesions and amputations observed in diabetes patients registered in a self monitoring blood glucose analysis program the municipality of Criciúma/SC, this program being a partnership between the Municipal Health Department and the University. The program is performed by the nursing course at UNESC and all procedures are made by multiprofessional team.

**Materials and methods:** It is a qualitative and quantitative project developed at Integrated Clinics at UNESC by students, professional and nursing residents. Work followed the rules of Ethical Committee of the university and was approved by protocol: (07160612.5.0000.0119/2012). The selection of the people of Blood Glucose Selfmonitoring program randomly occurred as the criteria for inclusion: be a diabetes patient, 18 years or older, agree to participate of the study. In November 2016, a campaign was developed was a continuous evaluation are still being offered until now. Specific equipments were used to analyse the feet's lesions as well as monofilament, tuning fork and goniometer. Data were analysed using Student T test and considered significant when  $p < 0.05$ . Qualitative data was analysed by the content analysis method proposed by Minayo.

**Discussion and results:** 133 patients were evaluated, age in between 59 and 88 years-old. 91% of them were DM2 and 92% are insulin-dependent. 11% have already had ulcers and amputation. A Student T test showed significative data when the injury, cracks, calluses, nail perfusion, temperature, staining, deformities, skin turgor, moisture/

hydration and plantar pressure with the risk rating was related as risks factors.

**Conclusion:** Considering the higher levels of comorbidities in this population, it's importante have promotions programs to prevent and evaluate risks of injury and amputation. Diabetes patients seems don't even realize the prevention coulbb easy and be applied in simple changes in every day life. However, it's believe that health education can chance this cenario. The extension Project evaluated, diagnosed needs attention, sent patients to services and updates for professionals, family members and users.

#### A144

##### Evaluation and screening of diabetes mellitus in health fairs: preliminary results of healthrise vitória da conquista

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**Introduction:** Health fairs in basic health care units can be an important strategy to enable the screening of individuals with DM (Diabetes Mellitus), as well as an assessment of previously diagnosed patients that are uncontrolled. The objective of this study was to describe the proportion of individuals without previous diagnosis or with self-reported DM, identified in health fairs with altered glyated hemoglobin (HbA1c).

**Methods:** This research was conducted as part of the HealthRise project. Five health fairs were held in areas with family health strategy coverage in the city of Vitória da Conquista, Bahia, from April to July 2017. Community health agents delivered invitations to patients with DM and their families. There were also announcements on local radio. At the health fairs, questionnaires with demographic data and self-reported DM diagnosis were applied, capillary blood glucose test and blood collection for glyated hemoglobin (HbA1c) measurements were performed. The latter is for individuals with capillary blood glucose > 100 mg/dL (fasting) or 140 mg/dL (non-fasting). Samples were sent to a clinical laboratory. Individuals without a DM diagnosis with HbA1c values  $\geq 6.5\%$  were later referred for another measurement and medical assessment. Uncontrolled patients were those with a diagnosis of DM and HbA1c > 7% (adults) and > 8.5% (elderly). Data was analyzed through descriptive statistics. This study was approved by the "Universidade Federal da Bahia – Instituto Multidisciplinar em Saúde" Ethics Board, approval number 1.861.073, and was funded by the Medtronic Foundation.

**Results:** Among the 151 patients whose HbA1c results had already been released by the laboratory, 110 (72.8%) were female and 89 (58.9%) were older adults. 36 (23.8%) of the patients had no previous diagnosis of DM, of which 6 (16.7%) presented HbA1c  $\geq 6.5\%$ . Between 115 patients with self-reported DM, 46 (40%) had uncontrolled HbA1c, according to the study criteria.

**Conclusions:** A high proportion of people with uncontrolled DM was found. The strategy of DM screening at health fairs proved to be a viable alternative to identify possible new cases.

#### A145

##### Evaluation nutricional and metabolic, in the gestation and four years after the childbirth, in women with DMG—association with intolerance to the glucose and DM2

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**Introduction:** The change in the way of life, including adaptation nutricional and exercise, is the key in the handling of the DMG and in the prevention of the DM2 4 years after the childbirth.

**Objective:** Value the profile nutricional and metabolic of women with DMG, in the gestation and 4 years after the childbirth, and to associate to risk of hiperglicemia after the childbirth.

**Method:** Cohort that valued 65 women with DMG at the gestation and 47 of these quatros years after the childbirth. The food consumption was valued for recordatório of 24 h and questionnaire of frequency food and qualified by the software Avanutri. Rate of Physical Mass (IMC), pleat cutaneous tricipital (PCT), muscular circumference of the arm (CMB) and levels of glicemia, of fast and 2 h—prandial, hemoglobin glicada (HbA1c), total cholesterol and fractions and triglicérides were valued and been associated by them to the disorders risk hiperglicêmicas 4 years after the childbirth. In the statistical analysis there was used test of the qui-square or right one of Fisher and calculation of odds ratio (OR) and interval of confidence to 95%, with  $p < 0.05$ .

**Results:** Most of the women presented unsuitable caloric ingestion and food consumption, in the gestation and 4 years after the childbirth. In the avaliação carried out after the childbirth, there were observed bigger values IMC and PCT ( $p = 0.028$ ) and, juveniles, of CMB ( $p < 0,001$ ), with bigger proportion of HbA1c  $\geq 6.5\%$ , ( $p = 0.007$ ) and HDL < 50 mg/dL ( $p < 0.001$ ). In this period, the IMC-gestacional  $\geq 25$  kg/m<sup>2</sup> showed OR of 4583 up (1189; 17,675) for Intolerance to the glucose (14.9%) and DM2 (36.2%).

**Conclusion:** The food inadequacy characterized the women with DMG, in the gestation and four years after the childbirth, with indicators of obesity and disorders glicêmicas and metabolic in the period after the childbirth. Nevertheless, the IMC-gestacional  $\geq 25$  kg/m<sup>2</sup> was the only factor associated to the risk of hiperglicemia 4 years after the childbirth.

#### A146

##### Evaluation nutricional in women bearers of diabetes melito gestacional—relation with metabolic syndrome, control glycemic, weight of newborn baby and diagnosis of diabetes melito after the gestation

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**Introduction:** It is defined diabetes Melito Gestacional by diabetes when second was diagnosed in or thirdly terms of the gestation, with world-wide predominance from 2 to 20%. This condition has motherly repercussions and fetais, in the gestation and after, and type constituti risk for Diabetes Melito 2, metabolic syndrome and disease cardiovascular.

**Objective I:** Value the profile nutricional of pregnant women with Diabetes Melito Gestacional, considering macro and microelements, in the gestation and in the period of 4 years after the childbirth, and it will connect this profile with markers of metabolic syndrome, controls glicêmico, I hurt of the newborn baby and incident of intolerance the glucose and Diabetes Melito type 2 after the gestation.

**Method:** Study of cohort that included 65 pregnant women with Diabetes Melitos Gestacional. Between the motherly variables, the indicators were analysed antropométricos and of markers of metabolic syndrome and control glicêmico. In the statistical analysis the next tests were employed—Qui-Square of Pearson,—paramétricos of Wilcoxon and McNemar, for the dependent samples, calculation of odds ratio (OR) and IC 95%.

**Resulted:** In the period gestacional more than 70% of the pregnant women presented inadequacy in the total energetic consumption and in the consumption of calcium, vitamin D and magnesium; significant associations with markers of metabolic syndrome were confirmed between unsuitable consumption of calcium and IMC  $\geq 25$  kg/m<sup>2</sup> ( $p = 0.042$ ); of vitamin D and HDL-Cholesterol < 50 mg/dL ( $p = 0.018$ ) and of zinc and glicemia of fast  $\geq 100$  mg/dL ( $p = 0.036$ ), besides magnesium and when were recently been born big for the age ( $p = 0.016$ ); the fibers consumption, besides unsuitable in the gestation, had significant reduction in the evaluation of 4 years after the childbirth ( $p = 0.047$ ). In the evaluation 4 years after the childbirth, the IMC and



the measure of the cutaneous pleat tricipital were bigger ( $p < 0.001$ ;  $p = 0.028$ ), with reduction in the measure of the muscular circumference of the arm ( $p < 0.001$ ). The fast glycemia ( $p = 0.008$ ) and the levels of HbA1c ( $p = 0.007$ ) increased and the values of total cholesterol, HDL-Cholesterol and triglicérides ( $p < 0.001$ ) lessened in the evaluation of 4 years after the childbirth. The IMC-gestacional  $\geq 25$  kg/m<sup>2</sup> showed OR of 4583 (1189; 17,675) for Intolerance to the glucose (14.9%) and DM2 (36.2%).

**Conclusion:** Significant associations were identified between the unsuitable consumption of macro and micronutritious of the diet and markers of metabolic syndrome and of the weight while being born, without association with markers of the control glicêmico motherly.

#### A147

##### Evaluation of 25-hydroxvitamin D levels and vitamin d receptor polymorphisms in type 2 diabetes mellitus patients

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**Introduction:** Vitamin D deficiency has been associated with a variety of diseases, including type 2 diabetes mellitus (T2DM). Due to its pleiotropic action, vitamin D can regulates insulin secretion and immune-inflammatory response. Vitamin D receptor (VDR) polymorphisms are involved in the gene expression regulation and have been associated with T2DM and their microvascular complications.

**Objective:** This study aimed to evaluate the association between the polymorphisms Apal (rs7975232), Bsm1 (rs1544410), FokI (rs10735810), and TaqI (rs 731236) in the VDR gene with T2DM, retinopathy, diabetic kidney disease occurrence, as well as 25- hydroxvitamin D levels [25(OH)D].

**Methods:** We evaluated 101 patients with clinical and laboratorial diagnosis of T2DM and 62 gender- and body mass index (BMI)-matched nondiabetic control. Molecular analyzes were performed by PCR-RFLP (Polymerase Chain Reaction-Restriction Fragment Length Polymorfism). 25(OH)D levels were measured by high performance liquid chromatography. Statistical analysis was performed with SPSS (version 17.0) using qui-square test with residual analysis and Mann-Whitney test. A p value  $< 0.05$  was considered statistically significant.

**Results:** The 25(OH)D levels were lower in T2DM patients [17.19 (18.26) ng/mL] when compared with controls subjects [31.10 (14.97) ng/mL— $p < 0,0001$ ]. We found no difference between genotype and allele frequencies of the VDR polymorphisms when compared T2DM and control groups ( $p > 0.05$  for all). However, regarding microvascular complications, diabetic kidney disease was associated with the GG genotype ( $p = 0.048$ ) and G allele ( $p = 0.015$ ) of Bsm1 polymorphism.

**Conclusions:** These results suggest that Bsm1 polymorphism is associated with the development of diabetic kidney disease in T2DM patients. Besides, T2DM patients exhibited lower 25(OH)D levels, which suggest its association with the disease. Acknowledgements: CNPq and FAPEMIG. Keywords: Vitamin D,

#### A148

##### Evaluation of cardiovascular risk in individuals with type 2 diabetes mellitus according to framingham criteria

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Patients with diabetes mellitus type 2 present higher risk of developing cardiovascular diseases, which are the main causes of death in the world. Thus, we recommend evaluating the cardiovascular risk of these

people as an important strategy to conduct the therapeutic plan. This was a cross-sectional study developed in a secondary care service from February to June in 2016, including a sample of 81 individuals with type 2 diabetes mellitus. We aimed to characterize the study sample regarding the sociodemographic and clinic variables and to evaluate the cardiovascular risk according to Framingham score. We collected data from individuals with type 2 diabetes and without history of cardiovascular disease, using a structured form based on Framingham risk score that estimates the cardiovascular risk in the following 10 years. The first part of the instrument described the variables sex, age, race, marital status, educational level, occupation and smoking habit, which the participants had reported, and the second part contained the variables HDL-cholesterol, LDL-cholesterol and blood pressure, based on medical records. To calculate the risk of cardiovascular event, each variable had a value and, based on the sum of these points, we estimated the cardiovascular risk in low (less than 10%), medium (10 to 20%) and high (more than 20%). We analyzed data using the descriptive statistics. We found that 82.8% of the sample were female, 23.5% were aged 55-59 years, 60.5% were married, 46.9% had not completed elementary school and 69.2% were retired. 38.3% of the sample had high risk of developing cardiovascular diseases in 10 years. In the categorization of the risk by sex, 38.9% of the female population had high risk, whereas 35.7% of the male population was equally distributed into low and highrisk categories. We found that the studied population is at risk of developing cardiovascular diseases and, therefore, we have showed the importance of optimizing prevention measurements and treatment to contribute to the decrease of morbimortality in this group.

**Keywords:** Diabetes mellitus, type 2; Framingham score.

#### A149

##### Evaluation of hospital Santa Marcelina's type-2 diabetic patients before and after bariatric surgery

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**Background:** Bariatric surgery is recommended to patients with morbid obesity, and is also efficient to control and prevent associated diseases, such as diabetes mellitus type-2 (DM-2). Past studies already showed that this procedure can reduce the incidence of DM-2 in 80%, and almost 90% of diabetic patients presented short-term remission of the disease. Weight loss can lead to improvement of insulinic sensibility and beta-cell function; also, it contributes to better hormonal modulation (through incretins GLP-1 and GIP).

**Objective:** This study aims to analyze the efficiency of bariatric surgery in type-2 diabetic patients, and this disease's remission after 6 months of the procedure.

**Methods:** This research was approved by Hospital Santa Marcelina's Ethics Board (n. 06587/17), and was based on the comparison of two charts: diabetic patients before bariatric surgery x after surgery. The data of each chart was retrieved through revision of Hospital Santa Marcelina's bariatric patient files, comparing the last medical appointment before and the first one after the surgery. The sample was composed by 21 individuals; weight, BMI, obesity level, HbA1C, fasting glucose, use of oral hypoglycemic agents or insulin and drugs to lose weight were studied. After the comparison between charts, the data was submitted to descriptive statistical analysis.

**Results:** 90.4% of the 21 patients analyzed were female. The mean age of the group was  $49 \pm 10.7$  years. The patients had mean fasting glucose levels of  $145.47 \pm 41.74$  mg/dL, mean glycated hemoglobin of  $7.55\% \pm 1.27$ , mean weight of  $114.1 \pm 25.03$  kg and mean BMI of  $44.06 \pm 6.46$  kg/m<sup>2</sup>. 19 individuals used oral hypoglycemic drugs, and 8 were insulin-dependent; there was only 1 patient who used only insulin. 6 months after bariatric surgery, the mean fasting glucose levels were reduced to  $117.4 \pm 44.5$  mg/dL; mean HbA1C was

6.34%  $\pm$  1.33, mean weight was 91.8  $\pm$  22.5 kg and mean BMI was 33.89  $\pm$  6.66 kg/m<sup>2</sup>. 42.1% of the 19 patients using hypoglycemic drugs had their therapy reduced, and 55.6% stopped using insulin. 19% of the patients achieved the 3 criteria for DM remission, and 19% achieved 2 of them.

**Conclusion:** 6 months after surgery, 4 of the 21 patients achieved all the criteria for DM remission (fasting glucose levels < 100 mg/dL, HbA1c < 5.7% and no necessity for hypoglycemic drugs); also, 4 individuals achieved 2 of said criteria. Informed consent to publish has been obtained from all 21 patients.

#### A150

##### Evaluation of insulin degludeca versus NPH intrahospital use: a retrospective study

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**Introduction:** In the hospital setting, diabetes increases hospitalization length, exacerbates coexisting diseases and increases mortality. Hypoglycemia, as well as hyperglycemia, is also a predictor of mortality.

**Objective:** Evaluate the clinical profile, incidence of hypoglycemia, including nocturnal hypoglycemia and severe hypoglycemia as well as hospitalization length on inpatient population under use of Degludeca plus Regular Insulin versus NPH plus Regular Insulin.

**Methods:** We conducted a retrospective, randomized study to compare the efficacy and safety of different basal insulin (Degludeca versus NPH), both on Basal-bolus insulin regimen on inpatient population with diabetes. Data were collected from the medical records, between May, 2016 until April, 2017. 8 patients were selected and randomized in each group. We established optimal glycemic control for patients with capillary glucose below 140 mg/dl in fasting and before main meals and below 180 mg/dL for 2 h after main meals. The criteria for excellent glycemic control was to achieve at least 70% within the previously established target and for acceptable glycemic control, those patients who had between 60% and 69% of the glycemia within the established target. The total number of hypoglycemia was assessed and classified as severe hypoglycemia (< 40 mg/dl) and mild hypoglycemia (< 70 mg/dl) as well as nocturnal hypoglycemia. In addition, the time required to achieve excellent or acceptable glycemic control was also analyzed.

**Results:** Group 1 (Degludeca) had 4 episodes of hypoglycemia during hospitalization, including 1 nocturnal episode classified as severe. Group 2 (NPH), had 13 episodes of hypoglycemia, including 2 severe and 2 nocturnal episodes. Those Patients, independently of the group, who had excellent control presented with a greater number of hypoglycemia, as well as more severe and nocturnal events. The incidence of hypoglycemia was higher in older patients, with higher number of comorbidities, lower BMI and longer time of diabetes diagnoses. Group 1 achieved excellent glycemic control in 4 days on average, while patients in group 2 took 6 days to achieved the same glycemic levels.

**Conclusion:** The study confirmed data already consolidated in the literature, evidencing the superiority of Degludeca insulin in the reduction of nocturnal and/or severe hypoglycemia. Keywords: Diabetes, and degludeca.

#### A151

##### Evaluation of lipid profile in different stages of development among young people with type 1 diabetes

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**Introduction:** As one of the most common endocrine disease and one of the most common chronic conditions in children and teenagers, type 1 diabetes (T1D) accounts for only about 5–10% of all cases of diabetes. Given the chronic nature of the disease, the atherosclerotic process starts very soon in life, even before it shows up in screening tests for micro or macrovascular complications. Puberty consists of a series of biologic transitions, and the sequence of changes in secondary sexual characteristics has been categorized by several groups. The physical measurements of development are based on external primary and secondary sex characteristics, such as the size of the breasts, genitals, testicular volume and development of pubic hair. Due to natural variation, individuals pass through the Tanner stages at different moments, being classified as children, adolescents and adults, depending justly on the timing of puberty (Fig. 1).

**Objectives:** To determine serum levels of lipid, cholesterol, triglycerides in 3 different stages of maturity with T1D, when compared to data from non-diabetic ones with similar maturity levels.

**Methods:** A case-control study was conducted on 21 T1D patients (5 prepubertal and 6 pubertal children; 10 adults) and 42 non-diabetic patients matched on age, sex, and body mass index (BMI) and pubertal stages according to Tanner's criteria. The lipid profile was determined and an Odds ratio (OR) was conducted with a confidence interval of 95% (95% CI), to establish a correlation between different lipid fractions and pubertal stages. A summary of the methodology is described in Table 1. Study Design—Case Control Study 21 patients with T1D 42 patients in the control group Clinical Features and Physical Examination Age Gender Body Mass Index (BMI) Pubertal Stages (Tanner's Criteria) Laboratory findings Total Cholesterol (TC) High Density Lipoprotein cholesterol (HDL-c) Low Density Lipoprotein cholesterol (LDL-c) Triglycerides (TG) Fig. 2: Table 1. Summary of the methodology.

**Results:** The T1D prepubertal children showed a trend in cholesterol levels highest than those non-diabetic, however, this difference was not statistically significant ( $p = 0.08$ ). Among individuals in the pubertal stages, T1D is associated with greater prevalence of dyslipidemia (71.4% vs. 21.8%,  $p < 0.03$ ), with high total cholesterol levels (184.7  $\pm$  37.6 vs. 143.8  $\pm$  25.9 mg/dl,  $p = 0.01$ ), LDL-c (123  $\pm$  31.2 vs. 81.4  $\pm$  21.3 mg/dl,  $p < 0.02$ ) and triglycerides (168.3  $\pm$  25.8 vs. 146.6  $\pm$  21.4 mg/dl,  $p < 0.004$ ) than those non-diabetics (Fig. 2: Table 2). In this study, no significantly differences were found for the entire adult population. Table 2. Summary of results T1D patients control group adolescents Dyslipidemia: 71.4% TC: 184.7  $\pm$  37.6 mg/dl LDL-c: 123  $\pm$  31,2 mg/dl TG: 168.3  $\pm$  25.8 mg/dl Adolescents Dyslipidemia: 21.8% TC: 143.8  $\pm$  25.9 mg/dl LDL-c: 81.4  $\pm$  21.3 mg/dl TG: 146.6  $\pm$  21.4 mg/dl.

**Conclusion:** Although search for primary and secondary causes have not been made to exclude them, our data suggests that an increasing prevalence of dyslipidemia among T1D pubertal individuals. Therefore, it is necessary systematic approaches on dyslipidemia screening in younger diabetics for preventing or delaying the development of future micro or macrovascular complications of the disease.

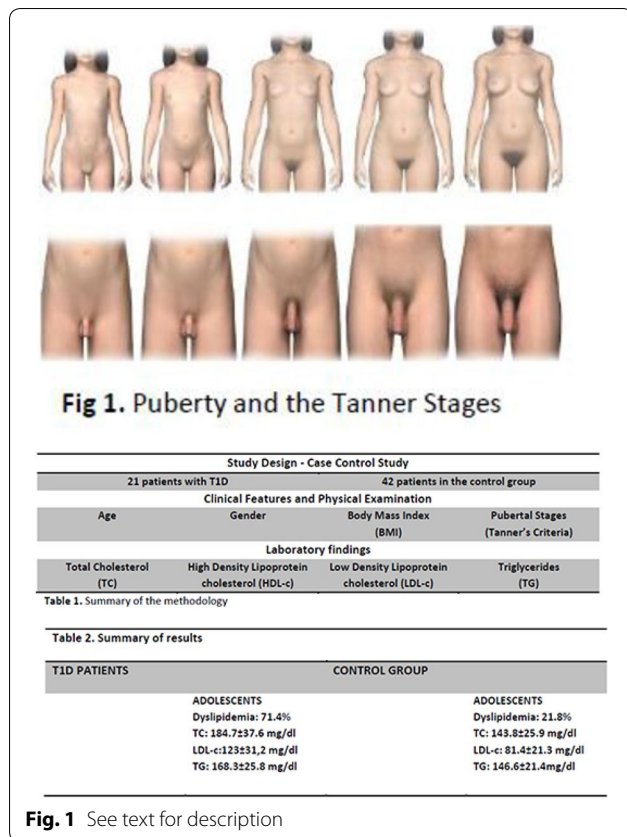


Fig. 1 See text for description

**A152**  
**Evaluation of macrovascular complications between diabetics type 2 in a hospital of teaching of São Paulo: retrospective study of 559 cases**

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**Introduction:** The development of atherosclerosis is the main complication of diabetes mellitus and includes cardio and cerebrovascular diseases in addition to peripheral arterial insufficiency. Together, they manifest themselves clinically frequently five to ten times higher in diabetics than in non-diabetics.

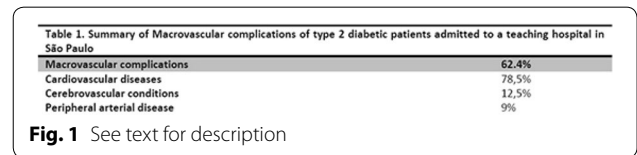
**Objectives:** To evaluate the profile of hospitalizations of type 2 diabetic patients due to macrovascular diseases in a teaching hospital in the city of São Paulo.

**Methods:** Retrospective study of 559 records of type 2 diabetic patients hospitalized between January/2009 and November/2016. Anamnesis data were analyzed, such as age, sex, causes and time of hospital stay. The patients were divided into three groups regarding the occurrence of macrovascular events: cardiovascular, cerebrovascular and peripheral arterial disease (PAD).

**Results:** Among all hospitalizations of type 2 diabetic patients, 62.40% were due to macrovascular events (n = 349). The mean age was 63 years (79–47 years). Of the macrovascular events, 78.5% were from

cardiovascular diseases, 12.5% from cerebrovascular diseases and 9% from PAD. The mean length of hospital stay was 18 days. Table 1. Summary of Macrovascular complications of type 2 diabetic patients admitted to a teaching hospital in São Paulo Macrovascular complications 62.4% Cardiovascular diseases 78.5, 12.5, 9%.

**Conclusion:** Diabetes mellitus was a risk factor for cardiovascular events 2 to 3 times higher in men, who are more likely to develop coronary heart disease, being the main cause of hospitalization. The data found in our study are consistent with the literature, since macrovascular diseases represented almost two-thirds of hospital admissions in this population, with cardiovascular events being the most prevalent in more than 75% of the cases (Fig. 1).



**A153**  
**An impact assessment on a health promotion and self-management project intended for people with type 2 diabetes mellitus**

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**Introduction:** Diabetes is a serious complex condition when we take into account all the complications, the changes in the habits of life of the individuals and the several classes of drugs, not always understood by the vast majority of patients. Educational actions help those affected to deal with the disease better and preventing other associated complications.

**Objective:** To evaluate the impact of a project exclusively directed for people with type 2 Diabetes (T2D), in the fields of education, health promotion and self-management.

**Methods:** From May to November 2016, patients with T2D within 10 years or less of diagnosis were recruited from the diabetes outpatient clinic of a university hospital in the city of Sao Paulo, Brazil. Inappropriate glycemic control was defined as HbA1c ≥ 8% (HPLC method). Patients who had previously participated in other educational projects were excluded. The same structured questionnaire was administered at the beginning and the end of this project to a total of 163 eligible participants (Fig. 1).

**Results:** As regards the replies to the questionnaire, the average scores at the first and second time were 31.45 and 43.86 out of 56, respectively. The patients started the clinical study with an average HbA1c levels of 10.3 ± 1.4%, having two consecutive decreased statistically significant since educational program has started (p < 0.05).

**Discussion:** Several studies have demonstrated the intensive treatment of diabetes with medical and multidisciplinary team visits in shortest intervals focusing on the education about complications and self-management are effective strategies that improving glycemic control and reducing the symptoms or long-term endpoints of the diabetes.

**Conclusion:** The model of diabetes self-management and patient education, with a view to reducing the modifiable risk factors such as sedentary lifestyle, high blood pressure, obesity and smoking, is extremely important in order to achieve the glycemic control in T2D patients. The data collected using the proposed methodology may be

used when drawing up the actions for improvement of critical points which may be identified. Although our data was collected using a non-randomized and non-controlled design study, it seems clear the contribution of these new forms of education aiming the improvement of assistance quality to diabetic people, especially with regard to the self-management of diabetes (Fig. 1).  
 Informed consent to publish had been obtained from the patients.



**A154**  
**An impact assessment on a health promotion and self-management project intended for people with type 2 diabetes mellitus**

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**Introduction:** The importance of a tight glycemic control in pre and gestational diabetes mellitus in maternal-fetal binomial is well known. Sometimes, the adequate glycemic goal is hard to be reached in public hospitals in development countries. However, the impact of this clinic inertia in this binomial could be heterogeneous and depends on the diabetes type.

**Aim:** To evaluate the relationship between the gestational age of the first antenatal visit and the maternal-fetal prognosis in the pregnancy of 3 main types of diabetes mellitus.

**Methods:** 642 pregnant women [470 Gestational Diabetes(GDM), 100 Type 1 Diabetes Mellitus(T1D) e 74 type 2 Diabetes Mellitus (T2D)] of a public university diabetes center were evaluated in respect of the gestational age of the first antenatal visit and fetal outcomes (jaundice, hypoglycaemia, respiratory distress, admission in intensive care unit (ICU), malformations) and maternal outcomes (preeclampsia, pregnancy specific hypertensive disease and oligoamnium). Estastics were performed in SPSS: ANOVA and QUI square tests.

**Results:** The patients with GDM, T1D and T2D had age, body mass index (BMI), gestational age of the first antenatal visit and HbA1c respectively: 33.8 + 5.3, 24.6 + 6.3 and 33.4 + 6.1 years; 30.2 + 6.1, 23.4 + 3.7 and 29.8 + 7.4 kg/m<sup>2</sup>; 25.6 + 7.1, 13.6 + 6.6 and 15.3 + 7.3 gestational weeks and 5.9 + 1.5, 8.4 +1.6 and 7.1 +1.9%. The cesarean cession was predominant in all groups: 80.6% GDM, 76.5% T1D e 73% T2D. The newborns birth weight (in kilograms) were: GDM: 3,16 +0,55; T1D: 2,74 +0,95 and T2D: 3,04 +0,72, with 8,1% of LGA (large for gestational age) in the GDM, 16,3% in T1D and 12,9% in T2D. The newborns of the patients with 1DM and 2DM had significantly higher rates of hypoglycaemia (p<0,000 in both groups), jaundice (p<0,002 and p<0,001), respiratory distress (p<0,007 and p<0,033) and admission in ICU (p<0,000 in both groups) compared to then with GDM. The malformation rate was higher in the newborns of the 1DM mothers compared to them with GDM (p<0,008). There were no significantly difference the maternal outcomes between the groups.

**Conclusion:** The gestational age of the first visit has higher influence in newborns than in maternal outcomes and in patients with pre gestational diabetes (Fig. 1).

**Table: Efficacy and Safety of LixiLan in Pts Aged ≥ 65 Years Included in the LixiLan-O and LixiLan-L Phase 3 Clinical Trials (mITT Population for efficacy outcomes, safety population for adverse events)**

Outcome	LixiLan-O <sup>a</sup>			LixiLan-L <sup>b</sup>			
	LixiLan	Gla-100	Treatment difference (SE), P value	LixiLan	Gla-100	Treatment difference (SE), P value	
Age at baseline (years), mean (SD) <sup>c</sup>	n = 113 68.8 (3.8)	n = 114 70.0 (3.9)	-1.2 (0.85) 0.167	n = 110 70.5 (5.0)	n = 119 69.6 (3.9)	0.9 (0.8) 0.270	
A1c%, mean (SD) <sup>c</sup>	Baseline	n = 132 7.96 (0.67)	n = 114 8.05 (0.67)	-0.09 (0.09) 0.334	n = 110 8.07 (0.66)	n = 118 8.09 (0.71)	-0.02 (0.09) 0.846
	Change at Week 30	n = 132 -1.45 (0.86)	n = 114 -1.15 (0.79)	-0.30 (0.11) 0.007	n = 110 -1.11 (0.89)	n = 118 -0.48 (0.84)	-0.63 (0.12) < 0.001
	Week 30	n = 132 6.51 (0.72)	n = 114 6.90 (0.73)	-0.39 (0.10) < 0.001	n = 110 6.96 (0.88)	n = 118 7.61 (0.89)	-0.65 (0.12) < 0.001
FPG (mg/dL), mean (SD) <sup>c</sup>	Baseline	n = 132 181.3 (43.4)	n = 114 179.8 (40.2)	1.4 (5.2) 0.784	n = 110 132.1 (32.8)	n = 118 138.6 (44.0)	-6.3(4.9) 0.182
	Change at Week 30	n = 132 -62.7 (43.2)	n = 114 -65.2 (48.5)	2.3 (6.1) 0.709	n = 110 -8.5 (42.0)	n = 118 -17.8 (48.5)	9.4 (6.5) 0.143
PPG (mg/dL), mean (SD) <sup>c</sup>	Baseline	n = 123 284.9 (64.9)	n = 107 278.9 (71.4)	5.8 (8.5) 0.491	n = 98 275.6 (69.7)	n = 115 270.5 (67.9)	5.2 (9.2) 0.574
	Change at Week 30	n = 123 -113.0 (78.92)	n = 107 -64.1 (70.1)	-48.8 (9.4) < 0.001	n = 98 -94.4 (87.6)	n = 115 -24.1 (70.3)	-70.3 (10.8) < 0.001
Weight (kg), mean (SD) <sup>c</sup>	Baseline	n = 132 87.2 (15.8)	n = 114 84.6 (15.0)	2.6 (2.1) 0.219	n = 110 84.0 (12.1)	n = 119 85.8 (14.1)	-1.8 (1.9) 0.341
	Change at Week 30	n = 132 -0.9 (3.7)	n = 114 1.2 (3.0)	-2.2 (0.5) < 0.001	n = 110 -1.2 (2.8)	n = 119 0.6 (2.5)	-1.8 (0.4) < 0.001
Proportion of pts with A1c ≤ 7.0% at Week 30, % <sup>c</sup>	n = 132 78.0	n = 114 54.4	24.3 (5.8) < 0.001	n = 110 51.8	n = 119 21.0	28.6 (6.0) < 0.001	
<b>Documented (SMPG ≤ 70 mg/dL) symptomatic hypoglycemia:</b>							
Proportion of pts with events, % <sup>a</sup>	n = 133 27.8	n = 114 28.9	-0.9 (5.8) 0.876	n = 110 36.4	n = 119 43.7	-6.7 (6.4) 0.291	
Number of events per pt-year <sup>d</sup>	n = 133 1.42	n = 114 1.89	-0.46 (0.22) 0.035	n = 110 2.84	n = 118 4.91	-2.07 (0.35) < 0.001	
Proportion of pts with A1c < 7.0%, no weight gain at Week 30 and no documented hypoglycemia (SMPG ≤ 70 mg/dL), % <sup>e</sup>	n = 133 30.1	n = 114 14.0	16.0 (5.1) 0.002	n = 110 26.4	n = 119 8.4	17.2 (4.8) < 0.001	
<b>Proportion of pts experiencing:</b>							
Nausea, % <sup>f</sup>	n = 133 12.0	n = 114 2.6	9.4 (3.3) 0.001	n = 110 13.6	n = 119 0.8	12.8 (3.6) < 0.001	
Vomiting, % <sup>f</sup>	n = 133 4.5	n = 114 1.8	3.0 (2.4) 0.219	n = 110 3.6	n = 119 0.8	2.9 (2.3) 0.219	

<sup>a</sup>Pts on metformin.  
<sup>b</sup>Pts on ± metformin.  
<sup>c</sup>2-way ANOVA means model for comparisons between LixiLan and Gla-100 by subgroup and for treatment by factor interaction tests.  
<sup>d</sup>Measured 2 hours after a standard liquid meal.  
<sup>e</sup>Cochran-Mantel-Haenszel test across randomization strata per protocol for comparisons between LixiLan and Gla-100 by subgroup and z-tests for treatment by factor interactions.  
<sup>f</sup>Mean rates of hypoglycemia events were compared between LixiLan and Gla-100 based on a Poisson distribution of events.  
 mITT, modified intent to treat using last observation carried forward for pts with baseline and follow-up assessments; SMPG, Self-Measured Plasma Glucose, SD, standard deviation; SE, standard error.

**Fig. 1** See text for description

**A155**  
**Evaluation of materno-fetal prognosis according to initial gestational age of first antenatal visit and metabolic-clinic parameters in type 1, type 2 and gestational diabetes mellitus in a public hospital**

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**Introduction:** The importance of a tight glycemic control in pre and gestational diabetes mellitus in maternal-fetal binomial is well known. Sometimes, the adequate glycemic goal is hard to be reached in public

hospitals in development countries. However, the impact of this clinic inertia in this binomial could be heterogeneous and depends on the diabetes type.

**Aim:** To evaluate the relation between the gestational age of the first antenatal visit and the maternal–fetal prognosis in the 3 main types of diabetes mellitus during pregnancy.

**Methods:** 642 pregnant women [470 Gestational Diabetes(GDM), 100 Type 1 Diabetes Mellitus(1DM) e 74 type 2 Diabetes Mellitus(2DM)] of a public university diabetes center were evaluated in respect of the gestational age of the first antenatal visit and fetal outcomes (jaundice, hypoglycaemia, respiratory distress, admission in intensive care unit (ICU), malformations) and maternal outcomes (preeclampsia, pregnancy specific hypertensive disease and oligoamnium). Statistics were performed in SPSS: ANOVA and QUI square tests.

**Results:** The patients with GDM, 1DM and 2DM had age, body mass index (BMI), gestational age of the first antenatal visit and HbA1c respectively: 33.8 +5.3, 24.6 +6.3 and 33.4 +6.1 years; 30.2 + 6.1, 23.4 + 3.7 and 29.8 + 7.4 kg/m<sup>2</sup>; 25.6 + 7.1, 13.6 +6.6 and 15.3 +7.3 weeks and 5.9 +1.5, 8.4 +1.6 and 7.1 + 1.9%. The C section was predominant in all groups: 80.6% GDM, 76.5% 1DM e 73% 2DM. The newborns birth weight (in kilograms) were: GDM: 3.16 + 0.55; 1DM: 2.74 +0.95 and 2DM: 3.04 + 0.72, with 8.1% of LGA (large for gestational age) in the GDM, 16.3% in 1DM and 12.9% in 2DM. The newborns of the patients with 1DM and 2DM had significantly higher rates of hypoglycaemia (p: 0.000 in both groups), jaundice (p: 0.002 and p: 0.001), respiratory distress (p: 0.007 and p: 0.033) and admission in ICU (p: 0.000 in both groups) compared to then with GDM. The malformation rate was higher in the newborns of the 1DM mothers compared to them with GDM (p: 0.008). There were no significant difference the maternal outcomes between the groups.

**Conclusion:** The gestational age of the first visit has higher influence in newborns than in maternal outcomes and in patients with pre gestational diabetes (1DM and 2DM).

#### A156

##### Evaluation of precious hospital replacement after high of patients with type 2 diabetes

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**Introduction:** Hospital readmission is an important indicator of care received during hospitalization. It is crucial to review the factors that lead to readmission, since it has high costs for the individual, for the health system, and is associated with higher morbidity and mortality.

**Objectives:** To evaluate the rate of readmission and the main associated causes among type 2 diabetic patients in a large hospital, São Paulo/SP.

**Methods:** A retrospective study was carried out between September 2014 and May 2017 with type 2 diabetic patients followed by the Endocrinology team for more than 48 h and readmitted within 30 days after hospital discharge. The percentage of readmissions was evaluated in relation to the total number of hospitalizations and their main causes.

**Results:** A total of 362 patients were studied, with a mean age of 64.5 years (43–86 years) and mean duration of diabetes 12.7 ± 9.3 years. The overall readmission rate was 11.8%. Among them, the majority were male (68%) and 78% had been hospitalized in the last 30 days with the same diagnosis. The main causes of readmission were cardiovascular diseases 56%, cancer 19.5%, respiratory 12.2%, genitourinary 7.3% and gastrointestinal 5.0% (Fig. 1: Table 1). The main adjuvant comorbidities to the diagnosis of DM and those mentioned above were (Fig. 1: Table 2): hypertension (39%), acute coronary syndromes (16%), decompensated heart failure (15%), renal failure (17%) and decompensation of chronic obstructive pulmonary disease (16%).

Among those readmitted, the mortality rate was 9.7%. Table 1. Main causes of hospital readmissions in patients with DM Cardiovascular diseases 56% Oncological diseases 19.5% Respiratory diseases 12.2% Genitourinary diseases 7,3% Gastrointestinal disorders 5% Table 2. Resumo das principais comorbidades adjuvantes ao diagnóstico de DM Systemic arterial hypertension 39% Acute coronary syndrome 16% Decompensated heart failure 15% Renal insufficiency 17% Chronic obstructive pulmonary disease 16%.

**Table 1.** Main causes of hospital readmissions in patients with DM

Cardiovascular diseases	56%
Oncological diseases	19,5%
Respiratory diseases	12,2%
Genitourinary diseases	7,3%
Gastrointestinal disorders	5%

**Table 2.** Resumo das principais comorbidades adjuvantes ao diagnóstico de DM

Systemic arterial hypertension	39%
Acute coronary syndrome	16%
Decompensated heart failure	15%
Renal insufficiency	17%
Chronic obstructive pulmonary disease	16%

**Fig. 1** See text for description

**Conclusion:** Our data are in accordance with the literature, which indicates readmission rates varying from 2 to 16%. The profile of the main comorbidities found refers to the specialties known to the general public and, in the case of a highly complex hospital, exposes patients' chronicity and severity. The epidemiological profile can help identify those with greater potential for rehospitalization and the implementation of strategies for better follow-up, with a substantial reduction in the morbimortality of the diabetic population.

#### A157

##### Evaluation of return rate with ogtt postpartum of patients accompanied in gestational diabetes ambulatory at UERJ

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Gestational diabetes mellitus (GDM) is an important risk factor for the future development of type 2 diabetes (T2DM). The American Diabetes Association (ADA) recommends screening for T2DM through the oral glucose tolerance test (OGTT) at 6 to 12 weeks postpartum and every 3 years throughout life. However, studies show that even with proper guidelines, the postpartum rate of return is low, between 20 and 64%. The objective of the study was to evaluate the rate of return with the OGTT result 6–12 weeks after delivery in women with previous gestational diabetes as well as the factors implicated in the greater adherence to the test. A retrospective study was conducted with a cohort of women with gestational diabetes, with prenatal care and delivery in a tertiary university center, from January 2013 to April 2017. The diagnosis of gestational diabetes was based on IADPSG criteria (fasting  $\geq 92$  mg/dl 1 h  $\geq 180$  mg/dl and/or 2 h  $\geq 153$  mg/dl) and the diagnosis of type 2 diabetes and glucose intolerance were made using the ADA criteria of 2016 (fasting and 2 h post-glucose load  $\geq 126$  mg/dl and/or  $\geq 200$  mg/dl and 100–125 mg/dl and/or 140 mg/dl and 199 mg/dl, respectively). All women were instructed to perform a OGTT 6–12 weeks postpartum. Statistical analysis was performed using the SPSS program version 17.0. The t test and Mann–Whitney test were used for the analysis of continuous variables and  $\times 2$  for categorical variables. Of the 152 patients analyzed, 21 (13.8%) returned with the OGTT results. There was a statistically significant difference in the frequency of insulin use during pregnancy (76.2% vs 38.9%, respectively for the group that performed the OGTT and the non-adherent to the screening, p value = 0.001). There was no statistically significant difference between the 2 groups regarding

age, family income, schooling, pre gestational BMI, parity, gestational age at the first visit, smoking, family history of T2DM, diagnosis of GDM before the third trimester, previous GDM and race. Among the patients who returned with the OGTT, 9 (45%) had the diagnosis of pre-diabetes and none of T2DM, and there was no difference between these 2 subgroups in the characteristics mentioned above. Measures are needed to improve adherence such as active patient search, earlier implementation of OGTT (48 h postpartum) and identification of patients at increased risk of developing T2DM.

**A158**

**Evaluation of risk factors associated with the presence of ulceration in carriers of diabetes mellitus type 2 in a university hospital in Rio de Janeiro**

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**Introduction:** Distal peripheral neuropathy (DPN), seen in more than 50% of diabetic's patients, and obstructive peripheral arterial disease (OPAD) are the main risk factors for ulceration. Foot ulcer affects 15% of patients with type 2 diabetes (T2DM), preceding 80% of amputations. The prevalence of DPN is 15% and 42%, after 10 and 20 years of disease, respectively; there are other minor factors associated with ulceration. In this work, we analyzed risk factors for ulceration in 30 patients from the outpatient endocrinology clinic of the Federal University of State in Rio de Janeiro.

**Methods:** A questionnaire was applied evaluating the risk factors for ulceration, from March 2016 to July 2017, in 30 patients of both genders, varied ethnicity, socioeconomic level, with T2DM, followed by neurological examination of the feet and tibial brachial index.

**Results:** In the evaluated patients, 56.7% presented neuropathy, 46.6% had OPAD and the prevalence of retinopathy and nephropathy was 73.3 and 43.3% respectively. Additionally, 60% of patients had more than 10 years of illness; 73.3% were elderly; 13.3% had psychosocial factors, 46.7% had inadequate glycemic control, 36.7% were obese, 43.3% were dyslipidemic, 63.3% had hypertension, 60% used inadequate footwear, 37.5% had structural deformities, 63.3% had calluses and none has developed Charcot's osteoarthropathy. In our patients, 16.7% presented ulceration.

**Conclusion:** In the descriptive analysis of this casuistry, the data show that our results follow the prevalence of neuropathy, OPAD and ulceration in patients with T2DM, based on the current literature as well as other risk factors. We observed the need to establish an improvement in the glycemic control of these patients in order to prevent long-term micro and macrovascular complications in the case of neuropathy and ulceration, performing the screening annually through the neurological test of the feet followed by self-care guidelines in diabetic patients.

**A159**

**Evaluation of socio-economic, clinical, and food frequency characteristics in relation to the control of patients with diabetes mellitus type 2**

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**Background:** Type 2 diabetes mellitus is a disease of high prevalence and it is believed that changes in dietary patterns in the last decades may be associated with a large increase in the number of cases.

**Objectives:** To evaluate the socioeconomic, clinical and food frequency characteristics regarding the control of diabetes mellitus in patients attending a university hospital in the South of Brazil.

**Methods:** Descriptive cross-sectional and quantitative study. Socio-economic and clinical data were collected and the Food Frequency Questionnaire was applied in 60 type 2 diabetic patients. Comparisons were made between the controlled (HbA1c ≤ 7%) and uncontrolled (HbA1c > 7%) patients, using the Chi square test and Fisher's Exact, with a significance level of 5%.

**Results:** Diagnosis time of 5 years or more (p < 0.01), insulin use (p < 0.001), frequent diet in foods rich in simple carbohydrates (p < 0.001), milk and derivatives (p < 0.01) and oils and fats (p < 0.001) were associated with worse glycemic control (HbA1c > 7%). Frequent diet in vegetables (p < 0.001), fruits (p < 0.001) and meat and eggs (p < 0.01) were associated with better glycemic control (HbA1c ≤ 7%).

**Conclusion:** It is important to encourage preventive actions and treatment of diabetic patients, especially those with a longer diagnosis and with emphasis on an adequate diet (Figs. 1, 2, 3).

**Tabela 1** – Distribuição dos pacientes diabéticos tipo 2 segundo variáveis socioeconômicas e associação entre o controle ou não do diabetes mellitus (n=60).

Variáveis	Não Controlado (HbA1 > 7%) (n=45)		Controlado (HbA1 ≤ 7%) (n=15)		p
	n	(%)	n	(%)	
<b>Idade em anos</b>					0,12**
Menos de 60	31	(68,9)	7	(46,7)	
60 ou mais	14	(31,1)	8	(53,3)	
<b>Gênero</b>					0,32*
Masculino	11	(24,4)	6	(40,0)	
Feminino	34	(75,6)	9	(60,0)	
<b>Cor</b>					0,52**
Não branca	14	(31,1)	3	(20,0)	
Branca	31	(68,9)	12	(80,0)	
<b>Escolaridade em anos de estudo</b>					0,88*
Até 4	26	(57,8)	9	(60,0)	
5 ou mais	19	(42,2)	6	(40,0)	
<b>Estado Civil</b>					0,43*
Sem companheiro(a)	17	(37,8)	4	(26,7)	
Com companheiro(a)	28	(62,2)	11	(73,3)	
<b>Trabalho remunerado</b>					0,29*
Não	22	(48,9)	5	(33,3)	
Sim ou aposentado	23	(51,1)	10	(66,7)	
<b>Renda família mensal per capita em reais</b>					0,48**
Até 880,00	34	(75,6)	13	(86,7)	
Mais de 880,00	11	(24,4)	2	(13,3)	

\*Teste Qui-quadrado \*\*Teste Exato de Fisher Fonte: os autores (2017)

**Fig. 1** See text for description

**Tabela 2** – Distribuição dos pacientes diabéticos tipo 2 segundo variáveis clínicas e associação entre o controle ou não do diabetes mellitus (n=60).

Variáveis	Não Controlado (HbA1 > 7%) (n=45)		Controlado (HbA1 ≤ 7%) (n=15)		p
	n	(%)	n	(%)	
<b>Tempo de diagnóstico do diabetes mellitus</b>					<0,01**
Menor que 5 anos	8	(17,8)	9	(60,0)	
Maior ou igual a 5	37	(82,2)	6	(40,0)	
<b>Uso de insulina</b>					0,001*
Sim	28	(62,2)	2	(13,3)	
Não	17	(37,8)	13	(86,7)	
<b>Outras doenças crônicas</b>					1,00**
Sim	34	(75,6)	11	(73,3)	
Não	11	(24,4)	4	(26,7)	
<b>Hipertensão arterial</b>					0,74**
Sim	33	(73,3)	12	(80,0)	
Não	12	(26,7)	3	(20,0)	
<b>Obesidade</b>					0,76*
Sim	28	(62,2)	10	(66,7)	
Não	17	(37,8)	5	(33,3)	
<b>Local das refeições</b>					0,67**
Em casa	38	(73,1)	7	(46,7)	
Em casa e/ou escola, trabalho, lanchonete	14	(26,9)	1	(6,7)	
<b>Número de refeições diárias</b>					0,67**
Até 4	38	(84,4)	14	(93,3)	
5 ou mais	7	(15,6)	1	(6,7)	
<b>Colesterol total plasmático</b>					0,74**
Maior ou igual a 200 mg/dl	13	(28,9)	3	(20,0)	
Menor que 200 mg/dl	32	(71,1)	12	(80,0)	
<b>Triglicerídeos plasmático</b>					0,37*
Maior ou igual a 150 mg/dl	27	(60,0)	7	(46,7)	
Menor que 150 mg/dl	18	(40,0)	8	(53,3)	
<b>LDL plasmático</b>					0,17**
Maior ou igual a 70 mg/dl	36	(80,0)	9	(60,0)	
Menor que 70 mg/dl	9	(20,0)	6	(40,0)	
<b>HDL plasmático</b>					0,88*
Menor que 40 mg/dl	17	(37,8)	6	(40,0)	
Maior ou igual a 40 mg/dl	28	(62,2)	9	(60,0)	
<b>Creatinina plasmática</b>					1,00**
Maior ou igual a 1,3 mg/dl	3	(6,7)	1	(6,7)	
Menor que 1,3 mg/dl	42	(93,3)	14	(93,3)	

\*Teste Qui-quadrado \*\*Teste Exato de Fisher Fonte: os autores (2017)

**Fig. 2** See text for description

**Tabela 3** – Distribuição dos grupos de alimentos ingeridos pelo menos uma vez ao dia pelos pacientes diabéticos tipo 2 e associação entre o controle ou não do diabetes mellitus (n=60).

Grupos de alimentos	Não controlado (HbA1c > 7%) (n=45)	Controlado (HbA1c ≤ 7%) (n=15)	p
	n (%)	n (%)	
<b>Não indicados para consumo</b>			
<b>Pães/cereais/raízes/tubérculos</b>			<0,001**
Sim	41 (91,1)	4 (26,7)	
Não	4 (8,9)	11 (73,3)	
<b>Leites e derivados</b>			<0,01*
Sim	30 (66,7)	3 (20,0)	
Não	15 (33,3)	12 (80,0)	
<b>Embutidos</b>			1,00**
Sim	3 (6,7)	1 (6,7)	
Não	42 (93,3)	14 (93,3)	
<b>Óleos e gorduras</b>			0,02**
Sim	44 (97,8)	12 (80,0)	
Não	1 (2,2)	3 (20,0)	
<b>Açúcares e doces</b>			1,00**
Sim	10 (22,2)	3 (20,0)	
Não	35 (77,8)	12 (80,0)	
<b>Diversos não indicados<sup>#</sup></b>			0,05**
Sim	15 (33,3)	1 (6,7)	
Não	30 (66,7)	14 (93,3)	
<b>Sem contra-indicação para consumo</b>			
<b>Hortaliças/verduras/legumes</b>			<0,001*
Sim	9 (20,0)	14 (93,3)	
Não	36 (80,0)	1 (6,67)	
<b>Frutas</b>			<0,001*
Sim	9 (20,0)	12 (80,0)	
Não	36 (80,0)	3 (20,0)	
<b>Leguminosas</b>			0,47**
Sim	37 (82,2)	11 (73,3)	
Não	8 (17,8)	4 (26,7)	
<b>Carnes e ovos</b>			<0,01*
Sim	13 (28,9)	11 (73,3)	
Não	32 (71,1)	4 (26,7)	
<b>Diversos sem contra-indicação<sup>**</sup></b>			1,00*
Sim	41 (91,1)	14 (93,3)	
Não	4 (8,9)	1 (6,67)	

\*Teste Qui-quadrado \*\*Teste Exato de Fisher

<sup>#</sup>Inclui refrigerante, suco artificial, salgadinhos, sorvetes e farofa.

<sup>\*\*</sup>Inclui café, suco natural e sopa.

Fonte: os autores (2017)

**Fig. 3** See text for description

## A160

### Evaluation of the frequency of diabetes mellitus and pre-diabetes in patients with acromegaly at diagnosis and evolution with treatment

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**Introduction:** Acromegaly results from increased production of growth hormone (GH) and insulin-like growth factor type I (IGF-I). Insulin resistance is one of the characteristics complications, and may result in glucose intolerance or diabetes mellitus (DM).

**Objective:** To identify the frequency of glycemic changes in patients with acromegaly followed in a reference service, as well as their evolution with the treatment of the pathology.

**Methods:** A review of medical records was carried out, and demographic, tumor and biochemical data were collected, as well as its evolution with the various forms of treatment. Numerical variables were compared using the Mann-Whitney test and categorical variables using the Chi square test.

**Results:** Thirty-five patients (69% women), with a median age at diagnosis of 42 years (2<sup>o</sup>67) were included. Twenty-four of 29 tumors (83%) were macroadenomas. GH and IGF-I levels at diagnosis were 9.7 µg/L (1.1–80.0) and 721 ng/mL (321–1757), respectively. The glucose level at diagnosis was 109 mg/dL (82–597) and glycated hemoglobin (HbA1c) was 8.5% (6.0–10.0), with 10 patients (29%) diagnosed with DM and 8 patients (23%) with pre-DM. The frequency of DM at

diagnosis was not different between genders ( $p = 0.440$ ), between micro or macroadenomas ( $p = 0.616$ ), nor among those with a positive family history for DM or not ( $p = 1.000$ ). There was no difference in GH or IGF-I levels among patients diagnosed with DM or not at diagnosis ( $p = 0.075$  and  $p = 0.357$ , respectively). The age at diagnosis was higher in patients with DM than in those without DM, with a tendency to statistical significance [50 years (24–67) and 38 years (20–63), respectively,  $p = 0.056$ ]. The median follow-up of the patients was 60 months (1–303) and 29 patients (83%) underwent surgery. Treatment with somatostatin analogues was used in 27 patients (77%). The median glucose level at the last visit was 97 mg/dL (64–309) and there was a reduction of HbA1c to 6.1% (5.0–11.0). At the last visit, 11 patients (31%) had a diagnosis of DM and 10 patients (29%) of pre-DM, with treatment with oral antidiabetics (primarily metformin) in 47% and associated insulin in refractory cases, corresponding to 19% of the cases.

**Conclusion:** The frequency of glucose changes in acromegaly is already high at diagnosis. Treatment of acromegaly allows reduction of glucose levels.

## A161

### Evaluation of the glycemic profile of patients with melito type 1 diabetes in use of continuous insulin infusion system

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**Introduction:** The objective of the treatment of mellitus type 1 diabetes (DM1) is to mimic the endogenous secretion of insulin by pancreatic  $\beta$  cells to maintain glycemic levels within normal limits, aiming at the disappearance of symptoms, improvement of quality of life and reduction of acute and chronic complications. The main advantages of continuous insulin infusion (SICI) therapy are: reduced glycemic variability, reduced episodes of hypoglycemia and a more flexible lifestyle. **Objective:** To evaluate the treatment of DM1 patients in the use of SICI.

**Methods:** Retrospective evaluation of medical records of DM1 patients using SICI followed at the endocrinology outpatient clinic. Time of disease, anthropometric and lipid profile, presence of severe hypoglycemia and chronic complications were evaluated. In addition, mean levels of glycated hemoglobin (HbA1c) were obtained 1 year prior to SICI treatment and 6 months later.

**Results:** The charts of 8 patients, all female, age  $31.6 \pm 6.8$  years, 75% eutrophic, duration of DM1  $17.2 \pm 7.9$  years were analyzed. Seven of the eight patients had a carbohydrate count and were under intensive bolus-based regimen; only 1 had fixed doses of insulin. Indications for treatment with SICI were: presence of severe hypoglycemia and glycemic variability. The time of treatment with SICI was  $2.9 \pm 2.3$  years. As for the chronic complications, only the patient with the longest duration of the disease (30 years) had nephropathy and proliferative diabetic retinopathy, remaining stable and controlled over the years. During the use of SICI, it also developed neuropathy. In the present study, 50% of the patients had severe hypoglycemia before treatment with SICI and there was resolution in 100% of the cases. Likewise, we observed an improvement in glycemic levels, mean HbA1c 1 year before SICI treatment was 8.1% ( $\pm 1.39$ ) and after 6 months, 7.5% ( $\pm 0.75$ ).

**Conclusion:** Our sample showed improvement in episodes of severe hypoglycemia concomitant to the improvement of glycemic control in DM1 patients in the use of SICI (Fig. 1).

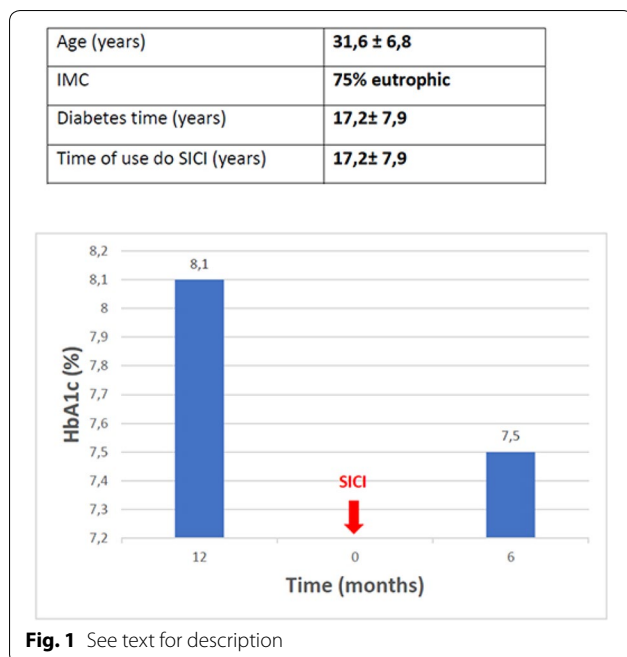


Fig. 1 See text for description

#### A162

##### Evaluation of the impact of pregnancy on glycemic control after birth on type 1 diabetes patients

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**Introduction:** Women with inadequately controlled diabetes before and during pregnancy are at high risk to develop perinatal complications. A strict glycemic control is advised before and during pregnancy in these patients. To achieve glycemic goals, a multiprofessional program is offered. The intensification of gestational treatment could lead to changes in the patient's attitude, with long term improvement in glycemic control and self health care.

**Objective:** To evaluate post-gestational glycemic control in type 1 DM (T1DM) patients in a tertiary hospital.

**Methods:** Retrospective records evaluation of 16 patients with T1DM that were pregnant between 2005 and 2016. The data collected was: anthropometric measurements, disease duration, number of pre- and post-pregnancy consultations, maternal-fetal complications and mean HbA1c in the year before gestation, on the first and second year after delivery. When there was no pre-gestational HbA1c available, it was considered HbA1c in the first trimester. Results are described as percentage and mean  $\pm$  standard deviation. Statistical analysis was made through the SPSS 17.0 program, considering  $p < 0.05$  as significant.

**Results:** The mean age of the patients was 25.43 years ( $\pm 4.59$ ) and the mean time of T1DM was 12.75 years ( $\pm 6.7$ ). 18.8% ( $n = 3$ ) had at least one chronic complication of DM while 18.8% ( $n = 3$ ) had more than one chronic complication. The mean number of consultations in the year prior to pregnancy was 3.25 ( $\pm 1.7$ ), 1 year and 2 years after

the pregnancy was 3.8 ( $\pm 1.2$ ) and 2.09 ( $\pm 0.7$ ), respectively. The mean HbA1c 1 year before pregnancy was 8.69% ( $\pm 2.03$ ), 1 year later was 9.04% ( $\pm 2.03$ ) and 2 years after was 9.09% ( $\pm 1.74$ ), without correlation with age, time of diagnosis and number of consultations before or after pregnancy. Before pregnancy, 37.5% of the patients presented HbA1c  $< 7\%$ , after 1 year 12.5% of patients had HbA1c  $< 7\%$  and 2 years after gestation 0% of the patients presented HbA1c  $< 7\%$ ,  $p = 0.007$ . Patients who had HbA1c  $< 7.0\%$  before gestation presented better control 1 year later than those with HbA1c  $> 7.0\%$  (HbA1c 7.24  $\pm 0.49$  vs 10.11  $\pm 1.77\%$ ,  $p = 0.01$ ).

**Conclusion:** Although they participated in a multiprofessional program, the patients presented worsening of glycemic control in the 2 years postpartum, as already described in the literature. Patients with better glycemic control had better postpartum control. There is need to implement new strategies to ensure better glycemic control for T1DM women after pregnancy.

#### A163

##### Evaluation of the knowledge about glycemic self-monitoring in patients with type 2 diabetes mellitus accompanied in an outpatient clinic

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**Background:** Self-monitoring of capillary glycemia is one of the pillars of the control of Diabetes Mellitus, being essential to help achieve goals and prevent complications.

**Objective:** To evaluate the knowledge of patients with type 2 diabetes mellitus (T2DM), insulin users, about practice of glycemic self-monitoring.

**Methods:** A cross-sectional study was carried out with a calculated sample of 60 patients, representing a Diabetes Center in Belo Horizonte, MG, during the first consultation by a nursing team. Data on patient knowledge about lancet use, hygiene and digital puncture, frequency of glycemic performance and recording, glycemic goals and lancet discarding were evaluated in an instrument developed and completed by the researchers (Table 1).

**Results:** Most of the participants were female (63.3%), aged between 35 and 60 years (51.7%) and more than 10 years of diagnosis (56.6%), with complete primary education (60%), retired (53.3%) and family income of up to 1 minimum wage (51.7%). About handwashing, only 13.3% of the individuals performed the technique correctly, with subsequent drying. The item with the highest assertiveness in glycemic self-monitoring was the correct insertion of the test strip (98.3%), followed by the placement of enough blood in the strip (93.3%). It was observed that it was easy to prepare and arm the lancet, as well as to position it correctly on the finger (84.4%), but only 43.5% did the lancet's graduation correctly. It was verified that a minority registered the results obtained (25%) and only 6,7% knew their glycemic goals. The study showed that reuse of the lancet is a common practice among patients, with 27 (45%) participants reusing, performing an average of 3 daily punctures with the same lancet.

**Conclusion:** Errors in the daily practice of glycemic self-monitoring can impair and delay diabetes control. The continuing education of patients with T2DM and their relatives is of fundamental importance in the treatment, contributing to ensure the correct realization of the capillary glucose monitoring and the achievement of treatment goals (Fig. 1).



**Table 1** - Percentage of correct answers to the Glycemic Self-Monitoring Questionnaire.

Number	Questions	n (%)
1	Was the lancet inserted in the lancet device?	40 (87)
2	Was the glucose meter set up?	7 (11,7)
3	Were the hands washed correctly?	8 (13,3)
4	Were the hands dried?	8 (13,3)
5	Was the glucose meter coded?	14 (23,3)
6	Did the patient check the strips for validity?	21 (35,0)
7	Has the reagent strip been inserted correctly?	59 (98,3)
8	Was the lancet device prepared and armed correctly?	39 (84,8)
9	Was the lancet device graduated?	20 (43,5)
10	Was the lancet placed correctly on the finger?	39 (84,8)
11	Did the patient deposit the drop of enough blood?	56 (93,3)
12	Was hygiene done after collection of blood?	14 (23,3)
13	Was the glucose result recorded in the glycemia log?	15 (25,0)
14	Were the glucose strips stored properly?	32 (53,3)
15	Has the material been disposed of properly?	8 (13,3)
16	Has the glucose meter been cleaned after use?	5 (8,3)
17	Are glycemic goals known?	4 (6,7)
18	How many blood glucose per day?	
	1	10 (16,7)
	2	12 (20,0)
	3	30 (50,0)
	> 3	8 (13,3)
19	How many blood glucose per week at 3 o'clock?	
	0	29 (48,3)
	1	26 (43,3)
	2	3 (5,0)
	3	2 (3,4)
20	How many times is the lancet reused?	
	Does not reuse	8 (13,3)
	1 per day	27 (45,0)
	1 per week	14 (23,4)
	1 per month	11 (18,3)

**Ethics Approval**

The study was approved by Santa Casa of Belo Horizonte Institution's Ethics Board, approval number 866.864 and written consent was obtained from all participants.

**Fig. 1** See text for description**A164****Evaluation of the knowledge and skills on self-monitoring blood glucose in patients and caregivers of patients with diabetes mellitus type 1**

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**Introduction:** The intensive treatment of Type 1 Diabetes Mellitus aims to mimize the physiological profile of insulin secretion to achieve good metabolic control, and for that, the blood glucose self-monitoring is known to be a fundamental procedure. In order to have the complete benefit of that, the patient needs to master the technique, be able to interpret the results and turn it into actions to adjust the treatment. Aware of the importance, the federal law nº: 11.347 was raised, in 2007, to regulate the availability of these supplies on public health care settings.

**Objective:** To evaluate the management and the degree of understanding about the monitoring of blood glucose in patients and caregivers of patients with DM1 attending at a secondary level of care health service.

**Methods:** A cross-sectional, descriptive study with a sample of Type 1 DM patients enrolled in the blood glucose monitoring program in a referral health care service in Ceará, Brazil, in the period of 2016 and 2017. The data was collected through a questionnaire answered on the outpatient visits during the study period.

**Results:** A sample of 95 patients, being 60.22% female, with the mean age of 17 years old were evaluated. 73% received free test strips from

the health care system program. 93.33% monitor the blood glucose on a daily basis, those of which 42.86% do it three times a day. However, 46.51% don't test postprandial glucose monitoring. 81.72% understands the meaning of the glycose measurements, and 91.40% of these claimed to have the knowledge about the normal goal of the treatment. In this group, 80% answered within the adequate range for fasting blood glucose, while for the postprandial values, only 52.63% of the answers were on the correct range. The self-adjustment of insulin dose based on blood glucose were performed by 65.22% of the patients. The limited access for the test strips and supplies due to economic reasons or inadequate distribution was the main limiting factor of the method.

**Conclusion:** The study data suggest that the access to the method is still limited. The knowledge of this population about the treatment goals are reasonable, however, this does not translate on the attitude of self-adjustment of the treatment, which is even less than the expected. The adherence to postprandial glucose monitoring is low among this population, also it is shown little knowledge about the postprandial goals of the treatment. Our study has not yet evaluated the influence of this behaviour in metabolic control.

**A165****Evaluation of the lipid profile of wistar rats treated with increasing doses of prednisone**

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**Background:** Glucocorticoids (GCs) are a group of drugs with immunosuppressive and antiinflammatory action, its mechanism of action is related to the suppressing the release of proinflammatory cytokines. In addition, GCs may interfere with carbohydrate metabolism, by antagonizing various peripheral actions of insulin, and from this action, trigger changes in the biochemical profile, mainly regarding the lipid representation. The present study aimed to evaluate the dose-response influence of prednisone in the biochemical profile of rats. For this, 36 male Wistar rats were distributed in five groups: control (CONT) administered with vehicle (n = 6); treated with prednisone (PRED) at doses of 0.625 mg/kg (PRED 0.625; n = 7); 1.250 mg/kg (PRED 1.25; n = 8); (PRED 2.5, n = 7) and 5.000 mg/kg (PRED 5.0; n = 7). The treatment was daily with a duration of 21 days, with fasting glycemic measures being evaluated in the first (zero) and last day (21). Then the rats were anesthetized and killed by decapitation, in order to collect the whole blood for serum biochemical analysis by spectrophotometry. All data were statistically evaluated with significance of 5%.

**Results:** In the measurement of glucose during treatment, a drop in blood glucose was observed on day 21 of treatment compared to day 0 only in the PRED 2.5 group (78.0 ± 3.9 vs. 93.5 ± 7.0 mg/dL). Regarding serum biochemical values at the end of treatment, the lipid levels decreased at high treatment doses group (PRED 2.5 and PRED 5.0 groups) related to the control, both for the levels of triglycerides: PRED 2.5 = 80.0 ± 29.7 mg/dL; PRED 5.0 = 76.0 ± 36.2 vs. CONT = 144.1 ± 39.6, as Very Low Density Lipoproteins, VLDL: PRED 2.5 = 16.0 ± 5.9 mg/dL; PRED 5.0 = 15.2 ± 7.2 vs. CONT = 22.8 ± 7.9; and also in High Density Lipoproteins, HDL: PRED 2.5 = 21.3 ± 7.3 mg/dL; PRED 5.0 = 23.8 ± 4.2 vs. CONT = 53.0 ± 7.7. Moreover, an increase of the enzyme alanine aminotransferase (ALT) was observed in the PRED group 1.25 (79.0 ± 25.1 U/L) compared to the control group (68.6 ± 24.8 U/L).

**Conclusions:** Even with no glycemic elevation due to the treatment of prednisone, the groups of higher doses (2.5 and 5.0 mg/kg) suggest a lipolysis action, promoting a decrease in triglyceride levels, VLDL and low levels of HDL. Therefore, it was concluded that high doses should be used with caution, because they can cause atherogenic particle accumulation, and metabolic acidosis due to the degradation of cholesterol.

**Ethics approval:** The study was approved by the Ethics Committee on Animal Research, approval number 23108.045215/2014-39.

**A166**

**Evaluation of the nutritional status of a patient undergoing hemodialysis treatment submitted to a bariatric surgery: case report**

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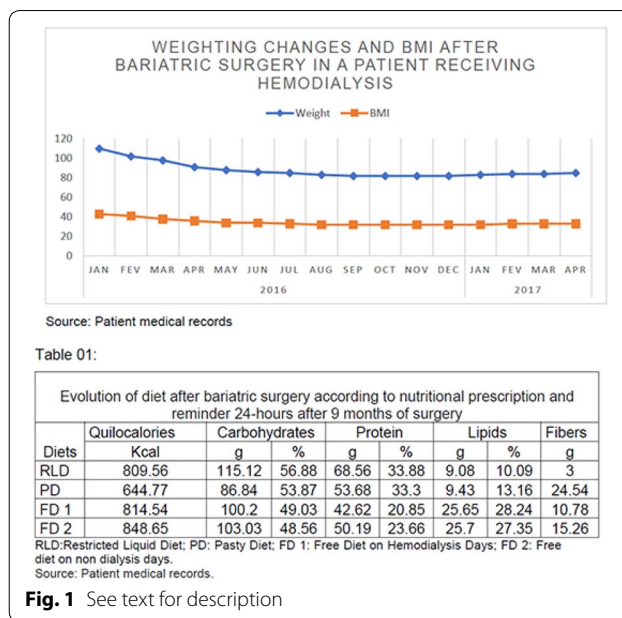
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Case presentation Female patient, 49 year-old, obese, sedentary, hypertensive, with chronic kidney disease on hemodialysis, without family history of chronic kidney disease and obesity. After 10 months of hemodialysis he underwent vertical gastrectomy weighting 110 kg, BMI (body mass index) of 43 kg/m<sup>2</sup>, clinical examination performed in the clinic before the surgery indicated conscious, oriented, anicteric, afebrile, 110 × 70 mmHg arterial pressure. It was in use of 9 tablets a day of sevelamer phosphate chelator. On the third day after bariatric surgery, the patient returned to the hemodialysis treatment, obtaining weight reduction according to weight changes chart and BMI (graph 01) after bariatric surgery. Graph 01: Weighting changes and BMI after bariatric surgery in a patient on hemodialysis treatment. Patient followed restricted liquid diet for 15 days with good acceptance, making use of two food supplements, being an hypercaloric and hyperproteic and another hyperproteic. In the pasty diet followed it was used only the hypercaloric and hyperproteic supplement. After a year and 2 months, the patient follows a diet that varies from 817 to 848 kcal according to a 24-h reminder in dialysis days and non-dialysis days, considering the energetic value of the supplement. It follows with good food acceptance. Table 1: The micronutrients were calculated through a 24-h reminder performed in November 2016, 9 months after bariatric surgery, in that same reminder was considered the food supplement and also the polyvitamin/polimineral supplement administered in 3-month intervals.

**Discussion:** With the decrease of the patient weight, it achieved a slight improvement in the metabolic profile, reached a BMI of 33 kg/m<sup>2</sup>, obtained a percentage of weight loss (% PWL) of 23%, the weight lost was 25 kg, the percentage of weight excess (% PWE) was 17%, which increases the chance of the patient performing renal transplantation, previously denied by overweight. Micronutrient ingestion is mostly adequate, with the use of dietary supplement and polyvitamin/polimineral it was possible to reach the recommendations for patients on hemodialysis and DRIS. The chelator was reduced to 1 tablet daily.

**Conclusion:** With this study it is possible to conclude that nutritional monitoring is of high relevance for this patient to reach the adequate macronutrients and micronutrients supply, according to the needs presented during the treatment. The monitoring of nutrient ingested is essential for the health and success of the treatment. Informed consent to publish had been obtained from the patient. (Fig. 1)



**A167**

**Evaluation of the plantar sensibility of persons with diabetes mellitus before and after the implementation of educative intervention**

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**Background:** Plantar sensibility is an indicator to be investigated in the person with Diabetes Mellitus (DM), as soon as the injury of the peripheric nerve turns in the reduction or total loss of the protective sensibility of the cloths, making the vulnerable person to the injuries appearance and, consequently, to amputations of inferior members [1]. Treatment of the consequences of the neuropatia for the feet, specifically, for the sensibility deficit, includes the education in health, the cares with the feet and the use of appropriate shoes. Purpose of the study to value the plantar sensibility of persons with DM before and after the educative intervention.

**Methodology:** Quantitative, descriptive study of the type daily pay and powders-interventions, developed in an Strategy of Health of the Family. Sample was composed by 35 persons above 18 years and I diagnose of DM more than 5 years ago. An instrument was applied for characterization and the plantar sensibility valued through the Monofilament of 10 g of Semmes-Weinstein and Score of Symptoms Neuropáticos. Sensibility was valued before and after eight fortnightly home meetings, which had the intention of teaching cares with the feet. Collected data were tabulated in an electronic spreadsheet of the program Excel 2007 and validated, being subsequently analysed by the program Statistical Package for the Social Sciences 21.0. Descriptive statistic was carried out for the characterization sociodemográfica and to analyse the results daily pay and powders-interventions, Anova was used with measures repeated with interest in the interaction. Project was approved by Institution's Ethics Board of the Federal University of Alfenas, number 20376013.2.0000.5142.

**Results:** 64.2% of the volunteers was women, with low level of schooling and familiar income; 80% reported what had never the evaluated feet and in the same proportion, they were never orientated on the cares with the feet. Regarding the plantar sensibility valued through the Monofilament of 10 g and of ESN, the volunteers presented scores of 7.05 points in the first evaluation and 7.80 after the educative intervention, representing significant statistical improvement in the protective sensibility of the feet ( $p < 0.001$ ).

**Conclusion:** Educative intervention based in the autocare with the feet contributed to the improvement of the plantar sensibility of the persons with DM, which can be made a list to the directions on the use of appropriate shoes that do not hold tight the feet, use of new shoes you punish 2 h in a day and of stockings without elastic or the change of the volunteers in the behavior and attentive glance for the feet during the evaluations.

#### A168

##### Evaluation of the profile of circulating micrnas in individuals with recent type 1 diabetes and healthy controls

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Type 1 Diabetes (T1D) is a heterogeneous disease resulted from numerous mechanisms that lead to chronic hyperglycemia. Genetic and environmental factors act on the pathophysiology of diabetes, but the molecular and cellular mechanisms underlying the disease are not fully understood, probably reflecting different genetic background and environmental triggering factors. Recently, a new mechanism of post-transcriptional regulation of genes, performed by small RNAs of 21–25 nucleotides called microRNAs (miRNAs), has favored the understanding of various biological processes and diseases. The objective of this study was to evaluate the influence of miRNAs on the pathophysiology of T1D.

**Methods:** The profile of 384 circulating microRNAs from 37 recent-onset T1D patients up to 6 months (17F/20 M), aged  $12.89 \pm 6.53$  years, HbA1c levels of  $7.8 \pm 2.0\%$  who tested positive for islet autoantibodies, was compared with those of 30 healthy controls (18F/12M), aged  $16.28 \pm 6.28$ , HbA1c of  $5.4 \pm 5.0\%$ . The groups were

paired for gender and age. Serum/Plasma kit- Qiagen was used for serum RNA extraction. Real-time PCR was performed in QuantStudio 12K equipment- Applied Biosystems TaqMan Low Density Array.

**Results:** Four serum miRNAs were upregulated in recent-onset T1D patients: hsa-miR-101 (3.9x;  $p = 0.04$ ), hsa-miR-203 (2.3x;  $p = 0.04$ ) and hsa-miR-21 (2.3x;  $p = 0.02$ ), related to inflammation, apoptosis of beta cells and inhibition of insulin secretion, and hsa-miR-874(2.6x;  $p = 0.02$ ), suppressor of angiogenesis. Two miRNAs were down-regulated in T1D: has-miR-125a-5p (0.5x;  $p = 0.04$ ) and hsa-miR-191(0.5x;  $p = 0.04$ ), both related to the control of immune response. The data suggests that circulating miRNAs can mirror T1D physiopathology, signaling inflammation, destruction and altered metabolism. Supported by São Paulo Research Foundation (FAPESP).

#### A169

##### Evaluation of the profile of patients with diabetic neuropathy at a public reference center

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**Introduction:** Diabetic Neuropathy is a chronic microvascular complication defined as signs and/or symptoms of peripheral nerve dysfunction in individuals with Diabetes Mellitus (DM) after exclusion of differential causes. It is known that this condition is related to the risk of ulcerations and amputations at lower limbs. Furthermore, a significant portion of health spending on this population is due to foot complications. Preventive care and early treatment are essential, therefore specialized DM care centers should know about patients profile and look forward to appropriate support services to change this unfavorable scenario.

**Objective:** The objective of this study was to analyze the profile of patients with Diabetic Neuropathy treated at the State Institute of Diabetes and Endocrinology Luiz Capriglione (IEDE)/RJ.

**Methodology:** 257 patients referred to the support clinic in Diabetic Neuropathy were evaluated. Clinical and laboratory data were collected from medical records. The scales used were neuropathic symptom score (NSS) and neuropathic disability score (NDS).

**Results:** In the present study, we found a prevalence of ND of 8.2% in type 1 DM and 86% in type 2 DM, medium age of 58.7 years (but patients with type 1 DM were younger,  $p = 0.05$ ), predominance of females (74.7%), time of diagnosis of DM greater than 15 years, with mean glycated hemoglobin (A1c) of 8.18%, and most of them had comorbidities (obesity, hypertension arterial and chronic kidney disease). Regarding the symptoms and signs, they presented NSS classified as moderate and NDS classified as mild. There were no significant differences related to the type of DM. Diabetic retinopathy was present at 64.2% of the patients. A prevalence of approximately 2% of signs and symptoms of Diabetic Neuropathy was detected in prediabetes patients.

**Conclusions:** Related to this population, the diagnosis of diabetic neuropathy was made only when the symptoms and signs were present after a long time of diagnosis of DM and the presence of risk factors previously described in the literature (hypertension, obesity, elevated HgA1c, duration of DM) as aggravating factors. Thus, reference centers must elaborate urgent preventive measures at a multidisciplinary form to provide education of the population and early detection and treatment of this complication with consequent reduction of unfavorable outcomes (Fig. 1).

Baseline characteristics (n = 257)			
Age (years)	58,74 ± 17,63	Type of Diabetes Mellitus [DM] (%)	
BMI (kg/m <sup>2</sup> )	33,31 ± 14,24	Type 1 DM	8,2
Diabetes Duration (anos)	17,58 ± 15,17	Type 2 DM	86
Neuropatic Symptoms Score	6 ± 2	LADA	3,9
Neurologic Disability Score	3 ± 3	Prediabetes	1,9
Glicated Hemoglobin (Hga1c) (%)	8,18	Diabetic Retinopathy (%)	64,2
Gender (%)		Chronic Renal Disease (%)	64,9
Male	74,7	Smoking (%)	6,61
Female	25,3	Alcohol Consumption (%)	10,8

Group Comparison According to Type of Diabetes (DM1 x DM2)			
	DM1 (n = 21)	DM2 (n = 210)	P value
Age (years)	47,8 ± 10,8	61,5 ± 10,6	0,0002*
BMI (kg/m <sup>2</sup> )	29,1 ± 7,0	30,7 ± 6,6	0,28
Time of Diagnosis (years)	18,4 ± 9,5	17,19 ± 9,4	0,30
Neuropatic Symptoms Score	6 ± 2	6 ± 2	0,59
Neurologic Disability Score	3 ± 3	3 ± 3	0,61
ZSOHD (ng/dl)	22 ± 8,3	24,9 ± 9,7	0,89

**Fig. 1** See text for description

### A170

#### Evaluation of the use of injectables in type 1 diabetics followed in reference ambulatory

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**Introduction:** Diabetes education is part of the integral care of the patient, interactively involving the affected individual and the educator. Patients systematically followed by a multiprofessional team have a better prognosis of the disease.

**Objective:** To evaluate the characteristics of diabetic patients, as well as their technique of injection.

**Methods:** A questionnaire was applied to patients with type 1 diabetes mellitus (DM1) and their caregivers. Numerical variables were described using mean; the categorical variables, absolute value and percentage. For a verification of associations, the Spearman correlation coefficient, Pearson's Chi square test and Kruskal-Wallis test were used.

**Results:** 105 patients, 3.8% infants, 11.5% pre-school children, 26.9% schoolchildren, 54.8% adolescents and 22.9% adults were evaluated; with a predominance of males (56.3%). The age at diagnosis of DM1 was 7.8 years and disease time was 3.4 years. A mean of glycosylated hemoglobin was 8.7% with a positive correlation to disease time ( $p = 0.029$ ). A total insulin dose was 0.93 IU/kg/day, being 0.53 IU/kg/day (56.98%) in basal form. Slow-acting insulin analogues were used in 68% of the individuals, with an ultrafast action in 70.9%, NPH in 32% and regular in 29.1%. There was a higher total insulin and bolus dose in the adolescents, as well as lower dose not pre-school group ( $p = 0.006$  and  $p = 0.013$ , respectively). Form of application: pen (65.4%), syringe (28.8%) and pump insulin (1.9%). The self-application of insulin in 50.5% of cases over 5 years, with a predominance of application 10 min before meals. A mean reuse of the needle for application of 8.13 times, being more frequent in adolescents ( $p = 0.021$ ).

Most used needle: 4 mm (42.2%). The injectables were discarded in the Health Units in 65% of the cases. The gluteal region was a less used version for medication (49.5%), with only 31.4% rotating in all muscle groups. While a lipohypertrophy (LH) was diagnosed by the physician in 46% of the patients, only 35.2% of them reported their presence. LH showed no correlation with type of basal insulin ( $p = 0.412$ ) or bolus ( $p = 0.366$ ).

**Conclusion:** There is still a lack of education about the use of injectables in diabetic patients. The educational process allows for injectable and improved practices, thus allowing better outcomes for the patient's health.

### A171

#### Factors associated to reduced bone mineral density in type 2 diabetes mellitus

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1)**:A171

**Introduction:** Type 2 Diabetes Mellitus (T2DM) is associated with increased fracture risk besides higher Bone Mineral Density (BMD), compared to non-diabetic controls. Factors influencing fracture risk are well established in literature, however studies on BMD have shown contradictory results.

**Objective:** Evaluate risk factors for BMD variation and fractures in T2DM.

**Methods:** This cross-sectional study included patients with T2DM with lumbar and femoral BMD measurement by dual energy X-ray absorptiometry. Data was collected from medical records from July 2016 to June 2017. SPSS 13.0 was used for statistical analysis.

**Results:** 138 patients, 87% female,  $64 \pm 8.36$  years, 67.2% overweight, 78.3% hypertension, 82.6% dyslipidemia and 97.3% were menopause women (84.8% without hormone therapy replacement). Duration of diabetes was  $16 \pm 10.09$  years, 71.7% were using insulin, 26.1% with macrovascular complications (15.2% heart attack, 9.4% stroke and 11.6% peripheral artery disease) and 72.5% with microvascular complications (45.9% retinopathy, 51.4% neuropathy and 36.6% albuminuria). Mean glycosylated hemoglobin (HbA1c) was  $7.7\% \pm 1.53$ . Osteopenia was present in 38.4% and osteoporosis in 24.6%. Only 8 (5.8%) presented clinical fracture, of which 7 had visual impairment and 1 was submitted to bariatric surgery. BMD and fracture risk had no correlation to HbA1c. BMD was inversely correlated to age (femoral neck e total hip), duration of the diabetes (three sites), fracture risk (three sites), microvascular complications (lumbar e femoral neck), albuminuria (femoral neck), neuropathy (lumbar). Higher BMD was correlated to male gender (lumbar) and higher BMI, Body Mass Index, (three sites). Fracture was positively correlated to duration of the diabetes (three sites) and insulin therapy (three sites), and negatively with albuminuria (three sites).

**Conclusion:** The prevalence of fractures in our population was lower than the literature and not correlated to A1c levels. Underdiagnosis of spine fractures might have contributed to this result. On the other hand, we observed negative correlation between microvascular complications and BMD that could be explained by the negative influence of diabetic microangiopathy on bone metabolism. The inversely correlation between fracture and albuminuria remains unclear, while the positively correlation of higher BMI and male gender is in accordance with previous data (Figs. 1, 2, 3).

Tables 1 and 2. General characteristics (n= 117).

Characteristics	n	Characteristics	N
Age (years)	63.82 ± 8.21	Macrovascular complications	31 (26.5%)
Female gender	101 (86.3%)	Heart attack	19 (16.2%)
Duration of diabetes (years)	15.69 ± 9.99	Stroke	11 (9.4%)
Hypertension	92 (78.6%)	Peripheral artery disease	14 (12%)
Dyslipidemia	98 (83.8%)	Microvascular complications	84 (71.8%)
Renal failure	29 (24.8%)	Retinopathy	52 (46.5%)
BMI (Kg/m <sup>2</sup> )	30.26 ± 6.48	Non proliferative	32 (28.6%)
Weight (Kg)	74.03 ± 15.24	Proliferative	20 (17.9%)
Height (m)	1.56 ± 0.07	Neuropathy	58 (49.6%)
BMI categories		Albuminuria	44 (38.6%)
25-29.9 Kg/m <sup>2</sup>	24 (21.2%)	Densitometry	
30-34.9 Kg/m <sup>2</sup>	30 (26.5%)	Normal	48 (41%)
35-39.9 Kg/m <sup>2</sup>	15 (13.3%)	Osteopenia	43 (36.8%)
≥ 40 Kg/m <sup>2</sup>	9 (8%)	Osteoporosis	26 (22.2%)
Smoking status		Clinical fracture	5 (4.3%)
Past	33 (37.1%)	Lumbar	2 (50%)
Present	7 (7.9%)	Forearm	2 (50%)
Alcoholism status		BMD (g/cm <sup>3</sup> )	
Past	5 (6%)	Lumbar	1.105 ± 0.217
Present	0 (0%)	Femoral neck	0.908 ± 0.131
Physical activity	46 (44.2%)	Total hip	0.967 ± 0.158
Menopause		Insulin therapy	87 (74.3%)
Premenopausal	3 (2.6%)	Glycated hemoglobin (%)	7.7 ± 1.52
Without hormone therapy	85 (72.6%)	Vitamin D (ng/mL)	27.0 ± 11.8
With hormone therapy	13 (11.1%)		

Table 3. Categorical variables and Bone Mineral Density (Mann-Whitney test).

		Lumbar BMD		Femoral neck BMD		Total hip BMD	
		Mean (SD)	p	Mean (SD)	p	Mean (SD)	p
Gender	Male	1.236±0.16	0.03	0.926±0.07	0.58	1.012±0.13	0.38
	Female	1.083±0.21		0.905±0.13		0.960±0.16	
Peripheral artery disease	No	1.101±0.22	0.52	0.919±0.12	0.04	0.972±0.15	0.70
	Yes	1.135±0.14		0.825±0.13		0.928±0.19	
Microvascular complications	No	1.181±0.26	0.03	0.959±0.12	0.04	1.010±0.15	0.17
	Yes	1.072±0.18		0.887±0.12		0.949±0.15	
Neuropathy	No	1.152±0.24	0.02	0.938±0.12	0.03	0.997±0.15	0.07
	Yes	1.057±0.17		0.877±0.12		0.936±0.15	
Albuminuria	No	1.130±0.23	0.13	0.929±0.14	0.02	0.977±0.17	0.17
	Yes	1.071±0.18		0.875±0.11		0.953±0.14	

Fig. 1 See text for description

Figure 1. Age and femoral neck BMD (p < 0.01).

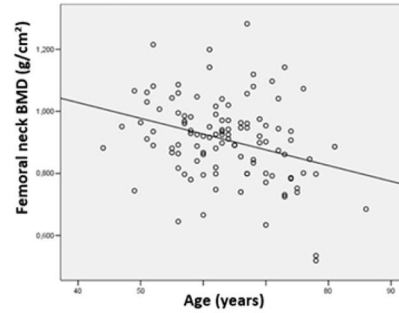


Figure 2. Body Mass Index (BMI) and femoral neck BMD (p < 0.01).

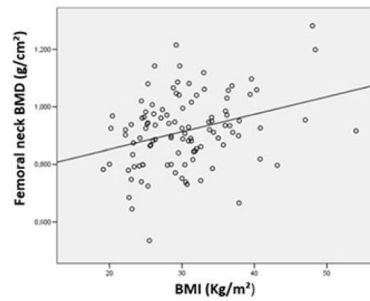


Figure 3. Microvascular complications and lumbar BMD (p = 0.03).

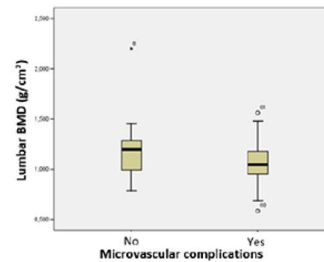
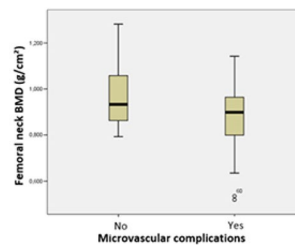


Figure 4. Microvascular complications and femoral neck BMD (p = 0.04).

Fig. 2 See text for description



**Ethics Approval:**

This study was approved by Ethics Board of Irmandade da Santa Casa de Misericórdia de São Paulo, approval number 2.202.736.

Fig. 3 See text for description

**A172**

**Familial hypobetalipoproteinemia: a case report**

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Abstract Patient, 19 years old, male, previously accompanied in a hospital of neurological rehabilitation by spastic paraparesis, equine tail syndrome and cognitive dysfunction. Spastic paraparesis was diagnosed after birth. The patient was referred to the Endocrinology Service of the General Hospital of Fortaleza for presenting hypocholesterolemia. As a clinical complaint, he had only reduced visual acuity. He denied diarrhea. Family history of unknown hypocholesterolemia. In view of the previous history of neurological pathology and hypocholesterolemia, the hypothesis of Familiar Hipobetalipoproteinemia was raised. Diagnostic screening tests showed total cholesterol: 65 mg/dL, HDL: 40 mg/dL, LDL: 19.2 mg/dL and triglycerides: 29 mg/dL. Apolipoprotein B was below the reference value (50 mg/dL). Other tests such as vitamin D3, TSH, free T4, INR were normal. The patient underwent ophthalmologic evaluation with Optical Coherence Tomography (OCT), which detected hyperreflective points in layers of nerve fibers, suggesting lipid accumulation. Hipobetalipoproteinemia is a rare group of genetic diseases, with clinical manifestations initiated in childhood. In its homozygous form, the patient may present neurological and ophthalmological alterations, as well as diarrhea and acanthocytosis. In its heterozygous form, it may be asymptomatic. Early diagnosis and treatment with vitamin replacement is essential for the adequate development of the patient. The present case is relevant because of its rarity and to illustrate the possible consequences of a late diagnosis.

Informed consent to publish had been obtained from the patient.

**A173**

**Feet reflexology in diabetic patients**

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A173**

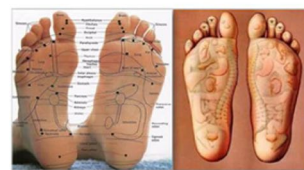
**Background:** The chronic nature of diabetes mellitus (DM) and the complexity of its treatment interfere with the patient's quality of life (QOL). Reflexology is one of the most popular complementary therapies in the world. It is a systematic practice in which applying some pressure to any particular points on the feet gives impacts on the health of related parts of the body.

**Objectives:** To evaluate the effects of feet reflexology on the quality of life of diabetic patients.

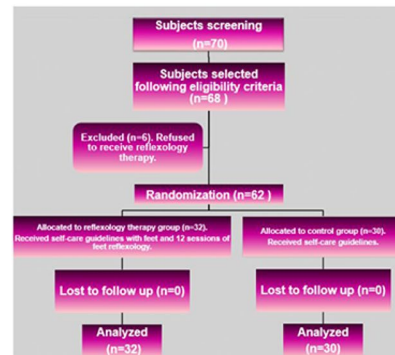
**Methods:** Randomized, controlled and single-blind clinical trial performed at a diabetes educational center, in Brazil. 68 subjects,

diagnosed with type 2 DM and aged 18 years or more was selected for recruitment in the trial. The details of the study subjects' recruitment procedure are presented in a consort flow diagram as shown below (Fig. 1). Reflexology is a systematic practice in which applying some pressure to any particular points on the feet impacts the health. According to the reflex theory, organs, glands and other parts of the body are linked to specific points on hands and feet (Fig. 1). For assessment of functional capacity the instruments for QOL (SF-36), and the Stanford Health Assessment Questionnaire Disability Index (HAQ-DI) were applied, before starting reflexology therapy and after 4 consecutive weeks. This research was conducted in accordance with the ethical recommendations of the Declaration of Helsinki. Conclusion Feet reflexology has improved the quality of life of diabetic patients, in functional capacity, role-physical, pain, role emotional aspects (Figs. 2, 3).

**FIGURE 1 -** Organs, glands and other parts of the body linked to specific points on the feet.



**FIGURE 2 -** Consort diagram for subjects' recruitment and follow-up



**FIGURE 3 -** Technique of Reflexology by Lourenço



**Fig. 1** See text for description

**Results**

**TABLE 1-** Social Demographic, Economical and Clinical characteristics of diabetic patients of the control group (CG) and reflexology therapy group (TG).

CHARACTERISTICS	CG (n=30)	TG (n=32)	P
Age (years; X±SD)	60.8±15.3	61.9±17.4	0.6
Years of DM (X±SD)	15.89±5.3	16.35±6.9	0.4
Female sex n (%)	16 (53.3)	17 (53.1)	0.8
Ethnicity, white n (%)	9 (30.0)	10 (31.2)	0.7
Marital status, single n (%)	19 (63.4)	20 (62.5)	0.5
Less than 4 years of education n(%)	16 (53.3)	17 (53.3)	0.6
Unemployed or retired n (%)	16 (53.3)	18 (56.2)	0.7
Household income < US\$ 300* n(%)	10 (33.3)	11 (34.4)	0.7
Urban resident n (%)	12 (40.0)	13 (40.6)	0.8
Physically inactive n (%)	7 (23.3)	8 (25.0)	0.6
Alcohol drinking n (%)	4 (13.3)	5 (15.6)	0.7
Current smoking n (%)	2 (6.6)	2 (6.2)	0.7
Psychotropic drugs n(%)	3 (10.0)	4 (12.5)	0.6
Obesity n (%)	12 (40.0)	12 (37.5)	0.5

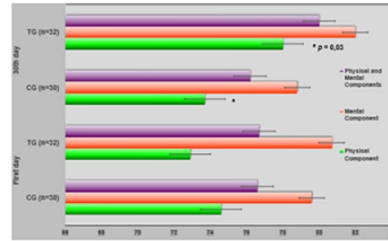
X±SD: mean ± standard deviation; DM:diabetes mellitus; \* monthly

**TABLE 2-** Comparison between the control group (CG) and reflexology therapy group (TG), of the SF-36 scales, on the first and on the 30th day of reflexology therapy.

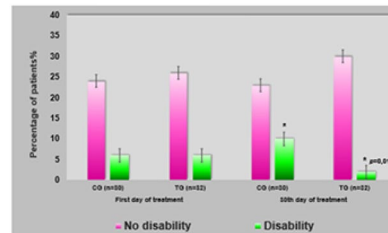
SF-36 SCALES	1 <sup>st</sup> DAY OF REFLEXOLOGY THERAPY			30 <sup>th</sup> DAY OF REFLEXOLOGY THERAPY		
	CG (n=30)	TG (n=32)	P	CG (n=30)	TG (n=32)	P
Physical Functioning (X±SD)	81.8±16.7	80.6±20.8	0.9	83.5±8.2	90.0±10.7	0.01
Role-Physical (X±SD)	86.5±10.8	87.2±8.1	0.9	85.3±5.0	95.3±7.6	0.01
Pain (X±SD)	66.6±14.4	62.7±10.9	0.7	67.3±12.2	80.2±7.2	0.01
General Health (X±SD)	73.7±23.6	72.5±23.2	0.1	70.3±21.4	73.1±22.3	0.5
Vitality (X±SD)	63.5±2.3	61.6±3.9	0.9	61.8±14.8	60.0±8.5	0.3
Social Functioning (X±SD)	96.7±10.3	96.9±10.0	0.9	97.3±6.9	96.7±7.8	0.5
Role-Emotional (X±SD)	84.6±8.6	86.6±7.9	0.6	81.5±15.1	95.0±7.2	0.01
Mental Health (X±SD)	83.2±13.0	85.8±13.7	0.9	82.9±20.0	84.8±8.3	0.5

**Fig. 2** See text for description

**FIGURE 1-** Comparison between the control group (CG) and reflexology therapy group (TG) of SF-36 components Physical and Mental scores, on the first and on the 30th days of reflexology therapy.



**FIGURE 2-** Comparison between control group (CG) and reflexology therapy group (TG) of Stanford Health Assessment Questionnaire Disability Index (HAQ-DI), on the first and on the 30th days of reflexology therapy.



**Fig. 3** See text for description

**A174****Flash glucose monitoring system use on type 1 diabetes patients attending a public health system diabetes reference center at Belo Horizonte, Minas Gerais**

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**Background:** Type 1 diabetes intensive treatment reduces complications risk and self-monitoring is essential to reach the goals. The flash glucose monitoring system (FGMS) consists of a subcutaneous sensor placed on the arm, which measures interstitial fluid's glucose in real time by a reader which displays current and historical glucose levels and glucose trends, with good accuracy and no need of capillary blood glucose sample for calibration. FGMS's use by public health system patients is surrounded by discussions about cost-effectiveness.

**Objective:** To evaluate FGMS's use on patients attending a public health system type 1 diabetes reference center at Belo Horizonte.

**Methods:** Patients 13 years old or more, on self-monitoring practice without help and hemoglobin A1c (A1c) above 7.5% were invited. The sensor was placed during the visit and instructions about the use were given. After 14 days data was downloaded and doses adjustments were made. 300 blood glucose test strips were provided and patients were instructed to perform daily 3 extra blood glucose tests beyond those usually performed. New evaluation was made after 3 months. The study was approved by Santa Casa of Belo Horizonte's Ethics Board, approval 1.064.985 and written consent was obtained from participants.

**Results:** 15 patients joined the study, with mean age  $30.3 \pm 14.14$  (16–55) years, 40% females, mean time of T1DM diagnosis of  $10.47 \pm 5.93$  (2–26) years and education level of 93,7% attending up to high school (26,7% attending up to elementary school). There were 4 problem situations with the sensor (2 detachments, 1 early interruption of the operation and 1 skin reaction). Mean number of daily scans was  $16.33 \pm 11.43$  (5–44), with a positive correlation with age ( $r^2 = 0.538$ ,  $p 0.038$ ), percentage of measures within the glycemic target ( $r^2 = 0.661$ ,  $p 0.007$ ) and negative with percentage of measures above the glycemic target ( $r^2 = -0.545$ ,  $p 0.035$ ), A1c prediction of the sensor ( $r^2 = -0.543$ ,  $p 0.037$ ) and A1c after 3 months ( $r^2 = -0.656$ ,  $p 0.008$ ). There was no correlation between education level and number of scans or interurrences. There was no significant difference in A1c before [ $8.39 \pm 0.86\%$  (7.5–10.3)] and after 3 months [ $8.01 \pm 1.17\%$  (5.8–10.1)]. 20% of patients reached  $A1c \leq 7\%$ .

**Conclusion:** It is possible to use FGMS at Brazilian public health system, even on low education level patients, with good acceptance and favoring treatment goals, related to the highest number of measured glucose levels.

**A175****Flatbush diabetes—a case report**

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**Case report:** A 31-year-old African-Brazilian man was admitted to hospital reporting abdominal pain associated to vomiting, polyuria and polydipsia 3 days ago, and weight loss. The patient had no previous medical history and was not under medications. He had family history (FH) of type 2 Diabetes Mellitus (T2DM). At presentation, he had acanthosis nigricans in cervical/axillary regions, BMI =  $46 \text{ kg/m}^2$ ,

was dehydrated and tachypneic, but no fever. Laboratory tests demonstrated blood glucose 690 mg/dL, severe diabetic ketoacidosis (DKA)—pH 7.0,  $\text{HCO}_3^-$  2.5 mEq/L, lactate 1.4 mmol/L and ketonuria. Once the DKA protocol was initiated, the patient's pH level normalized within 24 h. Furthermore, the patient had glycated hemoglobin (HbA1c) 12.2%, low C-peptide level (1.7 ng/mL) and negative autoantibodies (AA)—anti-GAD, anti-insulin, anti-islet cell and anti-protein tyrosine phosphatase. After the acute phase, the patient was treated with metformin, basalbolus insulin therapy and received hospital discharge at the 5th day. Short-acting (regular) insulin was suspended in the end of the first month and maintained NPH insulin plus pioglitazone and metformin. After the second month, his fasting glycemia was 94 mg/dL and HbA1c 7.1%. At this time, NPH insulin was suspended and the patient was managed with only oral anti-diabetic agents.

**Discussion:** Idiopathic type 1 diabetes (T1DM), Flatbush and “Ketosis-prone” T2DM are denominations for a rare form of Diabetes Mellitus (DM) due to transitory pancreatic failure. It is characterized by DKA, absence of AA and low C-peptide levels. The pathogenesis remains unknown, but the suggested mechanisms are glyco and lipotoxicity, which affect the beta cells (BC) insulin secretion but, after the DKA treatment, lead to BC function recovery. This form of DM typically occurs among obese men at 40 years old with FH of T2DM. The treatment proceeds with reduction of insulin intake, resulting, in most cases, with its suspension. Final Considerations: This case illustrates a rare form of DM that, nevertheless, has been more frequently described. We reported an African-Brazilian patient with class III obesity and insulin resistance signs that was diagnosed with DKA and had absence of AA and low C-peptide levels. There was a good response to insulin sensitizers, and the insulin administration was suspended in the following months. The natural course of Flatbush diabetes is atypical, which makes its identification important in order to introduce an adequate management.

Informed consent to publish had been obtained from the patient.

**A176****Follow-up of patients submitted to bariatric surgery in the university hospital of the federal university of Santa Catarina: clinical, laboratorial and socioeconomic profile**

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A176**

The weight gain is a challenge to the public health and researchers have shown that it can be more common in some social groups. Obesity can present with chronic diseases and it is risk factor for vitamin D insufficiency/deficiency. Although bariatric surgery is an effective treatment for weight loss, it may aggravate a vitamin D insufficiency/deficiency already present in the preoperative period. In this prospective longitudinal descriptive study, socioeconomic, clinical and laboratory data of patients undergoing bariatric surgery at the University Hospital of the Federal University of Santa Catarina were described and analyzed, from the preoperative period until the 6th postoperative month. The quantitative variables were described in mean  $\pm$  standard deviation, and the differences analyzed by the t student test for paired samples. The majority of the participants were female (88.1%) and those with the highest weight loss were in the 35–44 age group, family income per capita  $\geq \frac{1}{2}$  and  $< 1$  minimum wage, and incomplete or complete elementary education. A statistically significant decrease in body mass index was observed ( $49.0 \pm 6.6$  vs.  $35.8 \pm 5.5 \text{ kg/m}^2$ ,  $n = 40$ ,  $p < 0.0001$ ); and an improvement in fasting blood glucose, triglycerides and high density lipoprotein cholesterol levels ( $p < 0.05$ ). There was a decrease in the prevalence of hypertension, dyslipidemia and type 2 diabetes mellitus. There was also a high prevalence of vitamin D deficiency/insufficiency in all periods, but low use of cholecalciferol.



**A177****Frequency of hypoglycemia and diabetes treatment satisfaction in adults with type 1 diabetes in use of long-acting insulin analogues**

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**Introduction:** Strict glycemic control with multiple daily insulin injections is the focus of treatment for type 1 diabetes (T1D), but it is usually associated with an increase in the number of hypoglycemia episodes. Although long-acting insulin analogues have pharmacological properties to mimic physiologic insulin profile, literature is not unanimous in showing this effect in comparison to human insulin. In Brazil, only some states, including Rio Grande do Sul (RS), provide insulin analogues for T1D patients.

**Objective:** To evaluate the frequency of hypoglycemia and treatment satisfaction in patients with T1D using long-acting insulin analogues.

**Methods:** In this cross-sectional study, sample was calculated to represent 1382 T1D adults in 20 cities of RS who receive insulin analogues by the state. Demographics and clinical data were evaluated by a self-administered questionnaire. Satisfaction was assessed through the Satisfaction with Diabetes Treatment Questionnaire (DTSQs), a 6-item survey in which scores range from 0 to 36 (higher scores = greater satisfaction). The General Health Questionnaire (GHQ-12) was used to evaluate common mental disorders (CMD), which encompasses anxiety, depression and psychosomatic symptoms. A score  $\geq 3$  was used as a positive screening for CMD. Two groups were compared, according to the insulin regimen: long-acting + ultra-rapid acting insulin analogue (LUR) and NPH insulin + ultra-rapid acting insulin analogue (NUR).

**Results:** A total of 280 T1D patients were included, 230 on LUR (82.1%) and 50 on NUR (17.9%). Overall, the mean age was  $40.4 \pm 15.7$  years, 51.4% were women and 90.3% were Caucasian. In a one-month period, no differences were observed between LUR and NUR groups regarding > 4 episodes of hypoglycemia (27.4% vs. 33.3%,  $p = 0.53$ ), nocturnal hypoglycemia (28.2% vs. 30.9%,  $p = 0.72$ ) and severe hypoglycemia requiring help of third parties (18.1% vs. 25.6%,  $p = 0.25$ ), respectively. LUR patients presented a higher percentage of blood glucose monitoring measurements ( $\geq 4$  tests/week) when compared to patients with NUR (99.6% vs. 88.9%,  $p < 0.001$ ). The mean DTSQs score ( $31.9 \pm 7.3$  vs.  $30.3 \pm 5.2$ ,  $p = 0.07$ ) and the mean GHQ-12 score ( $4.7 \pm 2.4$  vs.  $4.6 \pm 2.5$ ,  $p = 0.80$ ) were not different between LUR and NUR patients.

**Conclusions:** The use of long-acting insulin analogues did not add satisfaction or hypoglycemia episodes reduction when compared to NPH insulin in adults with T1D already in use of ultra-rapid acting insulin analogues. Support: FIPE-HCPA.

**A178****Gastrointestinal gcg gene expression encoding glp-1 plasma concentrations in obese patients after roux in y gastric bypass (RYGB) may be associated with postoperative remission of type 2 diabetes mellitus (T2DM)**

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**Background:** The prevalence of type 2 diabetes mellitus (T2DM) increases in parallel with obesity. After RYGB, obese patients with T2DM have improvement or reversal of hyperglycemia before significant weight loss. Postoperative anatomical changes in the gastrointestinal tract (GIT) may influence the gene expression of GIT tissues and their production of hormones involved in glycemic homeostasis, such as glucagon-like peptide 1 (GLP-1).

**Objective:** To correlate the gastrointestinal expression of GCG gene and GLP-1 plasma levels with markers of glycemic homeostasis in obese patients with or without complete remission of T2DM after 3 months of RYGB.

**Methods:** Gastrointestinal biopsies were obtained from 20 obese patients with T2DM before and after 3 months of RYGB and submitted to global and target transcriptomic analysis, by microarray and RT-qPCR techniques, respectively. GLP-1 and markers of glycemic homeostasis were measured in blood, collected fasting and after food testing, before and after 3 months of RYGB. After 1 year of RYGB, patients were classified as responsive (R) and nonresponsive (NR) to total remission of T2DM. Statistical analysis was performed by non-parametric tests. Area under the curve (AUC) was calculated by trapezoidal rule, correlation analyzes were performed by Spearman test and association between R and NR groups was performed by Mann-Whitney.

**Results:** After RYGB, there was a significant increase in GCG gene expression in all segments maintained on GIT (Table 1) in parallel to increase in plasma concentration after meal test (graph 1)  $< 0.05$ . GLP-1 AUC showed significant increase only in R patients after 3 months of RYGB. There was a significant inverse correlation between systemic concentrations of GLP-1 and HbA1c (Person =  $-0.581$ ,  $p = 0.018$ ).

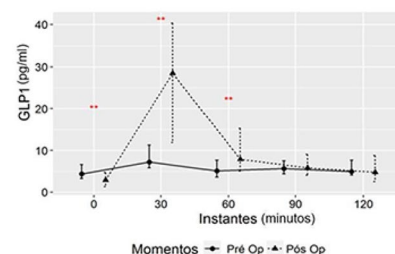
**Conclusion:** Increased GLP-1 after RYGB occurred in parallel with increase in gastrointestinal transcription and was inversely correlated with postoperative remission of T2DM in obese women (Fig. 1).

**Table 1.** Global gene expression and fold change target of GCG gene in GTI tissues

Gene	Transcript	Analysis	Stomach	Duodenum	Jejunum	Ileum
Remaining						
CGC	GLP-1	Global	<b>+0,8180</b>	+0,3287	<b>+0,8320</b>	<b>+0,6194</b>
		Target	+0,3745	+0,4936	+0,0275	+0,6745

Legend: Bold = ( $p < 0.05$ ); (pre vs. postoperative).

**Graph 1** - Plasma levels of GLP-1 in response to the pre and post feeding test 3 months of DGyR.



Legend: \*\*significant difference compared to the preoperative value ( $p < 0.05$ )

**Fig. 1** See text for description

**A179****Glucocorticoid sensitivity might underlie metabolic abnormalities in patients with familial partial lipodystrophy type 2**

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**Background:** Familial partial lipodystrophy type 2 (FPLD2) is characterized by insulin resistance, adipose atrophy from the extremities, and truncal obesity. Due to the resemblance with Cushing's syndrome,

we hypothesized a glucocorticoid (GC) role in the pathogenesis of the metabolic abnormalities in FPLD2.

**Objective and design:** This prospective study, conducted at the Ribeirão Preto Medical School University Hospital, aimed to evaluate the phenotypic heterogeneity and GC sensitivity in 24 FPLD2 patients exhibiting LMNA mutations (p.R482W and p.R644C) and 24 matched controls.

**Main outcome measures:** Participants underwent anthropometric, body composition, metabolic profile, and adipokines and cytokines measurements. Plasma and salivary cortisol were measured in basal conditions and after 0.25, 0.5 and, 1.0 mg of dexamethasone (DEX) given at 2300 h. Glucocorticoid receptor and 11 $\beta$ HSD isoforms expression were assessed by qPCR.

**Results:** FPLD2 individuals presented increased waist and neck circumferences, decreased hip circumference, peripheral skinfold thickness and fat mass. Patients also presented increased HOMA-IR and triglycerides, increased TNF- $\alpha$ , IL-1 $\beta$ , IL-6, and IL-10, and decreased adiponectin and leptin levels. After 0.5 mg DEX, salivary cortisol was less suppressed in FPLD2 patients. The clinical and biochemical phenotype was more pronounced in patients harboring LMNAp.R482W mutation. No differences were observed in the expressions of GR $\alpha$ , GR $\beta$ , 11 $\beta$ HSD1, and 11 $\beta$ HSD2.

**Conclusions:** FPLD2 patients exhibited phenotypic heterogeneity related to LMNA mutations. Patients also showed less ability to suppress cortisol after 0.5 mg DEX, which was the most effective dose to expose the spectral HPA axis sensitivity among groups. Increased levels of proinflammatory cytokines might contribute to decreased GC sensitivity in FPLD2.

#### A180

##### Glycemic control and associations between therapeutic adherence, quality of life, and hypoglycemia in adult subjects with type 1 diabetes

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**Background:** In Brazil, only 11.6% of patients with type 1 diabetes mellitus (T1D) reach the glycated hemoglobin (A1c) target of < 7%. Possibly, factors such as therapeutic adherence (TA), quality of life (QOL), and hypoglycemia (HYPO) interact with each other and negatively impact glycemic control. However, studies evaluating these associations are scarce. Objective to evaluate glycemic control, prevalence of microvascular complications (MICRO), and possible associations between the scores of questionnaires for evaluation of TA, QOL, and HYPO in adults with T1D.

**Methods:** This was a cross-sectional study using questionnaires and secondary data of 50 patients with T1D, aged 18-50 years, on regular medical follow-up. The study was approved by the local ethics board (CAAE 57469816.7.0000.5266). All participants signed the informed consent form and answered the Self-Care Inventory-revised (SCI-R; score ranging from 14 to 70 points, the higher the score, the better the TA), the Diabetes Quality of Life Measure (DQOL-8; score ranging from 8 to 40; the higher the score, the worse the QOL), and the American Diabetes Association's Hypoglycemia questionnaire (one point was assigned for each gradation of responses to the questionnaire questions). The records of A1c values (last 03 months) and MICRO screening (last 12 months) were collected from medical charts. The results were expressed as relative value (%), mean  $\pm$  SD, and median [p25-p75].  $P < 0.05$  was considered significant.

**Results:** The sample had a mean age of  $28.2 \pm 9.1$  years and a mean time of diagnosis of  $12.7 \pm 7.7$  years. Most of them were female (58%)

and white (54%). Mean A1c was  $8.4 \pm 1.8\%$ . There were 18% of retinopathy, 12% of albuminuria, and 6% of diabetic neuropathy. Median scores on SCI-R and DQOL-8 were 48 [43.2-53] and 22.5 [19.2-26.7], indicating modest TA and unsatisfactory QOL, respectively. A negative correlation was found to SCI-R and DQOL-8 ( $r = -0.42$ ;  $P < 0.01$ ). Considering the A1c, there was a significant correlation to the DQOL-8 ( $r = 0.41$ ;  $P < 0.01$ ), a trend to an inverse correlation to the SCI-R ( $r = -0.27$ ;  $P = 0.05$ ), and no correlation to the HYPO's questionnaire items.

**Conclusions:** Poor glycemic control, prevalent MICRO, modest TA, and unsatisfactory QOL were found in this adult sample with T1D. The increase in TA correlated with better QOL and a trend to lower A1c. Improvement in A1c was associated with improvement in TA and there was no association between A1c and HYPO-related issues.

#### A181

##### Glycemic control with continuous subcutaneous insulin infusion system: experience of a tertiary service

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**Introduction:** Continuous subcutaneous insulin infusion (CSII) system therapy maintains the release of micro doses of insulin 24 h a day in a precise and pre-programmed way to maintain stable glycemic control between meals and allows the release of insulin in bolus before meals, in order to mimic the physiological secretion of insulin. Studies have been shown efficacy, safety and improvement in the quality of life in patients taking this therapy, but have not shown significant impact on A1c.

**Objective:** To compare the effects on glycemic control (A1c), weight, basal insulin dose.

**Methods:** A retrospective study was carried out by reviewing the medical records of adult patients with type 1 diabetes mellitus (T1DM) in the use of CSII in a follow-up at the Diabetes outpatient clinic of a tertiary center. The glycemic control of the patients was evaluated through the measurement of A1c, weight, total basal insulin dose before and after CSII placement.

**Results:** In the year 2016, 1246 adult patients were treated in a tertiary Diabetes center; from these, 12 are using CSII. 66.6% are female, mean age is 29 yo, with mean time of diagnosis of 14.6 years. One patient has been in CSII since 2004; the majority ( $n = 8$ ) started use after 2014. Three patients were already using CSII when they came for follow-up. Records of 7 patients had more complete data for analysis; 71% presented with weight gain after starting CSII (average gain of 10.96%), 1 patient lost weight and 1 maintained. In the analysis of 9 patients, 55% ( $n = 5$ ) presented decrease of 12.76% in mean A1c, 3 patients a mean increase of 13.7%, and 1 maintained. The mean A1c before CSII was 7.3% and current 7.1%. The mean basal insulin dose on CSII was 26.44 IU. No one patient had diabetic ketoacidosis or skin infections in the cannulae or sensor placement during the use of CSII.

**Conclusion:** According to previous studies, patients who already have good glycemic control, the use of CSII did not have a great impact on the reduction of A1c. Our study has shown that patients presented weight gain in use of CSII despite the reduction of the basal insulin dose. Our challenges for the future: to avoid weight gain; better medical records (already in progress); to keep patients motivated to use the resources available in CSII (Fig. 1).

CHARACTERISTICS OF FOLLOW-UP PATIENTS IN USE OF SICI (CONTINUOUS SUBCUTANEOUS INSULIN INFUSION) IN A TERTIARY HOSPITAL

	AGE (YEARS)	GENDER	YEAR OF START OF SICI	DOSEAGE OF BASAL INSULIN PREVIOUS TO THE USE OF SICI	CURRENT DOSEAGE OF BASAL INSULIN	PREVIOUS HBA1C	LAST HBA1C	WEIGHT PREVIOUSLY TO THE USE OF SICI	LAST WEIGHT
1	24	F	2016	14 UI GLARGINA	13.5 UI	10.5%	7.7%	57 KG	56.7 KG
2	24	M	2015	60 UI GLARGINA	42.1 UI	6.4%	7.3%	72 KG	92.8 KG
3	32	F	2014	42 UI DETEMER	28.15 UI	5.3%	4.8%	73.5 KG	83.4 KG
4	44	F	2012	NO DATA	24.5 UI	NO DATA	6.1%	NO DATA	56.3 KG
5	33	M	2004	NO DATA	31.8 UI	NO DATA	9.1%	NO DATA	68.3 KG
6	31	M	2015	20 UI GLARGINA	17.7 UI	6.4%	6%	58.8 KG	66 KG
7	32	F	2014	NO DATA	36.8 UI	7.4%	8.8%	NO DATA	85.8 KG
8	28	F	2016	28 UI GLARGINA	22.95 UI	8%	7.1%	67.3 KG	73.8 KG
9	35	F	2016	22 UI GLARGINA	19.125 UI	7.2%	7.3%	70 KG	72 KG
10	20	F	2010	NO DATA	42.5 UI	6.4%	7%	NO DATA	61.5 KG
11	21	M	2015	28 UI GLARGINA	19.27 UI	7.8%	7.1%	67 KG	62.5 KG
12	27	F	2012	NO DATA	18.9 UI	NO DATA	7.2%	NO DATA	60.8 KG

**Fig. 1** See text for description

### A182

#### Glycemic remote surveillance with the diabetes mellitus (DM) patients survey about the telemedicine: a pilot study results

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**Introduction:** The aim of this study was to investigate the influence of remote surveillance on glycemic control in diabetic patients and to evaluate their opinions about this new technology. Two questions to be answered: (1) Telemedicine monitoring can improve outcomes in diabetes? (2) What is the patient point of view about telemedicine?

**Methods:** 20 diabetes mellitus type I or II patients were recruited from a private clinic in a upper-middle class region—Copacabana—in Rio de Janeiro city, Brazil. The patients was classified by education level, social class, age, sex, and type of diabetes and if they use insulin or not user, limited in 25% of total population recruited. Was used specific glucometers provided by the sponsor to transmit wireless the results by modems using a cellular internet provider to a Medical Center. The Medical Center staff was; 2 doctors, 1 nurse and 3 technicians in nursing. Patients had their glucose level followed by internet site during the 80-day studies. Was defined the hyperglycemia or hypoglycemia level defined by the patient medical assistant, the nursing team inform by email or telephone the glucose level out of medical assistant parameters, that will be responsible to the medical decision conduct. The surveys were conducted in 3 different times, beginning, day 40th and at the end (with a window of 7 days).

**Results:** During the study 4,111 registered glucose measurements was stored and analyzed. During the study, 3 patients was excluded, one decided to dropped and two other diabetic due to no protocol compliance. The 3,696 glucose measures validate were calculated and analyzed. These results show that there were no statistical differences in the blood glucose levels of diabetic patients monitored by telemedicine when compared the begging period, from the 1st to 40th day with the final period, from day 41 to study end. The total period of study was 86 days. This study showed that our methodology applied to monitoring the glucose level from DM patients by telemedicine using Internet-based intervention, have not influence in the glycemic control of diabetic patients type I or II. The patient opinion surveys show that the patients older than 50 years (61% of total), in the beginning period, believed that the telemedicine could improve the glycemic control, and 67% answered that the telemedicine would take care of him, 62% of recruited would take part of the study even if their doctors did not invite him; only 5% declared felt watched (spying), 76% found them useful have a personal staff contacts to notify changes of glucose, 42% did not access the site, 58% preferred “send” the glucose levels once a day, 89% would recommend to other patients to use telemedicine. Concerned to others possibilities to be applied; 89% suggested include pressure control, 68% suggested weight control. In the

study closer survey, 74% found that after the study, the methodology, applied (telemedicine using an internet-based intervention) was beneficial; 53% of patients are willing to pay for the service. The pilot study in telemedicine to private clinic DM patients answered two major questions proposed as the primary goal: Question (1): Telemedicine monitoring can improve outcomes in diabetes? Answer: No. Remark; the monitoring alone does not improve diabetes control. This monitoring may be associated with patient continuous motivational programs. Question (2): What is the patient point of view about telemedicine monitoring? Answer: Yes. Remark; Diabetics patients are open to use this technology because they feel care and do not feel spied. The patient survey shows that the Telemedicina could be recommend to others diabetics and a half of them are willing to pay for such services.

**Discussion:** This result may be due to the few medical interventions performed during the study, limited only to the serious cases of hyper or hypoglycemia. We also understand that “not just monitoring diabetic’s glucose level”, but it is also necessary to include dynamic and motivational actions to have a better improvement of glycemic control in DM. More studies in this specific health care technology must be conducted in order to have better way to achieve the patient quality of live improvement associated to the cost decline.

### A183

#### Glycemic responses, plasma lipids and body mass index after physical training in individuals with diabetes mellitus type 2

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**Introduction:** Currently, diabetes mellitus is considered as one of the main chronic diseases that affect man. It is a universal health problem, affecting all socioeconomic classes and affecting populations of countries at all stages of development. Its complications have an increasing impact on quality of life and mortality. The effects of regular physical activity on health have been widely documented. The association between physical inactivity and insulin resistance was first suggested in 1945, and since then new epidemiological studies have emerged demonstrating its relation with the presence of cardiovascular risk factors. On the other hand, physical exercise programs have shown efficacy in glycemic control, values of plasma lipids and consequently the Body Mass Index (BMI) of these individuals.

**Objective:** To analyze the effect of regular physical exercise of 36 weeks on glycemic control, plasma lipids and BMI in type 2 diabetic subjects from a Health Unit in the interior of São Paulo.

**Methods:** Metabolic variables were analyzed by fasting blood glucose, total cholesterol, HDL and LDL and BMI, which were recorded in the medical records of these patients (n = 25). The instruments used were the fasting blood test for laboratory evaluation and the anthropometric measurement (weight and height). The experimental treatment was a 36-week physical exercise program, three sessions per week with 50 min duration. Each session was divided as follows: 5 min of warming up with stretching exercises of MMSS and MMII and circumference of limbs and trunk; 35 min of walking and/or water aerobics and 10 min of cooling with stretching exercises and breathing and relaxation techniques. For the statistical analysis, the paired T test was used.

**Results:** The following mean values were obtained before and after physical training: 146.93 (+ 52.21) mg/dl and 121.16 (+ - 63.57) mg/dl for fasting glycemia; 215.96 (+ - 78.62) mg/dl and 195.05 (+ - 103.29) mg/dl for plasma lipids; 30.65 (+ - 15.79) kg/cm and 28.29 (+ - 11.16) kg/cm for BMI.

**Conclusion:** These results allow us to conclude that physical exercise is of great importance in the metabolic control, lipid profile and nutritional status of individuals with diabetes, improving these parameters.

**A184**

**Glycemic variability and hypoglycemia evaluation with insulin degludec compared to insulin glargine U100 in the treatment of elderly patients with type 2 diabetes mellitus**

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**Background:** Type 2 Diabetes Mellitus (T2DM) is a prevalent disease in the elderly population and they are at high risk of hypoglycemia (HYPO). Insulin degludec has been suggested to have both lower risk of hypoglycemia and less glycemic variability (GV). The primary objective of this study is to evaluate GV and hypoglycemia comparing insulin degludec (Ideg) to insulin glargine U100 (Iglar) as a basal insulin for elderly patients with T2DM.

**Secondary objectives:** Evaluation of duration and number of hypos (total, nocturnal and severe) and the total insulin daily dose (TDD) in each group.

**Methods:** It is a pilot study with ten patients during six weeks, randomized, prospective, controlled and open label trial. Inclusion criteria: T2DM, age over 60 years, A1C from 7 to 10%, use of NPH insulin with or without oral antidiabetic drugs. Patients were randomized 1:1 to receive once daily Ideg (n = 5) or Iglar-U100 (n = 5) before breakfast time. They were evaluated for glucose variability (GV) and HYPOs by continuous glucose monitoring (CGM) after 2 weeks of treatment with either insulin.

**Results:** They are expressed in median (minimum–maximum). GV had no difference in 24-h mean glucose between groups (Ideg = 168 (151–206) vs Iglar = 169 (138–193) mg/dL. P = 0.84) as well as the standard deviation from the mean (Ideg 69 (42– 83) vs Iglar 45 (41–66). P = 0.22). Overall HYPOs were similar in both groups (Table 1). The TDD (U/kg/dia) were similar in the beginning between groups [Ideg = 0.38 (0.12–0.59) vs Iglar = 0.21 (0.15–0.53). p = 0.69] as well as at the end of the trial (Ideg 0.36 (0.12–0.55) vs Iglar 0.24 (0.18–0.54). P = 0.54]. Comparing the two methods used for monitoring the blood glucose (GCM or self monitoring of blood glucose (SMBG)) we found that CGMS was able to detect more HYPOs than SMBG for the total HYPOs (SMBG = 12 vs CGM = 20. P = 0.03) and nocturnal (SMBG = 2 vs CGM = 11. P = 0.02). 40% of the total number of HYPOs and 81% of the nocturnal HYPOs were missed when using SMBG instead of CGMS. More than 50% of HYPOs occurred during the night (Figs. 1, 2).

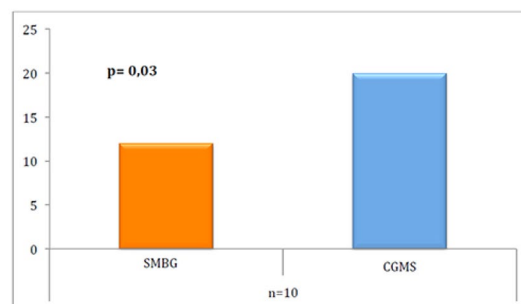
**Conclusion:** Both groups showed similar rates of GV, number and duration of HYPOs. There was no difference regarding the TDD between groups at the end of the study. A higher number of total and nocturnal HYPOs were diagnosed by CGM compared to SMBG. As a pilot study, its major limitation is the small number of patients and the short period of the trial.

**Table 1: HYPOS\***

	Ideg (n=5)	Iglar (n=5)	P value
N° of hypos (total) SMBG	0 (0-4)	0 (0-3)	0,841
N° of hypos (total) CGMS	3 (1-6)	1 (0-3)	0,222
N° of hypos (nocturnal) SMBG	0 (0-2)	0 <sup>a</sup>	0,690
N° of hypos (nocturnal) CGMS	2 (1-2)	0 (0-2)	0,095

\*Results expressed in median (minimum-maximum); absolute values; a= not calculated median (minimum-maximum) because none of the patients presented hypos accessed by SMBG.

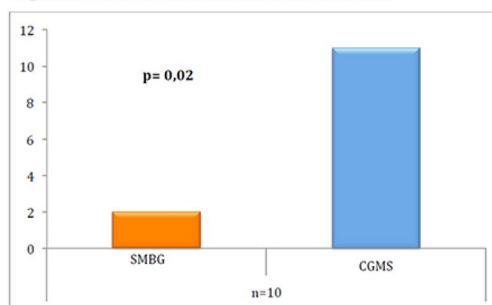
**Figure 1: N° of HYPOS (SMBG x CGMS) Total\***



\*absolute number

**Fig. 1** See text for description

**Figure 2: N° of HYPOS (SMBG x CGMS) Nocturnal\***



\*absolute number

**Ethics Approval**

The study was approved by Santa Casa Institution's Ethics Board, approval number CAAE 51523215.6.0000.5479

**Fig. 2** See text for description

**A185****Glycemic variability and vitamin D levels in type 1 diabetes mellitus patients**

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**Background:** Data in recent literature suggest that the daily fluctuations on the blood levels of glucose may play an important role in both glycemic control and the development of complications in Type 1 Diabetes Mellitus (T1DM). In consequence, glycemic variability (GV), a variable defined by the quantification of daily glycemic oscillations through specific methodologies and calculations, was created. In parallel, the relationship and potential benefits of 25-OH-Vitamin D (VD) have been explored, with studies demonstrating an effect of VD on insulin resistance, pancreatic beta cell function and on the immunological pathways of T1DM. It is suggested that VD may be important both in the etiology of T1DM and in glycemic control. Therefore, our study aimed to evaluate the relationship between GV and VD in patients with T1DM.

**Methods:** We evaluated the serum levels of VD and the GV of 22 patients. For assessing the GV, all patients were submitted to the Continuous Glucose Monitoring System (CGMS), for an average of 3 days.

**Results:** We found that patients with VD deficiency had higher GV when compared to patients with normal levels of this hormone ( $p < 0.01$ ). Additionally, a correlation was found between the VD status (normal or deficient levels) with the GV ( $r = 0.5$ ;  $p < 0.05$ ). **Conclusions:** Our pilot study was the first to associate VD and GV. Studies with more patients are needed in order to confirm our results, and further establish the relationship between VD and GV.

**A186****Haptoglobin levels are associated with type 2 diabetes mellitus and they are influenced by HP1-HP2 polymorphism, obesity, and hypertension**

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**Introduction:** Type 2 diabetes mellitus (T2DM) and obesity, mainly visceral obesity, have been associated with a low grade inflammatory state and immune system activation. Haptoglobin (Hp) is an acute-phase protein that primarily scavenges the hemoglobin (Hb) released into circulation, either by hemolysis or by normal red blood cell turnover, preventing Hb-related oxidative damage. Hp is mainly synthesized by hepatocytes and by non-hepatic cells, including adipocytes.

**Objective:** To evaluate the association between Hp levels with Hp1-Hp2 polymorphism, clinical and laboratorial parameters in T2DM patients.

**Methods:** We evaluated 102 patients with clinical and laboratorial diagnosis of T2DM and 62 age-, gender-, and body mass index (BMI)-matched non-diabetic control. Hp levels were measured in EDTA plasma samples using Quantikine<sup>®</sup> ELISA Human Haptoglobin Immunoassay (R&D Systems, USA) by ELISA method. Molecular analyzes of Hp1-Hp2 polymorphism were performed by specific twostep allelic polymerase chain reaction (PCR) technique. Statistical analysis was performed with SPSS (version 17.0) using Kruskal-Wallis, Mann-Whitney, Student t test, and qui-square test with residual analysis. A p value  $< 0.05$  was considered statistically significant.

**Results:** Hp levels were higher in the T2DM group [ $1.15 (0.52)$  g/L] when compared with control group [ $0.88 (0.58)$  g/L— $p = 0.005$ ]. Hypertensives T2DM patients exhibited higher Hp levels ( $1.19 \pm 0.46$  g/L) when compared with normotensives patients ( $0.80 \pm 0.26$  g/L— $p = 0.021$ ). Obese T2DM patients ( $1.27 \pm 0.47$  g/L) showed higher Hp levels than obese controls ( $0.95 \pm 0.40$  g/L— $p = 0.009$ ) and non-obese patients ( $1.00 \pm 0.41$  g/L— $p = 0.003$ ). Hp-Hp1 genotype showed association with T2DM according additive (OR = 3.038, IC 95% 1.127–8.192;  $p = 0.036$ ) and dominant (OR = 0.320, IC 95% 0.118–0.839;  $p = 0.010$ ) inheritance models. Considering these inheritance models, it was verified that Hp levels are lower in Hp2 allele carriers ( $p = 0.001$  and  $p = 0.020$ ).

**Conclusion:** These results suggest that Hp levels are associated with T2DM physiopathology and are influenced by Hp1-Hp2 polymorphism, obesity, and hypertension.

**A187****HbA1c, FPG, hypoglycemia, and basal insulin dose with insulin degludec (IDeg) vs insulin glargine 100 u/ml (GLA-100): lessons from the begin program**

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**Background:** The safety and efficacy profiles of IDeg, a long-acting basal insulin analog, were evaluated in the BEGIN program. This review reports comparative glycemic control, hypoglycemia, and insulin dose profiles of IDeg vs Gla-100, focusing only on basal-oral treatment trials in type 2 diabetes (T2DM) from the BEGIN program.

**Method:** HbA1c, FPG, confirmed ( $< 56$  mg/dL) or severe hypoglycemia, and insulin dose data (including dose increase needed for a 1.0% HbA1c decrease) from the selected BEGIN trials ( $n = 4$ ) comparing IDeg and Gla-100 in people with T2DM on basal-oral treatment were reviewed.

**Results:** HbA1c reduction with IDeg was non-inferior vs Gla-100, although, consistently, a greater (non-significant) reduction with Gla-100 was seen in each trial (Table 1A). FPG reduction was greater with IDeg. Rates of confirmed ( $< 56$  mg/dL) or severe hypoglycemia at any time (over 24 h) were similar with IDeg and Gla 100, but were lower with IDeg during the nighttime (Table 1A). Absolute insulin dose increases tended to be greater with Gla 100; however, when adjusted for a 1.0% HbA1c reduction, they were more frequently higher with IDeg (Table 1B).

**Conclusion:** In studies of IDeg vs Gla-100 in people with T2DM on basal-oral treatment from the BEGIN program, HbA1c reduction was slightly greater with Gla-100 while rates of hypoglycemia were either similar (hypoglycemia at any time) or lower (nocturnal hypoglycemia) with IDeg. Insulin dose requirements, when adjusted for 1.0% HbA1c reduction, were generally higher with IDeg vs Gla-100. This is an ENCORE abstract previously presented at ATTD2016. Funding and editorial support provided by Sanofi (Fig. 1).

**Table 1A. Comparative HbA<sub>1c</sub>, FPG and hypoglycemia with IDeg vs Gla-100 in people with type 2 diabetes on basal-oral treatment in the BEGIN program**

Trial duration (weeks)	Difference in mean HbA <sub>1c</sub> reduction from baseline, % (mmol/mol) IDeg <sup>b</sup>	Difference in mean FPG reduction from baseline, mmol/L (Gla-100 minus IDeg) <sup>b</sup>	Anytime hypoglycemia (over 24 h) <sup>c</sup>		Nocturnal (00:01–05:59 h) hypoglycemia <sup>c</sup>		
			Risk ratio <sup>d</sup>	Rate ratio	Risk ratio <sup>d</sup>	Rate ratio	
BEGIN Once Long <sup>e</sup>	52	0.09 (1.0)	-0.43*	1.00	0.82	0.91	0.64*
BEGIN Flex (Once-daily) <sup>f,g,h</sup>	26	0.18 (2.0) <sup>h</sup>	-0.36 <sup>h</sup>	0.89	0.89/1.04	0.50	0.75
BEGIN Flex (Flex) <sup>i</sup>	26	0.04 (0.4)	-0.42*	1.04	1.03	0.61	0.84
BEGIN Low Volume <sup>j</sup>	26	0.04 (0.4)	-0.42*	0.93	0.86	0.69	0.64
BEGIN Once Asia <sup>k</sup>	26	0.11 (1.2)	-0.09	0.94	0.82	0.85	0.62

**Table 1B. Comparative insulin dose with IDeg vs Gla-100 in people with type 2 diabetes on basal-oral treatment in the BEGIN program**

Insulin doses	Absolute change from baseline (U)		Dose increase needed to achieve a 1.0 % HbA <sub>1c</sub> improvement (U) <sup>l</sup>		Relative difference (%)
	IDeg	Gla-100	IDeg	Gla-100	
BEGIN Once Long <sup>e</sup>	46	48	43.4	41.7	4.0
BEGIN Flex (Once-daily) <sup>f,g,h</sup>	24	25	23.3	20.7	12.6
BEGIN Flex (Flex) <sup>i</sup>	27	25	23.1	20.7	11.6
BEGIN Low Volume <sup>j</sup>	49	52	41.5	42.5	-3.0
BEGIN Once Asia <sup>k</sup>	10	15	7.0	9.9	-29.3

Once Long, Flex (Once-daily), Low Volume, Once Asia: IDeg administered once daily in the evening vs Gla-100 administered once daily at the same time each day. BEGIN Flex (Flex): IDeg administered on Monday/Wednesday/Friday mornings and Tuesday/Thursday/Saturday/Sunday evenings vs Gla-100 administered once daily at the same time each day.

<sup>a</sup>Calculated from published data. <sup>b</sup>For differences in HbA<sub>1c</sub> and FPG, values <0 denote a greater reduction with IDeg and values >0 denote a greater reduction with Gla-100. <sup>c</sup>For hypoglycemia, values <1 denote a lower hypoglycemia risk/rate with IDeg and values >1 denote a lower hypoglycemia risk/rate with Gla-100. <sup>d</sup>Not tested statistically. <sup>e</sup>Data not published, risk ratio calculated from incidence data taken from Ratner et al. *Diabetes Obes Metab* 2013;15:175–84; <sup>f</sup>Zirman et al. *Diabetes Care* 2012;35:2464–71; <sup>g</sup>Menzhini et al. *Diabetes Care* 2013;36:858–64; <sup>h</sup>Ratner et al. *Diabetes Obes Metab* 2013;15:175–84; <sup>i</sup>Comparison of IDeg (Once-daily) arm with Gla-100 (Once-daily) arm was not an objective in this study; <sup>j</sup>Gough et al. *Diabetes Care* 2013;36:2536–42; <sup>k</sup>Onishi et al. *J Diabetes Invest* 2013;4:605–12; <sup>l</sup>Data not published, difference calculated based on baseline vs end-of-treatment levels; <sup>m</sup>Data not published, calculated from data in published manuscripts. FPG, fasting plasma glucose; Gla-100, insulin glargine 100 U/ml; IDeg, insulin degludec, U, units. \*p<0.05

**Fig. 1** See text for description

**A188 Health and nutritional literacy of adults with type 1 diabetes mellitus**

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**Introduction:** Literacy in health and in nutrition is the degree to which individuals are able to obtain, process, and understand basic health and nutrition information and guidelines necessary to make appropriate decisions regarding their treatment.

**Objective:** To assess the degree of literacy in health and nutrition and its associations with the therapy, the glycemic control and the nutritional status of adults with type 1 diabetes.

**Methodology:** Participated in the study 47 adults of both sexes, that were regularly attended in a school hospital. Participation on study was voluntary after the signing of the Informed Consent Term. The project is approved by the Ethics and Research Committee. The collected data were related to socioeconomic and demographic characteristics, treatment, glycemic control, body mass index and waist circumference. The degree of literacy in health and nutrition was valued by validated instruments, the S-TOFHLA[1] and the NVS-BR[2]. The association was analyzed by Chi square test, with a significance level of 5%.

**Results:** The participants had a mean age of 27 years (SD 0.04), the majority were female (66%) and with a high school education (64%). The predominant monthly household income was up to two minimum wages (66%) and only 74.5% had sanitary sewage. The mean age at diagnosis was 10 years (SD 0.01) and 40.4% of the participants reported already had some complication due to diabetes. Few participants (21%) still used human insulin, but almost all of them (96%) rotated the fields of insulin application. The mean capillary glycemia was 178 mg/dL (SD 85.25), the median fasting was 164 mg/dL (67–454) and the median of HbA1c was 8.5% (4.1–18). Overweight was

prevalent in 19% of participants and cardiovascular risk, measured by waist circumference, in 22%. Most of the participants (83%) presented inadequate or borderline health and nutrition literacy. The characteristics of gender, schooling and income were not associated to literacy in health and nutrition, as well as to variables anthropometric. Health literacy influenced the worst glycemic control evaluated by fasting glycemia.

**Conclusion:** The study participants presented inadequate literacy in health and nutrition, and the low health literacy influenced on the weak glycemic control.

**Keywords:** Diabetes Mellitus, Nutritional Status, Treatment Adherence, Health Literacy Ethics Approval The project is approved by the Ethics and Research Committee (CEP/CONEP) under the number CAAE: 62108616.1.3001.5078. Consent to publish Informed consent to publish has been obtained from all the participants of the study.

**A189 Health literacy and stress related to diabetes as impacting factors in adherence to treatment and glycemic control of type 1 diabetic patients**

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**Background:** The treatment of type 1 diabetes mellitus (T1DM) is complex and includes insulin injections, dose adjustments, glycemic monitoring, carbohydrate counting and physical activity. The management of these competences is essential for adherence and glycemic control. Health literacy assesses the reading and understanding of health information and decisionmaking. Diabetes-related stress (DD) can cause burnout and negatively impact selfcare. Both literacy and DD affect adherence to treatment.

**Objective:** To evaluate the levels of health literacy and DD in T1DM patients and the impact on adherence to treatment and glycemic control.

**Methods:** We studied 90 patients with T1DM, 18 years of age and over, both sexes. Questionnaires: standard for clinical, laboratorial and sociodemographic data; Test of Functional Healthy Literacy in Adults-STOFHLA for literacy; Brief Medication Questionnaire-BMQ for adherence and Problem Area in Diabetes-B-PAID for DD. The patients participated in the research after signing the consent form approved by CEP-UNICAMP.

**Results:** 90 diabetics patients type 1, 68.8% women, age 33.9 year ± 11.4; glycosylated hemoglobin (HbA1C) 9% ± 2.1, T1DM time 19.2 year ± 9.3. 86.6% presented adequate literacy, 6.6% marginal and 6.6% inappropriate. The average score of PAID was 42.1 ± 25.2 and 53% of scores were ≥40 (high stress). BMQ: adherence/likely adherence in 52.2% e non-adherence/likely low adherence in 47.7%. Statistically significant factors in univariate regression-related adherence were: PAID (p = 0.04 OR = 1.02) and arterial hypertension (p = 0.04 OR = 2.66 for presence). When we analyzed the domain regimen of the BMQ for non-adherence by univariate regression, we obtained: age p = 0.009 OR = 1.05 for older age, marital status p = 0.020 OR = 4.22 for married, arterial hypertension p = 0.004 OR = 4.16 for presence, dyslipidemia p = 0.010 OR = 3.50 for presence, occupation p = 0.004 OR = 5.08 for non-occupancy. The multivariate regression, Stepwise selection criterion, showed that variables related to non-adherence were: marital status p = 0.005 OR = 5.05 for married, arterial hypertension p = 0.005 OR = 6.86 for presence, retinopathy p = 0.042 OR = 4.08 for absence, occupation p = 0.005 OR = 6.72 for nonoccupancy. HbA1C was not associated with literacy, adherence and DD.

**Conclusion:** Health literacy is adequate in most T1DM and more than half of them have high DD. High scores of PAID, dyslipidemia, arterial hypertension, marital status, non-retinopathy and non-occupancy were associated with non-adherence, all of which except PAID were independent risk factors for worsening adherence to T1DM treatment.

**Keywords:** T1DM, health literacy, diabetes distress, adherence to treatment.

**A190**

**Hemichorea-hemiballism in hyperglycemic non-ketotic state: case report**

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**Case presentation:** Woman, 60 years old, diagnosed at 59 years old with type 2 diabetes (T2DM), high blood pressure and dyslipidemia. Was using pre-mixed insulin 25/75 (0.67 U/Kg) without the proper control and reported that she had been experiencing tremor-like involuntary movements on the left side of her body for the past week. At the exam, showed choreiform movements on the left side of her body, facial dyskinesia and faster blinking on the left, no other neurological deficits. Laboratorial exams revealed a HbA1c level of 16.7% and fasting blood glucose (FBG) 384 mg/dL, no other changes. Was hospitalized, and latter exams showed HbA1c 12%, FBG 122 md/dL, urine tests showed no ketones, no other changes. Cranial resonance showed T1-hypersignal in correspondence with right side putamen nucleus, suggesting neurotoxicity by non-ketotic hyperglycemia. During treatment, there was remission in the neurological state after glycemic control and the introduction of haloperidol and baclofen. After release, the patient remained asymptomatic, using regular and NPH insulins (0.56U/Kg) and metformin (1000 mg/day), without haloperidol and baclofen, and the last results showed a HbA1c level of 5.8%.

**Discussion:** The occurrence of hemichorea-hemiballism is characterized by involuntary movements on one side of the body and is usually the product of structural lesions in the contralateral subthalamic nucleus and striatum, side effects of vascular events and, less often, associated to metabolic, neoplastic or infectious causes. The neurological findings presented related to non-ketotic hyperglycemia and the involvement of basal nuclei configure a rare T2DM complication. The hypothesis is that hyperglycemia followed by cerebral hypoperfusion and the emergence of anaerobic metabolism reduces the GABA levels, which results in dysfunction of the basal ganglia. The case shows an unusual manifestation of T2DM, reinforcing the importance of early recognition and treatment of the syndrome. The prognosis is good and the adequate glycemic control is the basis of the treatment, it is often times enough to solve the symptoms. However, the treatment through the use of neuroleptics, benzodiazepines or antiepileptics might be necessary.

**Conclusion:** This is a case of non-ketotic hemichorea-hemiballism in a patient with poorly controlled T2DM, showing a complete recovery of its signals and symptoms after the normalization of glycemic levels. Informed consent to publish had been obtained from the patient.

**A191**

**Heterologous adipose derived mesenchymal stem cells and vitamin D supplementation in patients with recent-onset type 1 diabetes mellitus: effects on glycemic variability**

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**Introduction:** Glycemic variability (GV) correlates directly with the microvascular complications of type 1 diabetes (T1D). The continuous glucose monitoring system (CGM) demonstrates efficacy in improving glycated hemoglobin and reducing hypoglycemia in patients with T1D.

**Objective:** To evaluate the safety and efficacy of infusion of heterologous adipose tissue-derived mesenchymal stem cells (ADMSCs) of

healthy donors + daily cholecalciferol (VIT D) in patients with recent-onset T1D, and the effects on glycemic variability indexes.

**Methods:** 1. ADMSCs extraction • This is a prospective, randomized, open trial, in which patients with T1D of short duration were randomized to receive heterologous MSCs derived from adipose tissue in a single infusion plus daily oral cholecalciferol (2.000UI). • Adipose tissue samples were obtained from liposuction and processed and cultivated in culture medium chemically defined for MSCs. 2. Patients selection • Patients with T1D were included, between 15 and 35 years and GAD antibody (+). • All patients were diagnosed with T1D 4 months or less at the time of MSCs infusion. • Exclusion criteria: Diabetic ketoacidosis, drugs that interfere in immune response, pregnancy, malignant neoplasms, HIV (+), Hepatitis B or C. 3. ADMSCs infusion • The ADMSCs were infused in a single dose in peripheral vein (kg x 106). 4. Daily oral cholecalciferol supplementation (2.000UI) 5. Continuous glucose monitoring (CGM) • Data analysis of 72 h CGM (Ipro Medtronic) was performed in 6 T1D patients, assessed at baseline (T0), and 3(T3) months after the ADMSCs infusion. All patients received standardized dietary guidance according to the American Diabetes Association. • Descriptive analysis were made and the following GV indexes were calculated: mean, standard deviation (SD), J-Index, M-value, glycemic risk assessment in diabetes equation (GRADE), high blood glucose index (HBGI), low blood glucose index (LBGI), mean amplitude of glucose excursions (MAGE). Mann-Whitney test were used to compare results at baseline and after follow-up with statistic significance of p < 0.05. Specific formula were used to calculate the GV indexes.

**Results:** Six patients received ADMSCs infusion and completed 3 months follow-up. Table 1 describes the patients baseline characteristics. The mean blood glucose detected in CGM was 5534 mmol/L (T0), and 5848 mmol/L (T3) (p 0.602). There was a significant reduction in SD of glycemias 3 months after the infusion (TO = 1.929, T3 = 0.934, p 0.037). For the other GV indexes no significant difference was found between groups. All patients presented an excellent glycemic control, with the following frequency: hypoglycemia (TO 2%, T3 0.7%), hyperglycemia (TO 12.2%, T3 8.3%), and normoglycemia (TO 85.8%, T3 91%).

**Discussion:** In patients with T1D, infusion of heterologous ADMSCs + oral VIT D improved blood glucose SD, suggesting that this intervention has some impact on β cell function. Although the intervention did not result in any improvement in the other GV indexes, all patients presented excellent glycemic control. It is still necessary a control group without intervention and a longer follow up of these patients to better define the effect of ADMSCs infusion in pancreatic function (Fig. 1, 2, 3).

Table 1 - Distribution of the patients evaluated in this study according to gender, age, smoking / alcoholism, retinopathy, nephropathy, neuropathy, any of microvascular complications, systemic arterial hypertension (SAH), dyslipidemia, stroke, glycated hemoglobin, time of illness.

Variable	% (n)
<b>Gender</b>	
Male	36.0 (36)
Female	64.0 (64)
<b>Age</b>	
Up to 40	4.0 (4)
41 to 50	15.0 (15)
51 to 60	24.0 (24)
61 to 70	37.0 (37)
More than 70	20.0 (20)
<b>Smoking / Alcoholism</b>	31.0 (31)
<b>Retinopathy</b>	23.0 (23)
<b>Nephropathy</b>	45.0 (45)
<b>Neuropathy</b>	18.0 (18)
<b>Any of microvascular complications</b>	59.0 (59)
<b>SAH</b>	83.0 (83)
<b>Dyslipidemia</b>	50.0 (50)

Fig. 1 See text for description

**Table 1. Patients Characteristics**

Characteristics	
Gender	3 male x 3 female
Age	15-35 yr (mean 27 yr)
Ethnicity	4 white x 2 non white
T1D duration	Mean 2 months

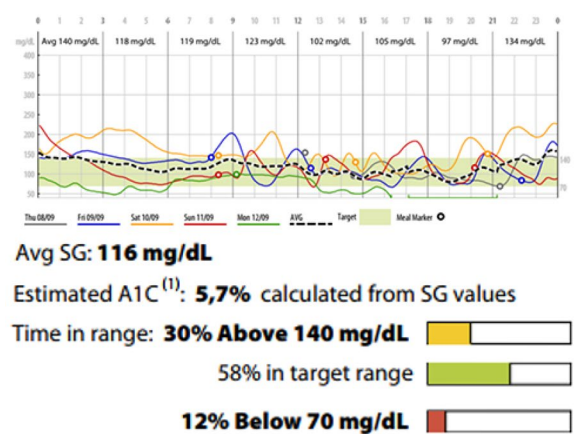
**Table 2 . GV Indexes**

Glycemic variability index	Baseline (T0)	3 months after intervention (T3)	p-value
Mean (mmol/L)	5,534	5,848	0,602
SD	1,929	0,934	0,037
J-Index	19,579	15,648	0,327
M-value	6,136	44,520	0,217
GRADE	1,567	3,083	0,516
HGBI	2,126	0,777	0,234
LBGI	12,217	8,381	0,937
MAGE	1,567	0,429	0,258

4. Continuous glucose monitoring (CGM)

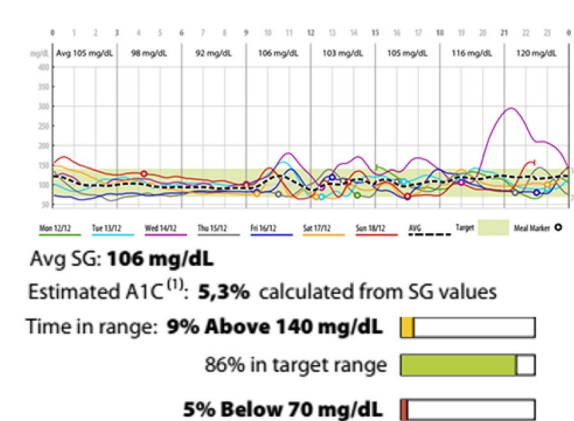
**Figure 1. Patient example 1**

**A. CGM in T0**



**Fig. 2** See text for description

**B. CGM IN T3**



**Fig. 3** See text for description

**A192 Heterologous adipose derived mesenchymal stem cells and vitamin D supplementation in patients with recent-onset type 1 diabetes mellitus: preliminary results**

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**Objective:** To evaluate the safety and efficacy of infusion of heterologous adipose tissue-derived mesenchymal stem cells (ADMSCs) of healthy donors + daily cholecalciferol (VIT D) in patients with recent-onset T1D.

**Methods:** In this prospective open trial, patients with recent-onset T1D received a single infusion of heterologous ADMSCs (Kg body weight x 106 cells) + daily oral VIT D (2.000UI). Adipose tissue samples were obtained from liposuction, processed and cultivated in medium chemically defined for ADMSCs. Patients with T1D for < 4 months, age between 16 and 35 years old and GAD antibody (+) were included. HbA1c, basal and stimulated C-peptide (CP) after a mixed meal, insulin dose, adverse events and Foxp3 expression in CD4 + cells were assessed at baseline (T0), after 1(T1) and 3 months (T3). T tests were used to compare results at baseline and after follow-up. The study was approved by the Ethics Board Federal University of Rio de Janeiro/HUCFF.

**Results:** Six patients received infusion of ADMSCs. Their mean age was 27 ± 7.7 y/o and 3 were males. VIT D levels were 30.4 ± 12.8 ng/ml, e 38.3 ± 6.9 ng/ml e 47.9 ± 8.5 ng/ml. Basal CP basal was 0.8 ± 0.4 ng/dl, CP T1 = 0.9 ± 0.5 ng/dl and CP T3 = 0.7 ± 0.3 ng/dl (p = 0.51). CP peak after stimuli was: T0 = 2.9 ± 1.3 ng/dl, T1 = 3.2 ± 1.9 and T3 = 2.6 ± 1.5 ng/dl (p = 0.51). HbA1c before intervention, T1 and T3 were, respectively, 7.8 ± 1.26%, 6.6 ± 0.85% e 6.1 ± 0.42 (p = 0.06). Mean insulin dose (T0) was 0.32 ± 0.29U/kg initially, after 1 and 3 months was 0.28 ± 0.22U/kg and 0.25 ± 0.17 U/kg, respectively. There was an inverse correlation between peak CP and HbA1c on T3 (p0,03, r = -0.84). FoxP3 expression in CD4(+) T cells were 1.46 ± 1.47% on T0, 2.27 ± 3.36% on T1 and 3.31 ± 3.29 on T3, p = 0.89. Immediate adverse events were: transient headache (n = 6), mild local reactions (n = 6), tachycardia (n = 4), abdominal cramps (n = 1). Within the first week, 4 patients developed local thrombophlebitis and 2 had visual scotomas.

**Conclusion:** In patients with T1D, infusion of heterologous ADMSCs + oral VIT D is feasible and appears to be safe. Although the intervention did not result in any improvement in CP, insulin dose or Hb1c after three months, patients presented excellent glycemic control, preserved β cell function and low insulin requirements after the intervention. A prospective follow up will determine the ADMSCs effect on the pancreatic function.

**A193 High doses of insulin in children with congenital generalized lipodistrophy (CGL) and serious insulin resistance**

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**Case:** Child, 4 years old, female, with clinical diagnosis of CGL type 2 and diagnosis of diabetes for 1 year. At 4 years of age, using Glargina and Lispro insulin basal/bolus (5.1 IU/kg/day) presented mean daily capillary glycemia above 600 mg/dl, associated with irritability, low weight and voracious appetite. Interned for intravenous insulin therapy and nutritional adjustment with standardized diet of 1600 kcal/day fractionated in 7 meals. Initiated continuous infusion of regular insulin (RI), 6.1UI/kg/day. Progressive dose adjustments were made, mean increase of 1UI/kg/day, to 26.6 IU/kg/day, were divided into 3 different basal (6 h at 12 h 1.18 IU/kg/h, 12 h at midnight 1.28 IU/kg/h and 1.01 IU/kg/h from midnight to 6 h), reaching a mean capillary



glycemia of  $283 \pm 99$  mg/dl. Subsequently, it was modified to intramuscular administration, in 5 application times, without differences in glycemic averages. On the 36 th day, Degludeca insulin was introduced (9.3 IU/kg/day) associated with RI ( $18.2$  U/kg/day), evolving within the first 24 h with improved glycemia ( $180 \pm 42$  mg/dl). After this period, the blood glucose level was  $232.6 \pm 74.7$  mg/dl and the bolus was increased to  $23.7$  U/kg/day, maintaining a blood glucose level of  $260 \pm 79$  mg/dl. After approximately fivefold increase in the initial insulin dose, there was improvement in glycemia, irritability, weight gain and decreased appetite.

**Discussion:** CGL is characterized by loss of body fat and its deposition in atypical sites, predisposing to the development of insulin resistance (IR) and its complications such as DM, hypertriglyceridemia and hepatic steatosis. In CGL, IR is more severe, using high doses of insulin that often do not guarantee adequate control. It is possible that the scarcity of subcutaneous(SC) tissue makes it difficult for the insulins action that need this substrate to metabolize. Degludeca, because in its mechanism of action the formation of complex multihexamers with slow and continuous release of monomers in the blood circulation and its distribution in the circulation due to high affinity with serum albumin could be a treatment option for patients with lipodystrophy, providing better therapeutic response.

**Final comments:** Reported child with LGG and severe RI who presented clinical improvement with the use of very high doses of insulin. Due to the significant reduction of SC tissue, insulins with an independent mechanism of release of this tissue seem to be an option in the therapy in these patients.

Informed consent to publish had been obtained from the patient.

#### A194

##### High prevalence of comorbidities and complications related to diabetes in patients linked to a care line

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**Introduction:** The Diabetes Care Line (DCL) is a specialized interdisciplinary service that treats patients with comorbidities and some degree of diabetes mellitus (DM) decompensation and/or chronic complications, articulating resources and practices guided by clinical guidelines.

**Objective:** To describe clinical and sociodemographic's profile in referred patients to a DCL in Fortaleza-CE, Brasil.

**Method:** Descriptive, quantitative study, conducted from March to July 2017, through the analysis of medical records. The study was approved by the Institution's Ethics and Research Committee No. 1.956.803 e CAAE: 64549817.0.0000.5045.

**Results:** The sample consisted of 66 patients, with a mean age of  $64.0 \pm 9.7$  years, 54.5% (36) of the female sex. 53.1% (35) were married, 21.2% (14) single and 18.2% (12) widowers (Table 1). As for schooling, 25.8% (17) had incomplete elementary education, 19.7% (13) complete elementary education, 18.2% (12) complete secondary education and 16.7% (11) were literate. type 2 DM, 92.4% (61), 4.5% (3) with type 1 DM and 3.1% (2) with maturity onset diabetes of the young (MODY) based on clinical history. The time of diagnosis of DM was  $14.5 \pm 7.6$  years. Dyslipidemia was present in 92.4% (61), systemic arterial hypertension in 84.4% (56), cardiovascular disease in 56.1% (37) and obesity in 42.4% (28). Regarding complications, diabetes renal disease was present in 31.8% (21), peripheral neuropathy in 54.5% (36), diabetic retinopathy in 28.7% (19) and diabetic foot in 13.6% (9).

**Conclusion:** There was a high prevalence of comorbidities and complications related to DM in the population referred to the DCL. These data may suggest the need for prior referrals from non-specialized services, with a view to better control of the disease and comorbidities, as well as prevention or delay of complications (Fig. 1).

	n	%
<b>SEX</b>		
Female	36	54,5
Male	30	45,4
<b>MARITAL STATUS</b>		
Married	35	53,1
Single	14	21,2
Widowed	12	18,2
Stable union	3	4,5
Divorced	1	1,5
No informations	1	1,5
<b>SCHOOLING</b>		
Incomplete elementar school	17	25,8
Complete primary education	13	19,7
Full High Scholl	12	18,2
Literate	11	16,7
Incomplete high school	5	7,6
Non-literate	4	6,0
No informations	3	4,5
Complete higher education	1	1,5
<b>PROFESSION</b>		
Retired	31	47,0
Housewife	12	18,2
Worker	9	13,6
Unemployer	6	9,1
Self-employed liberal professional	5	7,6
Penioner	2	3,0
Housekeeper	1	1,5

**Fig. 1** See text for description

#### A195

##### High prevalence of psychiatric disorders and association with increased frequency of acute and chronic complications in patients with type 1 diabetes mellitus: cross-sectional evaluation in the south of Brazil

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A195**

**Introduction:** Psychiatric disorders in patients with type 1 diabetes may interfere with the quality of care and increase the risk of acute and chronic complications.

**Aim:** To establish the prevalence of psychiatric disorders and drug abuse in a population of patients diagnosed with type 1 diabetes mellitus regularly followed in a specialized public health center of the south of Brazil.

**Methods:** Cross-sectional, retrospective study. We reviewed clinical and laboratory variables from patients' medical records, and we applied a questionnaire to evaluate drug use and anxiety disorder and PHQ-2 and PHQ-9 questionnaires for the diagnosis of depression.

Patients older than ten years with, at least, one medical appointment in the last year were included. All patients signed an informed consent form. The study was approved by the Ethics Committee of our institution.

**Results:** Fifty-four patients with a mean age of 26 years, 52% men, with a median diabetes duration of 9 years, were evaluated. Of these, 5 (9.3%) smoked, 14 (25.9%) drank alcohol, 2 (3.7%) used illicit drugs, 28 (51.9%) had at least one psychiatric illness, 26 (48.1%) had anxiety and 12 (22.2%) a diagnosis of depression. The prevalence of diabetic nephropathy (60% vs 12.5%,  $p = 0.002$ ), macrovascular disease (25% vs 4.7%,  $p = 0.033$ ), peripheral neuropathy (50% vs 4.7%,  $p < 0.001$ ) and diabetic retinopathy (41.6% vs 4.7%,  $p = 0.001$ ) were higher in patients with depression when compared to patients without the disease. Regarding acute complications, there was no difference in diabetic ketoacidosis episodes ( $p = 0.661$ ) between groups. However, 66.6% of the patients with depression had severe hypoglycemia in comparison to 19% of the control group ( $p = 0.001$ ). When evaluating patients with anxiety, there was no statistical significance between the groups for acute and chronic complications.

**Conclusion:** The prevalence of psychiatric disorders and drug abuse was extremely high in patients with type 1 diabetes mellitus. Depression was associated with an increase in acute events and chronic complications related to diabetes.

#### A196

##### High prevalence of type 2 diabetes mellitus in familial hypercholesterolemia among participants of hipercol Ceará program

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**Background:** Familial hypercholesterolemia (FH) is a genetic disease characterized by severely elevated LDL cholesterol (LDL-C) levels that lead to an increased risk factor for cardiovascular disease at an early age. Type 2 Diabetes Mellitus (T2DM) is an additional cardiovascular risk which can also occur in FH patients. International studies described the prevalence of T2DM less than 10% among FH patients. But in Brazil, few studies reported the prevalence of T2DM among FH. The objective of this study was to describe the prevalence of T2DM among FH participants from a genetic screening program for FH.

**Method:** A cross-sectional study of patients evaluated in "Active Genetic Screening Program for Familial Hypercholesterolemia in Ceará" - HIPERCOL CEARÁ in a referral medical service in Ceará-Brazil from 2013 to 2017. The screened subjects had a LDL-cholesterol levels above 210 mg/d. A molecular study was also performed for gene mutation analysis (LDL receptor, ApoB protein and inhibitor protein PSK9). The first-degree relatives (FDR) of genetic confirmed cases were also evaluated.

**Results:** Among the 122 participants evaluated, 19.7% (24/122) was previously diagnosed for T2DM. Of these the mean age was 57.8 ( $\pm 12.4$ ) and 83.3% was female. The genetic study was positive in 27.9% (34) of the patients. All of them presented LDL receptor gene mutation in this subgroup, the T2DM prevalence was 20.8%. Of these, 87.5% were the index cases.

**Conclusion:** It was observed a high prevalence of T2DM in patients with clinical diagnosis of FH, specially the index cases. Other studies are needed, but these data may suggest the need for early detection of T2DM among FH patients. Ethics Approval This study was performed according Good Clinical Practices Guidelines. The HIPERCOL program has ethical approval (3757/12/013) and all patients given an informed consent form.

#### A197

##### High-sensitivity c-reactive protein as main biomarker of cardiometabolic risk in obese children and adolescents

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**Background:** Childhood obesity is already considered a worldwide public health problem and its etiopathogeny is based on a low-grade chronic inflammatory process induced by cellular hypoxia and release of cytokines with hepatic C-reactive protein production [1].

**Objective:** To establish the importance of high-sensitivity C-reactive protein (HSCRP) as main biomarker of cardiometabolic risk in obese children and adolescents.

**Materials and methods:** Study involving a case group (CG) with 235 children and adolescents (128 girls and 107 boys) with a body mass index (BMI) above the 97th percentile and a Z-score greater than + 3, mean age of  $10.0 \pm 2.5$  years. The control group consisted of 107 (GC) nonobese children (55 girls and 52 boys), mean age of  $10.0 \pm 2.3$  years. The HSCRP, fasting glucose, total cholesterol and fractions (HDL-c, LDL-c), triglycerides and homocysteine were evaluated.

**Results:** The HSCRP showed a mean value of  $2.36 \pm 1.28$  mg/dl (0.7–9.1- IC: 0.7–9.1-95%) in the GC, and  $0.01 \pm 0, 1$  mg/dl (0.01–0.1- IC: 0.01–0.1-95%) in the GCc. In the GC group, the HSCRP levels were higher in boys. The BMI and waist circumference were elevated in CG in relation to GCc ( $P = 0.0001$ ). The changes in fasting blood glucose levels ( $P = 0.05$ ), total cholesterol ( $P = 0.001$ ), LDL ( $P = 0.001$ ), HDL ( $P = 0.0001$ ) and triglycerides ( $P = 0.0001$ ) were statistically in the CG. Homocysteine did not show statistically significant changes in GC.

**Conclusion:** The HSCRP can be validated as the main biomarker of cardiometabolic risk in obese children and adolescents.

#### A198

##### Hiperglycemia secondary to glucagonoma: a case report

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**Introduction:** Glucagonoma is a pancreatic neuroendocrine tumor derived from alpha-cells of the islets of Langerhans. It is marked by tumoral autonomous production of glucagon, resulting in hyperglycemia and necrolytic migratory erythema (ENM), erythematous circinate lesion with areas of necrosis and sloughing. The incidence is 0.01–0.1 new cases per 100,000 people.

**Case report:** ISS, female, 39 years old, hospitalized in 2015 for investigation of cholestatic syndrome associated with pancreatic mass of 51x48 mm evidenced on abdominal tomography (15/05/03). The patient underwent corpocaudal pancreatectomy and total splenectomy, with free surgical margins, but with angiolymphatic invasion. Anatomopathology showed well differentiated pancreatic endocrine carcinoma. The patient received chemotherapy with gemcitabine which was replaced by Folfirinnox. However, after 1 year without medical follow-up, she returned presenting weight loss, cutaneous disseminated lesions in the upper and lower limbs (Fig. 1), trunk and genitalia, angular cheilitis, macroglossia, deep venous thrombosis of the lower limbs and glycemia above 400 mg/dl. Figure 1: Cutaneous disseminated lesions It was used several antimicrobial regimens to treat skin lesions, unsuccessful, and performed biopsies of the skin, that diagnosis psoriasiform spongius dermatitis. The case was referred to the endocrinology department and we did the diagnosis of glucagonoma, based on the symptoms and skin lesions, confirmed by pancreatic glucagon levels of 722 pg/ml (reference value < 208 pg/ml). During monitoring, the patient presented a sudden decrease in the level of consciousness, initially associated with hypoglycemia (52 mg/dl), sodium of 117 mEq/l and potassium of 7.4 mEq/l, without

improvement with endovenous correction. We considered diagnosis hypothesis of adrenal insufficiency and after offered hydrocortisone, it was observed improvement in her condition in 24 h. The skin lesions were treated with zinc vitamin supplement and Octreotide, that was effective in reducing the number and extent of lesions, as well as reducing insulin doses. The patient is currently undergoing outpatient follow-up maintaining the use of zinc, prednisone, Octreotide and insulin with adequate glycemic control.

**Conclusion:** The necrolytic migratory erythema associated with hyperglycemia is important for the clinical recognition of glucagonoma, and its early diagnosis is essential for a successful curative therapy. Informed consent to publish had been obtained from the patient (Fig. 1).



**Fig. 1** See text for description

**A199**  
**How to extend and evaluate self-care behavior in the patient with type 1 diabetes mellitus**

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Type 1 diabetes mellitus (DM1) is a chronic disease that needs specific knowledge and skills for self-care. Brazil's health system provides insulin analogues for better posology and adaptation. According to the 11.347 (2006) law, the right for supplies must be coupled with diabetes education. The absence of this important element is probably one reason for unsatisfactory glycemic controls. In this project, we created an educational method using a motivational approach with groups, aiming to improve DM1 selfmanagement. The motivational approach differentiates itself by helping the patient to understand his/her ambivalence and to define his/her own goal, as well as creating motivation for a lifestyle change based on the interest of health and the patient's own values. It has a practical focus, using the techniques of problem solving, goal setting and exploration of the patient's personal reasons for making a change, and a non-confrontational style of questioning. The team had previous training in the technique of motivational interview as to apply this approach in four group sessions once a month. These sessions consisted of providing general knowledge and information about diabetes and its self-care in a participatory and dynamic manner, with an exchange of experiences among the participants. For the approach to be motivational, some guiding principles are essential: empathy, open-ended questions, reflective listening, working with patients' ambivalence and resistance, as well as the construction of intrinsic motivation and confidence towards change. Activities such as the identification of personal values, the definition of action-oriented plans, the evaluation of the success and difficulty of each plan, the setting of goals and the metric of importance and confidence help delineate this method. It is possible to evaluate the impact of an educational activity using this approach by applying the Diabetes Self-Management Profile (DSMP) before and after the activities. The DSMP is a new and specific instrument for evaluating DM1 patients' self-care, with psychometric properties validated in the Portuguese language. Compared to other questionnaires it has less bias

in its application, due to the introduction that "normalizes" non-adherence. To test this methodology, we recruited DM1 patients from Cruz Vermelha Hospital's endocrinology clinic. We did not obtain enough sample for statistical significance, however we had positive returns from participants and positive individual results (Fig. 1).

**Keywords:** group education, motivational principles, Diabetes Self-Management Profile.

**MEU PLANO DE AÇÃO**

NOME: \_\_\_\_\_ SESSÃO FINAL \_\_\_\_\_

O QUE EU PODERIA MUDAR ATÉ A PRÓXIMA SESSÃO?

\_\_\_\_\_

QUAIS VANTAGENS TERIA EM MUDAR?

\_\_\_\_\_

QUAIS DESVANTAGENS?

\_\_\_\_\_

O QUANTO SERIA IMPORTANTE PARA MIM MUDAR?

MUITO IMPORTANTE                       IMPORTANTE  
 POUCO IMPORTANTE                       NÃO É IMPORTANTE

COMO COLOCARIA EM PRÁTICA ESSA MUDANÇA?

\_\_\_\_\_

QUANDO?

\_\_\_\_\_

QUANTAS VEZES?

\_\_\_\_\_

ONDE?

\_\_\_\_\_

QUAIS AS DIFICULDADES PODERIA TER?

\_\_\_\_\_

COMO RESOLVERIA ESSAS DIFICULDADES?

\_\_\_\_\_

O QUANTO CONFIO EM QUE PODERIA CONSEGUIR FAZER DIFERENTE?

VOU CONSEGUIR                       EU VOU TENTAR CONSEGUIR  
 EU GOSTARIA DE CONSEGUIR                       NÃO VOU CONSEGUIR

**Fig. 1** See text for description

**A200**  
**Hyperosmolar hyperglycemic state during pregnancy**

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**Case report:** A 28 year-old patient, first pregnancy, a gestational age of 38 weeks, asymptomatic, was hospitalized with a dead fetus. She had no regular prenatal follow-up. Her capillary blood glucose reported = 116 mg/dL (2nd trimester), she did not have treatment for diabetes mellitus (DM). She had no other comorbidities but a positive family history for type 2 DM and a pre-gestational BMI = 31; with a presence of acanthosis nigricans. She was labor induced (LI), but she did not undergo any blood glucose measurement at the time of admission. After 48 h, the patient was taken to the surgical center for cesarean section, with a history of prolonged labor, maternal "exhaustion" and lowering of the level of consciousness, as well as hypotension and dehydration. She was Hydrated and submitted to anesthetic induction but then she developed with cardiorespiratory arrest (CRA) - electrical activity without pulse. Laboratory tests showed: blood glucose = 927 mg/dL, acute renal failure (ARF)—CrCl < 15 mL/min, pH

6.96 (HCO<sub>3</sub> = 13.3), plasma osmolarity = 339.5 mOsm/L. Ketonuria and ketonemia was not measured. Venous insulinization and hydration was initiated, with improved of glycemia and acidosis. However, the patient progressed with severe sepsis and multiple organ dysfunction, and she died after 4 days of hospitalization. Discussion: There are few reports on Hyperosmolar Hyperglycemic State (HHS) in pregnancy. HHS is a severe complication (mortality: 15–60%), often associated with previous type 2 DM, especially in undiagnosed cases. Due to the increase prevalence of pregnant women with DM 2, it is a situation that may become more frequent, and it deserves the attention of professionals dealing with pregnant women. Precipitating causes previously documented in the literature are numerous: infection, discontinuation of insulin treatment, and hyperglycemic medications. The best way to prevent is with a properly diagnose and treatment, as well as increase the diabetes educational programs.

**Comments:** In spite of this case did not match, clearly, criteria for HHS (pH and HCO<sub>3</sub> values), the probability of complications is high. In addition, the severe ARF associated, certainly contributed to worsen the acidosis parameters. The message is clear: pregnant, diabetic prior, should be carefully evaluated in regard to prenatal and in-hospital care, especially in the case of an inadequate treatment and severe interferences such as infections and abortions (Figs 1, 2). Informed consent to publish had been obtained from the patient.

EXAMES	17/04	19/04 (06:30)	19/04	20/04	20/04 (18:06h)
Hb	10,8	10,8	8,3	8,5	8,0
Hto	31,7%	32,2%	24,8%	25,3%	22,9%
Leuco	12500	8900	6200	19700 (13%)	22200 (13%)
Plaq	227mil	174mil	113mil	74mil	57mil
Tipo Sg / Fator Rh	A +				
VDRDL	NEG				
HIV	NEG				
PCR		293	247,8		
Acido Urico			10,2		
Glicose	?		927		
Ureia			60	68	89
Creatinina			5,13		4,13
INR			1,24		1,81

Figure 2.

	19/04	20/04
Na	139	145
K	2,9	4,8
Ca	6,6	
P	9,1	
LDH	568	
TGO	220	
TGP	34	
GGT	29	
Alb	1,2	
T4 livre	1,19	
PTT		2,91
EAS		20 piócticos
		Bact mod.; nitrito neg, Corpos Cetónicos neg

Fig. 1 See text for description

Gasometrias seriadas

	19/04 (18:40h)	19/04 (21:52h)	20/04 (08:09h)	20/04 (18:31h)	20/04 (20:25h)	20/04 (20:46h)
pH	6,96	7,33	7,44	7,40	7,29	7,24
pO2	122	111 (P/F: 246)	141 (P/F: 352)	141	80 (P/F: 266)	44
pCO2	59	52	48	41	40	43
HCO3	13,3	27,4	32,6	25,4	19,2	18,4
SatO2	96%	98%	99%	99%	94%	70%
BE	-17,6	1,0	7,6	0,5	-7,0	-8,3
Lactato	14,8	9,8	5,7	6,5	10,4	10,5

Figure 4.

CULTURAS

	20/04
Urinocultura	Negativa
Hemoculturas	?

Histopatológico

Placenta compatível com terceiro trimestre

Fig. 2 See text for description

A201

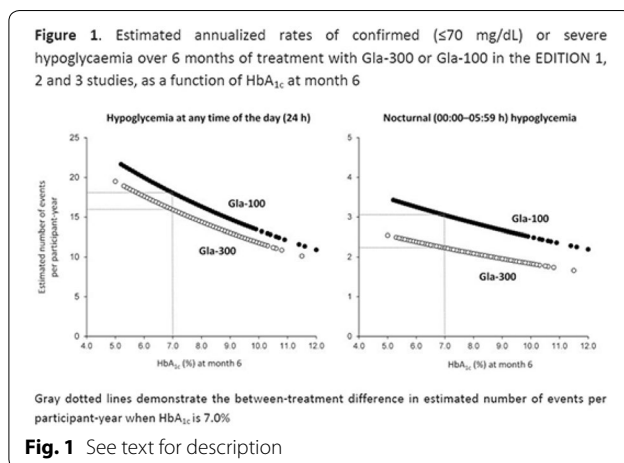
Hypoglycemia as a function of HbA1c in type 2 diabetes (T2DM): insulin glargine 300 u/ml in a patient-level meta-analysis of edition 1, 2, and 3

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Basal insulin therapy can be a compromise between achieving glycemic targets and avoiding hypoglycemia, dependent on how intensively insulin is titrated. In the phase 3a EDITION 1, 2 and 3 studies, insulin glargine 300 U/mL (Gla-300) provided equivalent glycemic control to insulin glargine 100 U/mL (Gla-100) with less hypoglycemia in people with T2DM. The objective of the current analysis was to evaluate rates of confirmed ( $\leq 70$  mg/dL) or severe hypoglycemia over 6 months of treatment with Gla-300 or Gla-100 in these EDITION studies, as a function of HbA1c. Meta-analysis was performed on patient-level data, and annualized hypoglycemia rate as a function of HbA1c at month 6 was fitted using a negative binomial regression model. Adding a treatment-by-HbA1c interaction term to the model did not significantly improve the goodness of fit (interaction p-value 0.937 and 0.829 for anytime [24 h] and nocturnal [00:00-05:59 h] hypoglycemia, respectively). Therefore the model without interaction describes the data accurately: people treated with Gla-300 experienced a consistently lower rate of confirmed ( $\leq 70$  mg/dL) or severe hypoglycemia vs. those treated with Gla-100, regardless of HbA1c at month 6 (Figure). In conclusion, these results suggest that treatment with Gla-300 vs. Gla-100 could allow people with T2DM to achieve equivalent glycemic control with less hypoglycaemia. Study codes: NCT01499082, NCT01499095 and NCT01676220. This is an ENCORE abstract previously presented at ADA2016. Funding and editorial support provided by Sanofi. (Fig. 1)



## A202

### Hypoglycemia in non-diabetics—evaluation and conduct—experience of a tertiary service

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**Introduction:** Hypoglycemia, defined by the Whipple triad, is uncommon in non-diabetics and requires careful evaluation.

**Objective:** To analyze cases of hypoglycemia in hospitalized patients between January 2000 and June 2017 in a tertiary service.

**Method:** Retrospective descriptive study of 32 cases of hypoglycemia by reviewing medical records. The patients had previous diagnosis of hypoglycemia in the health unit. At admission, were excluded hepatic, renal and adrenal insufficiency, hypopituitarism, leukemia, and were collected blood glucose, insulin, proinsulin and peptide C. 59% of the patients performed 72 h of prolonged fasting.

**Results:** 62.5% of the patients were women; the average age was 42 years. Symptoms reported: loss of consciousness (62.5%), convulsions (43.7%), sweating (59.3%), tremors (50%), visual turbidity (40%), mental confusion, palpitations (25%) and nausea (12.5%). Improvement of symptoms with feeding in 56.2% of the cases. The median time to diagnosis was 30.7 months. 15 patients had hypoglycemia in the supervised prolonged fasting test, with a mean of 18 h for their occurrence. Laboratory hypoglycaemia was confirmed in 27 patients (84.3%), with mean blood glucose of 35.5 mg/dl and insulin of 55.6 uU/ml. The diagnoses were: 11 cases of insulinoma, 3 cases of primary hyperplasia of islets (IHP), 3 of factitious, 4 of endogenous hyperinsulinemia without insulinoma image, 2 due to inadvertent use of sulfonyleurea, 2 after bariatric surgery, 1 of reactive hypoglycemia, 1 of hypoglycemia secondary to the production of IGFII per tumor (hemangiopericytoma with metastases to the liver) (3.1%) and 1 of persistent hyperinsulinemic hypoglycemia of childhood. 2 patients lost follow-up, 2 had no confirmation of hypoglycaemia. Ten insulinoma patients and three HPI patients (1 in another service) were operated on. The insulinomas were located: 5 in the head (50%), 2 in the tail (20%), 1 in multiple sites (10%), 1 in the body (10%) and 1 still awaiting an anatomicopathological report.

**Conclusion:** Prolonged supervised fasting helped in the exclusion of factitious hypoglycemia. In cases of endogenous hyperinsulinemia, hypoglycemia was reached within a few hours of fasting. Neuroglycopenic symptoms were more prevalent than adrenergic, probably due to long-term symptoms. The literature reports a homogeneous distribution of insulinomas in the pancreatic segments, in our sample we observed a higher prevalence in the head of the pancreas.

## A203

### Hypothalamic TGF- $\beta$ 1 downregulation improves energy homeostasis in mice fed on high-fat diet

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**Background:** Obesity and its associated comorbidities are growing fast worldwide. Increased adiposity contributes to the low-grade inflammation which leads to insulin resistance and increases the risk of developing type 2 diabetes mellitus. In the hypothalamus, the inflammation leads to an impairment of the energy and glucose homeostasis. The disruption in glucose homeostasis observed in mice fed on high-fat diet (HFD) is associated, at least in part, to the excess of TGF- $\beta$ 1 levels in the hypothalamus. Increased hypothalamic TGF- $\beta$ 1 levels lead to atypical activation of NF- $\kappa$ B, boosting the inflammatory response. However, the molecular mechanisms involved in this deregulation have not yet been fully elucidated.

**Aim:** To investigate the role of hypothalamic TGF- $\beta$ 1 in response to the inflammation triggered by saturated fatty acids from the diet. **Materials and methods:** In all experiments we have used eight-week-old male mice (C57BL/6). TGF- $\beta$ 1 knocking down have been performed through a bilateral injection of a lentiviral shRNA particle (TRCN94) in the arcuate nucleus of the hypothalamus (ARC). Immediately after surgery, animals were divided into two groups (scramble and TRCN94) and began to receive HFD for two weeks. Food intake and body mass were measured throughout the study. At 14th day post-surgery, animals were sacrificed and their tissues were removed for analysis. The study was approved by Institutional Animal Care and Use Committee from State University of Campinas (CEUA 4331-1A).

**Results:** As expected, in the hypothalamus TGF- $\beta$ 1 was colocalized with glial cells. TGF- $\beta$ 1 downregulation in the ARC has prevented the body mass gain and fat mass accumulation. TRCN94 group showed lower BAT mass, was protected from HFD-induced thermogenesis impairment, and showed increased locomotor activity when compared to scramble group. No differences were observed in the food intake, in the glucose homeostasis and in the hypothalamic inflammation between groups, despite TRCN94 group have shown lower levels of fasting blood glucose.

**Conclusion:** Hypothalamic TGF- $\beta$ 1 downregulation improves energy homeostasis by increasing BAT activity and locomotor activity that results in lower body mass gain, preventing the development of obesity. Funding: FAPESP (2016/17810-3).

## A204

### Identification of HNF1B gene mutations in a brazilian sample selected by hyperglycemia and renal cysts

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**Introduction:** There are at least 14 described subtypes of MODY (maturity onset diabetes of the young). Mutations in the HNF1B gene are associated with multiorgan disease, including HNF1B-MODY (MODY5), morphological abnormalities of the kidney (mainly renal cysts) and pancreas, and low serum magnesium levels. Due to this clinical heterogeneity, there is much debate about the best criteria for HNF1B genetic screening.

**Aim:** To investigate HNF1B mutations in a sample of Brazilian patients selected by hyperglycemia and renal cysts.

**Methods:** Thirty-three unrelated subjects with clinical suspicion of HNF1B mutation defined as Diabetes Mellitus (DM)/prediabetes (as

per the ADA criteria) and renal cysts were selected. Other data were collected from medical records. Genotyping was performed by Sanger sequencing and multiplex ligation-dependent probe amplification (MLPA). Available relatives were recruited in positive cases.

**Results:** Two individuals had mutations. 1- Male, 36 yrs old, BMI 22,9 kg/m<sup>2</sup> with a HNF1B heterozygous whole gene deletion (p.Met1\_Trp557del), DM since age 13 yrs, using NPH and Regular insulin, negative GAD and IA2 antibodies, C-peptide 1,4 ng/mL, fasting glucose 231 mg/dL, HbA1c 7,1%, creatinine 1,17 mg/dL, creatinine clearance (CrCl) (CKD-EPI) 92,2 mL/min, magnesium 0,9 mg/dL (NR:1.7–2.6 mg/dL). Imaging demonstrated body and tail pancreatic agenesis, besides renal cysts. The same mutation was seen in his father, who had DM, renal cysts, and pancreatic tail agenesis, in a normoglycemic brother with renal cysts and pancreatic body/tail agenesis, and a sister with pancreatic body hypoplasia and agenesis of the pancreas tail, renal cysts, and bicornuate uterus. 2- Male, 38 years old, BMI 19,4 kg/m<sup>2</sup>, DM diagnosed at age 12 yrs, using NPH insulin since one year after the diagnosis, negative GAD and IA2 antibodies, C-peptide 0,9 ng/mL fasting glucose 165 mg/dL, HbA1c 13.2%, creatinine 1.2 mg/dL, CrCl: 76.2 mL/min, magnesium 1,0 mg/dL, renal cysts, with a previously described p.Pro328 fs (C.983del C) mutation. Patient 2 had no known familial history of DM or renal cysts, and no relatives were available for testing.

**Conclusion:** Screening for HNF1B mutations in patients with hyperglycemia and renal cysts showed a 6% positivity rate. Informed consent to publish had been obtained from the patient.

**A205**

**Identification of risk factors for diabetic foot in the first preventive examination of patients with type 1 diabetes mellitus attended in a public service of reference in Minas Gerais**

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**Background:** Diabetic foot is one of the most worrying complications in patients with diabetes, since it is the main cause of lower limb amputation. Patients with Type 1 Diabetes Mellitus (T1DM) may have a delay in the detection of risk factors for injuries due to the time elapsed to start the tracing. Identifying these factors early can contribute to the elaboration of a more appropriate educational program for this group, starting early after diagnosis or at admission to the outpatient service.

**Objective:** Identify risk factors for diabetic foot in patients with T1DM on admission to a specialized outpatient clinic for neuropathy and diabetic foot.

**Methods:** A cross-sectional study, with an analysis of 181 medical records of patients with T1DM, with five or more years of illness, attended by an interdisciplinary team between 2004 and 2014 and forwarded to the first outpatient care on neuropathy and diabetic foot of reference public service in Minas Gerais. Data related to the socio-economic, clinical profile, physical changes in the feet and prevention guidelines of the diabetic foot were analyzed. The study was approved by Institution's Ethics Board.

**Results:** Among the 181 patients referred, the following diagnoses were confirmed: retinopathy (35.4%), nephropathy (27.8%), diabetic neuropathy (17%) and neuropathic pain (20.5%), however, only 88 performed the consultation in the center of neuropathy and diabetic foot. Of these, the majority were female (51.1%), aged 38.23 ± 11.65 years, diagnosis time of 17.7 ± 9.84 years, ambulatory follow-up of 2.82 ± 1,75 years, incomplete high school (33.7%), monthly income between 1 and 2 minimum wages (69.6%) and glycated hemoglobin of 8.19 ± 1.6%. In relation to the physical alterations of the feet, the most common were plantar hyperkeratosis (66.7%), callus (33.0%), fissures (23.7%), onychomycosis (17%) and ulcers (2.4%). The use

of adequate footwear (66.3%) and good foot hygiene (92.5%) were predominant.

**Conclusion:** The study detected a failure in the educational process and in the patients orientations regarding the importance of foot evaluation, with a high percentage of non-appointment schedules and modifiable risk factors for diabetic foot, which could have been identified by foot inspection in habitual consultations and previously treated, regardless of the time of illness and the beginning of the traces, also showing that the patient did not identify such factors as risk of lesions and amputations.

**A206**

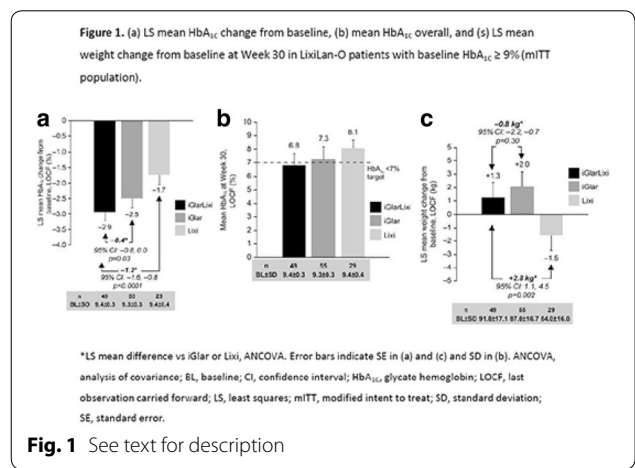
**iGlarlix fixed-ratio combination in patients with HbA1c > 9%: lixilan-O subgroup analysis**

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In patients (pts) with T2DM and HbA1c ≥ 9% (75 mmol/mol), the ADA/EASD guidelines recommend considering a dual combination of metformin + oral antidiabetics (OADs), a glucagon-like peptide-1 receptor agonist (GLP-1 RA), and/or basal insulin; NICE recommends premixed insulins. Both guidelines suggest that pts with high HbA1c may require basal ± prandial insulin replacement to expedite reaching target HbA1c. The 30-week randomized LixiLan-O trial (NCT02058147) treated pts with T2DM uncontrolled on metformin ± another OAD with iGlarLixi (insulin glargine [iGlar] + lixisenatide [Lixi] fixed-ratio combination), iGlar, or Lixi. This LixiLan-O exploratory subgroup descriptive analysis, assessed whether iGlarLixi, which improves fasting and postprandial glucose, demonstrated findings consistent with the primary trial results in pts with baseline HbA1c ≥ 9% (iGlarLixi, n = 49; iGlar, n = 55; Lixi, n = 29). iGlarLixi showed greater HbA1c reductions (− 2.9%) at Week 30 vs. iGlar (− 2.5%; least squares [LS] mean difference, − 0.4%; p = 0.03) and Lixi (− 1.7%; LS mean difference, − 1.2%; p < 0.0001); only the iGlarLixi group achieved a mean HbA1c < 7.0% (Fig. a, b). iGlarLixi also mitigated weight gain with iGlar (Fig. c). In pts with HbA1c ≥ 9%, iGlarLixi provided benefits generally consistent with the primary LixiLan-O analysis. These findings support iGlarLixi as part of stepwise intensification in pts with high HbA1c. Study code: NCT02058147(Fig. 1).



**Fig. 1** See text for description

**A207**

**Immunization against influenza: knowledge and accession of persons with diabetes of a health promotion program**

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**Introduction:** People with Diabetes Mellitus (DM) are more susceptible to complications from influenza viral infections. In the population above 60 years, these infections are more pronounced. Thus, immunization, indicated by the World Health Organization since 1963, should be an essential strategy for primary care, and it's been described as a measure of greater effectiveness in coping with the problem, preventing hospitalizations, complications and consequently reducing morbimortality. This way, the propagation of knowledge and adherence are fundamental to achieving such benefits.

**Objective:** To estimate vaccine coverage and to identify the importance of knowledge and adherence of immunization against influenza in people with DM receiving clinical assistance in the Health Promotion Program.

**Method:** Cross-sectional studies with a quantitative approach, with no qualification of semiprothetic formats, socio-demographic variables, clinical and immunization, after flu vaccination campaign in 2017. Data analyzed: no SPSS version 22.0. The study was approved by the Ethics and Research Committee (Comitê de Ética e Pesquisa) (CEP) of the Federal University of Amapá (Universidade Federal do Amapá), with Postal Code/CEP number: 38390014.4.0000.0003.

**Results:** Of the 77 active participants, 44 agreed to participate in the study, with prior signature of a Free and Informed Consent Term. On the characterization of the sociodemographic profile: mean age of 60.2 years (Table 01), being (79.5%/n = 35) female; predominant race was brown (75.0%/n = 33); marital status (38.6%/n = 17) were married; source of income predominantly domestic and retirees, both with (18.2%/n = 8) (Table 5). Regarding the characterization of the disease, (100%) demonstrated to have Type 2 DM (Table 2), with a mean time of diagnosis of 9.4 years (Table 3). Concerning influenza vaccine adherence, (20.5%/n = 9) reported having fear/vaccine related urges; (25%/n = 11) were not immunized in the previous year and of these (13.6%/n = 6) remained unimmunized in the current year, stating as main reason the possible reactions that the vaccine may cause. As to the importance of immunization (95.5%/n = 42), the main objective was to "prevent and/or fight influenza" predominating (59.1%/n = 26); (6.8%/n = 3) were not aware of the importance/purpose of immunization (Table 4).

**Conclusion:** There was satisfactory immunization coverage of people with DM who agreed to participate in the study, but regarding the importance, purpose and benefits that immunization provides for their health, their knowledge is limited only to the side effects of the vaccine, reflected in the immunization adherence shown (Figs. 1, 2).

**Table 1.** Distribution of data according to age, N=44.

People with DM					
Age	N	Minimum	Maximum	Average	Standard deviation
	44	37	81	60.02	11.64

Source: Questionnaire applied

**Table 2.** Distribution of data on the type of Diabetes Mellitus, N=44.

Data about DM				People with DM	
Type of DM	Type 1 DM	Type 2 DM	N	%	
			-	-	
			44.0	100.0	
<b>Total</b>			<b>44.0</b>	<b>100.0</b>	

Source: Questionnaire applied

**Table 3.** Distribution of data on the time of diagnosis, N=44.

People with DM					
Time to Diagnosis	N	Minimum	Maximum	Average	Standard deviation
	44	0.1	26.0	9.46	7.60

Source: Questionnaire applied

**Table 4.** Distribution of data on the Influenza Immunization, N=44.

Immunization Data				People with DM	
Immunized last	Yes	N	%		
		33.0	75.0		

**Fig. 1** See text for description

year?	No	11.0	25.0
<b>Total</b>		<b>44.0</b>	<b>100.0</b>
Immunized current year?	Yes	38.0	86.4
	No	6.0	13.6
<b>Total</b>		<b>44.0</b>	<b>100.0</b>
Refer fear of immunization	Yes	9.0	20.5
	No	35.0	79.5
<b>Total</b>		<b>44.0</b>	<b>100.0</b>
Know its importance	Yes	42.0	95.5
	No	2.0	4.5
<b>Total</b>		<b>44.0</b>	<b>100.0</b>

Source: Questionnaire applied

**Table 5.** Distribution of sociodemographic data, N=44

Sociodemographic data			People with DM	
		N	%	
<b>Gender</b>	Female	35,0	79,5	
	Male	9,0	20,5	
<b>Total</b>		<b>44,0</b>	<b>100,0</b>	
<b>Race</b>	Brown	33,0	75,0	
	Black	5,0	11,4	
	White	5,0	11,4	
	Yellow	1,0	2,3	
<b>Total</b>		<b>44,0</b>	<b>100,0</b>	
<b>Profession</b>	Retired	8,0	18,2	
	Housekeeper	8,0	18,2	
	Housewife	7,0	15,9	
	Self Employed	5,0	11,4	
	Seamstress	2,0	4,5	
	Teacher	2,0	4,5	
	Salesman	2,0	4,5	
	Pedagogue	1,0	2,3	
	School lunch servicer	1,0	2,3	
	Painter	1,0	2,3	
	Mason	1,0	2,3	
	Public agent	1,0	2,3	
	Administrator	1,0	2,3	
	Cook	1,0	2,3	
	General Services	1,0	2,3	
	Nursing Assistants	1,0	2,3	
	Unemployed	1,0	2,3	
<b>Total</b>		<b>44,0</b>	<b>100,0</b>	
<b>Marital Situation</b>	Married	17,0	38,6	
	Not married	12,0	27,3	
	Widower	10,0	22,7	
	Stable union	3,0	6,8	
	Divorced	2,0	4,5	
<b>Total</b>		<b>44,0</b>	<b>100,0</b>	

Source: Questionnaire applied

**Fig. 2** See text for description

**A208****Impact of cardiovascular rehabilitation program in individuals with diabetes from a private outpatients institution in São Paulo**

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**Introduction:** Diabetes Mellitus (DM) is a complex disease that requires care in order to decrease risk of complications and glycaemic levels. A healthteam from a Private Outpatient Institution (POI) started a Cardiovascular Rehabilitation Program in order to prevent complications and to encourage patients to practice physical activity.

**Objective:** To show the impact of Program's adherence. **POPULATION:** all DM patients from POI (N = 58), that attended all Rehabilitation Program sessions. People of both sexes, age average:  $41 \pm 20,5$  years old; Body Mass Index (BMI): 34% eutrophic, 67% overweight. Epidemiological characteristics: 98% DM 2, who were 86% hypertensive, 83% dyslipidemic, 78% with atherosclerotic disease, 14% with heart failure, 7% with COPD (chronic obstructive pulmonary disease) and 88% with CAD (coronary artery disease).

**Methods:** DM patients who were referred to join the Program (N = 58) were followed for the 36 sessions in the POI. At the beginning of rehabilitation program and at end of it, they were requested to fill in a Quality of Life Questionnaire-SF-36, excluding patients with cognitive deficit, in order to evaluate if there was Quality of Life (QL) improvement. Data were tabulated and evaluated along with others quantity and quality variables, being presented as media, standard deviation and graphics with values expressed in percentages of prevalence.

**Results:** Among those patients, we noted that 67% had been seen regularly by a secondary sector (endocrinologist), identified by ACTIVE. The patients without regular medical follow-up were nominated as administrative DISCHARGE. It was detected that, 7% of ACTIVE, had at the end better HbA1c (glycated haemoglobin) levels, 6% remained the same and 21% worsened. In comparison with those patients, only 41% of administrative DISCHARGE group improved HbA1c levels, 35% remained the same and 24% worsened. Besides the HbA1c, improvement of SF-36 was compared. ACTIVE had a 68% improvement by the end of the Program. It was compared better and worse SF 36 results with patients' HbA1c levels (Figs. 1 and 2): Fig. 1: Relation Between

SF 36 result and HbA1c levels in administrative DISCHARGE patients Fig. 2: Relation Between SF 36 result and HbA1c levels in ACTIVE patients.

**Conclusions:** Analyzing the 58 patients included in the Program for 2 years, it shows the importance of a proper medical follow up, as a transdisciplinary and multiprofessional care to prevent disease complications. The best HbA1c levels and adherence to Rehabilitation program was in the ACTIVE group.

**A209****Impact of continuous subcutaneous insulin infusion system (CSII) in child and adolescent treatment: follow up for 10 years**

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There is increasing evidence that Continuous subcutaneous Insulin Infusion System (CSII) can improve quality of life, ensuring flexibility and improved glycemic control including a reduction in severe hypoglycaemia. However, there are few Brazilian studies on the subject. CSII therapy physiologically reproduces insulin levels, with the basal rate through continuous automatic delivery of microinfusions adjusted by hour, complemented by user calculation and bolus delivery for post-prandial glycemic control or correction, with more predictable release, and, time of recognition and decision-making before becoming serious. In asymptomatic hypoglycemia, evidence suggests a reversal of this condition if events are avoided. This reduction in hypoglycemia will only occur if the CSII has been programmed correctly and the user has made the proper decision when managing problems, interpreting, and acting on the basis of blood glucose. During 2006 to 2016, we followed 46 children and adolescents attended by an endocrinologist of the private health system, with support from Multidisciplinary Center focused on this therapy. About 5 years ago, the SUS (Single Health System—Brazilian public system) created a specialized center for CSII users, for global multidisciplinary educational monitoring (nutritionist, nurse and psychologist), with production of performance reports to support the decision of the medical teams. In the follow-up, 56.5% are female and 43.4% male, between the ages of 2 and 26 years (mean  $\pm$  SD:  $15 \pm 2.35$  years), with 9 previous users of CSII. Groups were separated into users (old) and those who initiated CSII in the Center (new). In the old group, CSII time ranged from 7 to 11 years (mean 9.11 years), A1C ranged from 7.9% in the pre-CSII to 8.25% at the beginning of follow-up at the Center and 7.07% at follow-up. In the new group the CSII time ranged from 5 months to 5 years (mean 4.5 years), A1C ranged from 8.37% in the pre-CSII to 7.14% in the SICI post in the center. There were no new complications in the period. There were only 2 events of severe hypoglycemia hospitalized for handling error by the caregiver in those 10 years. An effective partnership between professional staff and the user is a key factor in achieving success in therapy. Continuous support for users is an essential component of the service, which must be delivered by a specialized and experienced multidisciplinary team.

**A210****Impact of hemodialysis on insulin doses in patients with type-1 diabetes mellitus and endstage kidney disease**

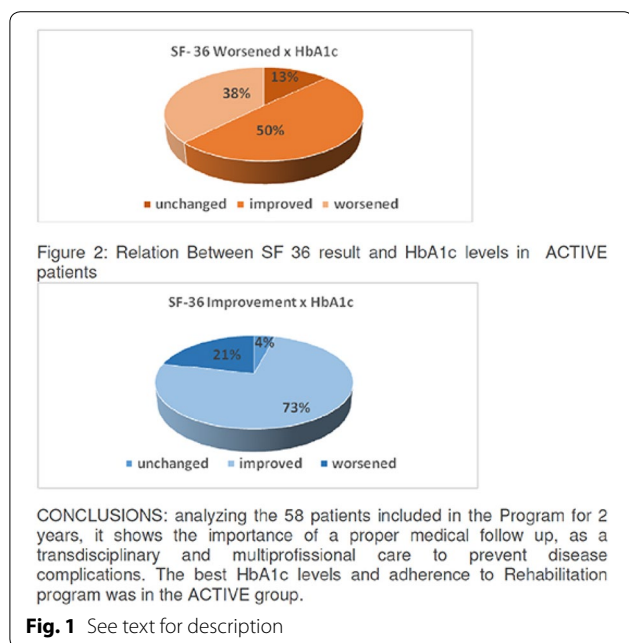
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**Introduction:** Kidneys are responsible for the clearance of one-third of circulating insulin, and its progressive function loss has been associated with a decrease in clearance capacity. Besides, glucose loss through dialysis fluid and insulin adsorption to the membrane modify glycaemic control and insulin doses during hemodialysis (HD). The objective of this study was to evaluate the HD influence in type-1 diabetes mellitus (T1DM) patients on renal replacement therapy.





**Methods:** The doses of insulin used on non-HD days were compared with those on HD days in 32 T1DM patients followed in diabetes out-patient clinic.

**Results:** Twenty women and 12 men were included with mean age  $38.2 \pm 8.6$  years and diabetes duration  $25.4 \pm 6.2$  years. Hemoglobin glycosylated (HbA1c) during last year ranged from 5.6 to 11.3%, mean  $8.0 \pm 1.1\%$ . Total daily dose (TDD) of insulin in non-HD and HD days were  $0.50 \pm 0.19$  and  $0.45 \pm 0.18$  units/Kg/day, respectively. Regarding schedule for hemodialysis, we observed lower TDD ( $20 \pm 9$  units and  $35 \pm 17$  units, respectively,  $p:0.04$ ) and basal insulin dose ( $10 \pm 5$  units and  $23 \pm 18$  units, respectively,  $p:0.04$ ) for patients underwent to HD on intermediate-shift compared to those at afternoon-shift. The mean of HbA1c and fructosamine did not reach significant difference concerning to early-morning, intermediate or afternoon HD shift schedule.

**Conclusion:** TDM1 individuals on renal replacement therapy require lower insulin doses in HD days. HD patients on intermediate-shift have lower basal dose than those on afternoon-shift, probably by the decreased insulin doses at lunch time, in order to avoid hypoglycemia during HD session. The knowledge of the daily routine of T1DM patient in HD by diabetes healthcare team is essential to adjustments of insulin doses.

#### A211

##### Impact of the implementation of inpatient multidisciplinary glucose control team and institutional protocols in the glycemic control of hospitalized patients

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**Introduction:** There is a growing recognition that glycemic control is a critical element in inpatient care. The optimal management of blood glucose in the hospital remains a great challenge. We introduced a hospitalwide inpatient glucose management program in our hospital that included the establishment of a multidisciplinary glycemic control team (MGCT) in June/2014. The aims of this study were to describe and evaluate the impact of the implementation of a MGCT and institutional inpatient glycemic control protocols in the glycemic control of hospitalized patients.

**Methods:** We performed a retrospective analysis of the medical records and of the point-of care glucose monitoring (POCT) of the hospitalized patients before (may/2014) and after (may/2017) the implementation of the MGCT. The institutional inpatient glycemic control protocols are in accordance with the international recommendations. All the patients admitted to the institution have their glycaemia monitored using the POCT Abbott® Precision PXP glucometer. The study was approved by the local Ethics Committee.

**Results:** We analyzed a total of 6888 and 7869 POCT from 389 and 545 patients in may/2014 and July/2015, respectively. The mean glycaemia was of  $158.9 \pm 60.7$  mg/dl and  $150.3 \pm 57.8$  mg/dl in may/2014 and may/2017, respectively ( $p < 0.001$ ). There was a reduction of 17.8% in the rates of hyperglycemia  $\geq 180$  mg/dl in may/2017 compared to may/2014 (19.3% and 23.5%, respectively;  $p < 0.001$ ). Hyperglycemia  $\geq 300$  mg/dl was reduced in 28.5% in may/2017 compared to may/2014 (1.8% and 2.5%, respectively;  $p = 0.003$ ). Hypoglycemia  $\leq 40$  mg/dl was observed in 0.1% and 0.2% of the patients in may/2017 and may/2014 (non statistically significant reduction of 34%;  $p = 0.34$ ). In may/2014, 34.2% of the prescriptions were not in accordance with the institutional protocol and this was reduced to 7.5% in may/2017 ( $p < 0.001$ ).

**Conclusions:** The implementation of hospitalwide glycemic control program was associated with significant reduction on hyperglycemic events. The key elements for these achievements were the development of institutional inpatient glycemic control protocols, the establishment of a MGCT, and the continuous educational programs for hospital personnel. Altogether, these actions resulted in improvement of processes of care, patient's safety and clinical outcomes of hospitalized patients.

#### A212

##### Impact of time to basal insulin initiation on glycemic control and health care costs in T2DM patients: an analysis of U.S. commercial claims data

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**Objectives:** Many patients who would benefit from insulin therapy do not receive it in a timely manner. This study assessed HbA1c control and health care costs in a real world setting using a retrospective commercial claims database.

**Methods:** Patients with a T2DM diagnosis (ICD-9-CM codes 250.x0 or 250.x2) from 1/1/2007 to 12/31/2014, were identified in the MarketScan database. Patients initiating basal insulin (BI) and with an HbA1c  $> 7\%$  in the 6 months pre-BI initiation were identified. Patients were required to have 24 months pre- and 12 months post-BI initiation health plan enrollment and were stratified by time with uncontrolled HbA1c ( $> 7\%$ ) before BI initiation (i.e.,  $< 6$ , 6-12, 12-18, 18-24 months). Study measures included pre- and post-BI initiation HbA1c and health care costs.

**Results:** A total of 5422 patients met the inclusion criteria. Before BI initiation, mean (SD) HbA1c was 9.8% (2.0), with 50.3% of patients uncontrolled  $< 6$ , 18.3% 6-12, 13.7% 12-18, and 17.8% 18-24 months. There was little variation in baseline HbA1c by duration of time uncontrolled. Mean (SD) HbA1c reduction was 1.4 (2.4) but 48.1% of patients had HbA1c  $> 8\%$  during follow-up. Patients with uncontrolled HbA1c  $< 6$  months had the largest reduction in HbA1c (mean [SD] change of 1.8% [2.7], 58.4% HbA1c  $< 8\%$ ), while patients with uncontrolled HbA1c 18-24 months had the smallest change in HbA1c (mean [SD] change of 1.0% [2.0], 38.4% HbA1c  $< 8\%$ ). Costs in the 12 months post-BI initiation ranged from mean (SD) \$14,621 (\$22,654) among patients uncontrolled for 12-18 months to \$18,816 (\$40,793)  $< 6$  months.

**Conclusions:** Despite improvements in HbA1c following BI initiation, almost half of patients had HbA1c  $> 8\%$  during follow-up, with patients with the longest period of uncontrolled HbA1c during baseline least likely to achieve HbA1c  $< 8\%$ . This study suggests there would be benefit from earlier introduction of BI or alternative therapeutic options to assist patients in achieving HbA1c targets. This is an ENCORE abstract previously presented at ADA2017. Funding and editorial support provided by Sanofi.

#### A213

##### Impact of using an automatic bolus calculator for the glycemic control of type 1 diabetes mellitus patients receiving multiple daily insulin injections

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**Introduction:** Type 1 diabetes mellitus is a chronic disease characterized by hyperglycemia that may lead to chronic complications. The strict glycemic control is a key in the prevention of these long term complications. In spite of both technological development and intensive insulin therapy, most of T1DM patients are far away from their suggested ranges. One of the main challenges in the therapy is the meal insulin bolus calculation. The suitable adjustment of the insulin dose for a given carbohydrate amount present in a meal is key to success in the postprandial control and in the T1DM management.

**Objective:** Assessing the impact on the glycemic Control in T1DM patients using the blood glucose meter Accu-Check Performa Connect with an automatic bolus calculator (ABC).

**Method:** This is a prospective, non-randomized and controlled 12 week clinical trial, with 26 over 16 year-old T1DM patients, whose HbA1c were equal or superior to 6.5%, who have T1DM diagnostic for more than 1 year, and following a multiple daily insulin injections (MDI) therapy, plus adjusted postprandial insulin doses according to each meal carbohydrates count. The intervention Group used the Accu-Chek Performa Connect glucometer linked to the mobile phone ABC app, and the Control Group continued with their standard blood glucose meter, with manual bolus. The download of data collected from their devices was used for dose adjustments in the whole treatment period.

**Results:** A total of 13 patients completed the study (Control, n = 6; Connect, n = 7). The Connect Group patients showed an important improvement in their Estimated Mean Glycemia (EMG), reaching statistical significance (p = 0.01). Percentages of both hyperglycemia and normoglycemia have also presented relevant improvement (p = 0.004 and p = 0.015, respectively). Statistical significance was not reached between groups in severe hypoglycemia (< 50 mg/dl). HbA1c decreased more in the Connect Group, but without reaching statistical significance (p = 0.315).

**Conclusion:** This was the first Brazilian prospective, controlled, non-randomized trial with T1DM patients, aiming to evaluate the ABC impact on the glycemic improvement of these subjects. In this study, it was possible to see the improvement of some glycemic parameters, without increasing the occurrence of severe hypoglycemia. However, further studies are needed to better evaluate the impact of the glycemic improvement, mainly to access the HbA1c reduction.

#### A214

##### Implementation of the diabetes reference center at schools in Minas Gerais

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**Background:** School is the space where students spend most of their time, so there is a need for a team prepared to receive the student with diabetes, a disease that has an impact on the life of the individual as well as that of their family members. In the current scenario, parents feel insecure about taking their children to school due to the lack of preparation of a large part of the school staff.

**Objective:** To describe the creation and functioning of a Diabetes Reference Center at Schools (DRCS) in the Public Health System, for the training of the public and private schools of Minas Gerais.

**Methods:** Project developed by the interdisciplinary team of a Public Diabetes Center in Minas Gerais, with financial support from FAPEMIG (Foundation for Research Support of the State of Minas Gerais) and divided into 4 stages (Table 1).

**Results:** From August 2016 to July 2017, 147 public and private schools from the metropolitan region of Belo Horizonte were enrolled. Of these, 71 (48%) did not attend the scheduled and confirmed face-to-face training, performing only the online stage, requesting a rescheduling for times outside of the school days, justifying lack of school support for release from training, among other reasons. Most participants (87%) rated their knowledge to help a child with diabetes as unsatisfactory at the time of enrollment. In the evaluation of the training, in a scale from very good to bad, the participants classified as very good: the initial contact with the DRCS and the scheduling (84.62%), quality of the material sent by email in the first stage of the training (88.46%), content presented in face-to-face training

(100%) and quality of didactic material used in tablets (92.31%). All respondents answered the questionnaire "yes" to the question "Do you feel better prepared to help a child with diabetes in the school environment?"

**Conclusion:** The creation of the DRCS and the adopted model have met the objective of training of the school teams, enabling their inclusion in the treatment of children with diabetes. However, the lack of importance given to the subject in the country, both by government agencies and by the direction of schools, have required diversified strategies to enable training in different circumstances and difficulties, such as distance education, the final phase of the project. Ethics Approval The study was approved by Santa Casa of Belo Horizonte Institution's Ethics Board, approval number 1.064.985 and written consent was obtained from all participants (Fig. 1).

**Table 1.** Stages for implementing the DRCS.

STAGE	ACTIVITIES
1 (Creation, disclosure and registration for training)	<ul style="list-style-type: none"> <li>• Presentation of DRCS in the State and Municipal Departments of Education and dissemination through social networks (<a href="https://www.facebook.com/groups/diabetesnasescolas/">https://www.facebook.com/groups/diabetesnasescolas/</a>), e-mails and website (<a href="http://www.diabetesnasescolas.com.br">www.diabetesnasescolas.com.br</a>).</li> <li>• Teacher training registration via e-survey online platform (<a href="https://esurvey.org/2n-CADASTRO">https://esurvey.org/2n-CADASTRO</a>).</li> </ul>
2 Teacher's training in DRCS	Divided into 3 stages: <ol style="list-style-type: none"> <li>1- Initial training with sending of educational materials to introduce to the subjects topics related to the day-to-day life of someone with diabetes;</li> <li>2 - Face-to-face training in DRCS on hypoglycemia, hyperglycemia, insulin and glycemic monitoring, among others;</li> <li>3- Online update on important topics in diabetes and support for clarifying doubts.</li> </ol>
3 Training at schools	Training of all staff in the school environment.
4 Distance Education	In the final phase of implementation and testing, for expansion of the DRCS and training to all regions of the country, free of charge.

##### Ethics Approval

The study was approved by Santa Casa of Belo Horizonte Institution's Ethics Board, approval number 1.064.985 and written consent was obtained from all participants.

**Fig. 1** See text for description

#### A215

##### Improved glycemic control with carbohydrate counting for adjustment of fast-acting insulin aspart vs. insulin aspart in subjects with type 1 diabetes

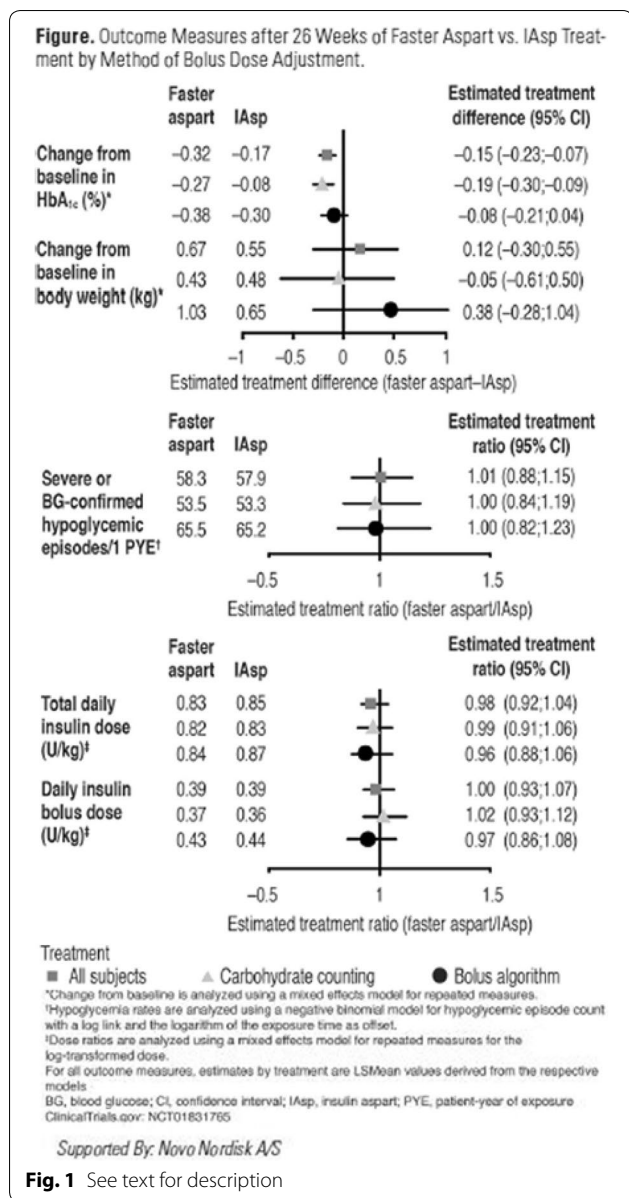
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Insulin delivery based on carbohydrate counting (CC) is the gold standard for improving glycemic control in type 1 diabetes (T1D). A post hoc analysis of onset 1, a 26-week, phase 3 trial, assessed methods for adjusting the dose of mealtime fast-acting insulin aspart (faster aspart) and insulin aspart (IAsp), each with insulin detemir. Subjects with previous experience continued CC (HbA1c, faster aspart and IAsp 7.6%) and remaining subjects used a simple bolus algorithm (BA; HbA1c, faster aspart 7.5%, IAsp 7.6%). Faster aspart showed a statistically significant greater reduction in HbA1c vs. IAsp, and non-inferiority was confirmed (Fig. 1). With CC, HbA1c reduction was statistically significantly greater for faster aspart vs. IAsp (est. treatment difference: - 0.19% [95% CI - 0.30; - 0.09]) but was similar for both treatments with a BA. Rate of hypoglycemic episodes and bolus insulin dose were similar between treatments across adjustment methods. No significant differences in total insulin dose or weight gain were observed between treatments with either adjustment method. Faster aspart was



effective in glycemic control regardless of adjustment method. For patients with T1D capable of dosing based on CC, faster aspart may offer improved glycemic control vs. IAsp, with similar weight gain and insulin dose, and without an increased risk of hypoglycemia.

**A216**  
**Improvement of glycemic control in DM2 patient after association of GLP-1 receptor agonist to insulin therapy, independent of weight loss**

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LC, male, 66 years old, type 2 diabetic for 3 years, using Gliclazide 60 mg/day and Metformin 1500 mg/day. He reported asthenia and difficulty losing weight. Laboratory tests showed poor glycemic control (HbA<sub>1c</sub> = 9.6%) and weight = 107.1 kg. Therapy with Insulin Degludec 16U was started to control glycototoxicity, suspension of gliclazide and maintenance of metformin. After 30 days, the glycemic control was improved, GJ = 171 mg/dl, HbA<sub>1c</sub> = 8.2%, but with increased appetite and difficulty to perform physical activities. To optimize patient glycemic control and weight loss, Liraglutide 1.2 mg/day was initiated. On the 30-day return, HbA<sub>1c</sub> presented 7.6%, GJ = 153 mg/dl and weight = 105.9 kg, and Liraglutide dose was increased to 1.8 mg/day. After 4 months of maximal Liraglutide dose, patient presented a 3 kg weight loss, but with continuous decrease of HbA<sub>1c</sub> (7.0%), an improvement that remained until the last evaluation (total weight loss = 6 kg/5.60% of total weight with HbA<sub>1c</sub> = 6.4%). The insulin dose was reduced to 10 U and reassessed in 30 days for possible discontinuation of insulin therapy. GLP-1 receptor agonists stimulate insulin secretion in a glucose-independent manner, inhibit glucagon secretion and hepatic glucose output, delay gastric emptying, induce satiety, reduce appetite, and cause weight loss. They were superior in glycemic control and weight when compared to other DM2 treatment options. Compared to DPP-4 inhibitors in 11 of 13 studies, they were superior in glycemic control and in 14 of 14 studies, were superior in weight loss. With sulfonylureas, they showed superiority in HbA<sub>1c</sub> control in 7 of 10 studies and weight loss in 10 of 10 studies. Compared with insulin therapy it also demonstrated superiority in weight loss in all studies and was superior in the control of HbA<sub>1c</sub> in 23 of 30 studies. Liraglutide, regardless of weight loss, showed a decrease in HbA<sub>1c</sub> in quartile analysis of weight loss (Liraglutide 18 mg-LEAD-3). It is a therapeutic option with action well established in weight loss, metabolic and glycemic improvement in the DM2 patient. However, its action on HbA<sub>1c</sub> reduction was independent of weight loss, evidencing intensive glycemic control with HbA<sub>1c</sub> between 6.5 and 7.0% even with discrete or even absent weight loss.

Informed consent to publish had been obtained from the patient.

**A217**  
**Improvements in blood glucose level and blood pressure after the performance of the bariatric surgery**

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A217**

**Introduction:** Obesity is a chronic and multifactorial disease that implies in many difficult-to control metabolic problems, such as diabetes and hypertension. It is known that there are several modalities of bariatric surgeries resulting in significant weight loss and improvement in blood glucose and blood pressure levels. Moreover, in some cases the patient returns to normoglycemic levels after bariatric surgery. Weight loss can also be observed.

**Objective:** To evaluate the clinical and metabolic profile of patients with obesity after bariatric surgery.

**Methods:** A cross-sectional study was carried out in the Multidisciplinary Outpatient Clinic of Obesity and Metabolic Surgery at Ana Costa de Santos Hospital. Laboratory tests data were collected from the medical records of twenty patients who had undergone bariatric surgery and were afterwards seen in this outpatient clinic.

**Results:** Twenty-four percent of patients lost weight after bariatric surgery. Patients have postoperative time ranging from 15 days to 1 year. Eleven patients out of sixteen had undergone the surgery 3 months before they participated in this study. Fasting blood glucose level decreased in nine percent in patients who had undergone the surgery. Five patients stopped taking medications they had been using previously.

**Conclusion:** Results point bariatric surgery as an important therapeutic option due to its potential to reverse diabetes and improve blood glucose level and blood pressure in patients who have morbid obesity.

**A218****In silico projection of the molecular structure of microRNA over-expressed in type 2 diabetes**

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A218**

**Introduction:** Molecular biology studies demonstrate that microRNAs (miRNAs) seem to play a fundamental role in triggering and progression of type 2 diabetes (DM2), as well as, have been suggested as a novel biomarker for DM2 prediction. The miRNAs are small noncoding RNAs with 19–25 nucleotides that implicate in post transcriptional control of gene expression in multicellular organisms by disturbing the stability in processes such as translation, resulting in target miRNAs degradation or silencing.

**Objective:** To develop in silico projection of molecular structure of miRNA already defined as biomarker for DM2 prediction.

**Methods:** A search was performed on the nucleotide sequence of 4 miRNAs already defined as biomarker for DM2 prediction, performing in silico projection of the molecular structure of the following miRNAs: miR-455-5p, miR-454-3p, miR-144-3p and miR-96-5p. The nucleotides

were selected using GenBank that is the NIH genetic sequence database. The sequences obtained were aligned with the Clustal W multiple alignment algorithms. For the molecular modeling, the structures were generated with the RNAstructure, a fully automated miRNAs structure modelling server, accessible via the Web Servers for RNA Secondary Structure Prediction.

**Results:** We demonstrated a search for nucleotide sequence and the projection of the molecular structure of the following miRNA: miR-455-5p (Fig. 1), miR-454-3p (Fig. 2), miR-144-3p (Fig. 3) and miR-96-5p (Fig. 4).

**Conclusion:** In this study we show in silico secondary structures projection of selected of 4 miRNA defined as biomarker for DM2 prediction through computational biology (Fig. 1).

**A219****Incidence of diabetes mellitus in patients treated in the ubs horto forestal of Itaperuna-RJ**

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**Introduction:** Brazil, following the world trend, has undergone processes of demographic, epidemiological and nutritional transition since the 1960s, and in recent years an increase in the number of deaths caused by chronic non-transmissible diseases, hypertension and diabetes mellitus (DM). It is estimated that 12% of the Brazilian population suffers from DM, resulting in changes in patterns of occurrence of pathologies, emphasizing cardiovascular. In order to respond to this challenging situation, the Ministry of Health organizes surveillance strategies in Basic Health Units (UBS).

**Objective:** The objective of this study was to evaluate the incidence of diabetic patients followed in a UBS through a basic research, raised by medical students, that aimed to evaluate cardiovascular risk and possible associations and correlations with other clinical and laboratory variables in the scenario of the Northwest Fluminense.

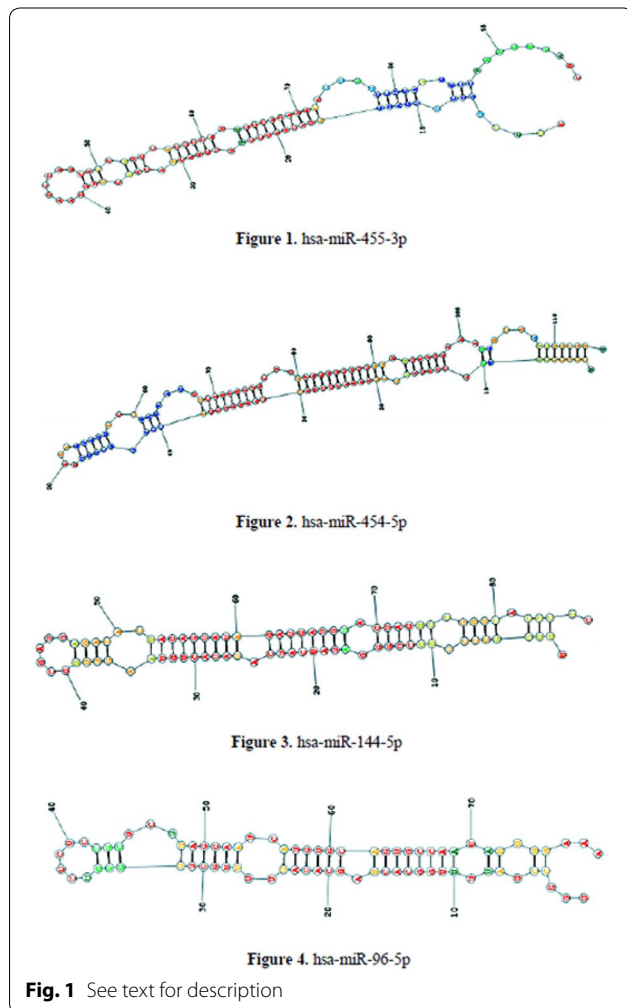
**Method:** We evaluated 105 patients who were followed at the Basic Health Unit of the Horto Florestal neighborhood, Itaperuna, RJ, from August 2014 to April 2015, in a randomized study. Data collection was completed using the information reported by the patients during the consultations and after receiving the results of laboratory tests related to the protocol, together with a home visit for interview and blood pressure measurement. The risk equation was based on the Framingham score, with one of the predictors being diabetes, which was stratified by the fasting glucose test of the patients under study.

**Results:** The profile of the protagonists that made up the sample universe of the research represented 80% of the female sex and 20% of the male sex, only; 20% in the age group up to 44 years; 41% between 45 and 59 years; and 39% over 60 years. The exploration revealed that 88 people from the sample space, reflecting the percentage of 83.8% of the total, do not have a diagnosis of Diabetes Mellitus (DM), while those suffering from the metabolic syndrome correspond to 16.2%. Although the result showed to be higher than expected nationally, the comparison is dubious and evidenced bias in the statistical studies against the analysis of age.

**Conclusion:** Despite the importance of DM, there is a shortage of studies that investigate the epidemiological characteristics of this condition in the Brazilian population.

**A220****Increased urinary ADAMTS13 levels correlate with renal disease in animal model of type 1 diabetes mellitus**

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**Introduction:** ADAMTS13 is a proteolytic enzyme responsible for large von Willebrand factor (vWF) multimers degradation, in order to prevent the hypercoagulability process. This enzyme is mainly synthesized in the liver, but is also expressed in platelets, endothelial cells and kidney.

**Objectives:** To compare the plasma levels of ADAMTS13 and vWF, as well as ADAMTS13 gene expression in liver and kidney, in type 1 diabetic mice and controls (nondiabetic).

**Methods:** Type 1 diabetes mellitus was induced in 10 male C57BL/6 mice by intraperitoneal injection of streptozotocin. Control group mice (n = 10) received sodium citrate buffer. The levels of ADAMTS13, vWF and urinary albumin excretion were detected using the ELISA technique. The capillary blood glucose levels were obtained with a glucometer. The mRNA was extracted from liver and kidney samples and the ADAMTS13 gene expression was investigated by real-time PCR. Statistical analyzes were performed in SPSS v. 13.0 software. Values of  $p < 0.05$  were considered significant.

**Results:** The urinary levels of ADAMTS13 in diabetic group were higher when compared to the control group ( $p = 0.001$ ), which accompanies histopathological findings in the kidney, characterized by mesangial expansion and interstitial fibrosis in the diabetic group. There was no significant difference between plasma levels of ADAMTS13 and vWF between the groups ( $p > 0.05$ ). The gene expression of ADAMTS13 was higher in the liver ( $2.53 \times$ ) of diabetic animals, when compared to the control group, but in renal tissue, the gene expression of ADAMTS13 was not different between the groups ( $1.00 \times$ ). In addition, urinary ADAMTS13 levels showed a positive correlation with urinary albumin excretion ( $r = 0.820$ ,  $p = 0.001$ ) and blood glucose levels ( $r = 0.901$ ,  $p < 0.001$ ).

**Conclusions:** Loss of ADAMTS13 enzyme in the urine correlated with diabetic kidney disease in the mice. In addition, the data suggest that increased mRNA expression of ADAMTS13 in the liver is critically important for the plasma regulation of this enzyme, and consequently of vWF

## A225

### Individuals with long-standing type 1 diabetes have residual C-peptide after a mixed meal and sulfonylurea

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**Introduction:** Post-death pancreatic analysis of patients with long-standing type 1 diabetes mellitus (T1DM) has found residual  $\beta$ -cells. The development of an ultra-sensitive assay for the detection of small amounts of C-peptide showed that T1DM, even decades after diagnosis, may present a basal hormone secretion. However, it is important to know if this residual beta cell function respond to meals or to insulin secretagogues.

**Objective:** This study aimed to determine the prevalence of residual beta cell function in individuals with long-standing T1DM using an ultrasensitive C-peptide after a mixed-meal and oral dose of sulfonylurea.

**Methods:** 129 patients who had clinical diagnosis of T1DM and diabetes duration of  $> 5$  years (ADA criteria, SBD) were recruited from a tertiary care center. Fasting blood was taken for measurement of C-peptide (ELISA; Mercodia® (Uppsala, Sweden; cat.Nº10-1141-01). Thirty one patients (24,5%) had C-peptide  $> 10$  pmol/L or 0.03 ng/ml. Six patients were randomly recruited to undergo a mixed-meal tolerance test + oral 5 mg glibenclamide.

**Results:** 51.9%  $\delta$ , age:  $22.7 \pm 7.1$  years; duration of diabetes mellitus (DDM):  $12.6 \pm 6.4$  years, BMI:  $23.2 \pm 3.7$  kg/m<sup>2</sup> and HbA1c:  $8.7 \pm 1.6\%$ . The presence of detectable fasting C-peptide was inversely associated with DDM (rs:  $-0.35$ ,  $p, 0.0001$ ). Among chronic complications, a fasting C-peptide  $> 1.5$  pmol/L (0.004 ng/ml) was associated with a lower percentage of patients with nephropathy (63.2 vs 36.8%,  $p = 0, 0187$ ). In the 6 T1DM patients (age:  $25.5 \pm 7.6$ , DDM:  $15.2 \pm 6.7$ , BMI:  $23.8 \pm 3.2$ , HbA1c:  $7.9 \pm 0.6$ ) who underwent the mixed meal tolerance test + sulfonylurea, 4 (66.7%) had a positive response (C-peptide  $> 200$  pmol/L (0.6 ng/ml).

**Conclusions:** Patients with long-duration T1DM present residual beta cell secretion, related to a lower prevalence of nephropathy and had a positive response to a mixed-meal and secretagogue stimulus. This residual secretion suggests the presence of functional  $\beta$  cells that can potentially be worked for its preservation and regeneration.

## A226

### Influence of diabetes mellitus on balance and plant pressure

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**Introduction:** Diabetes Mellitus (DM) is a heterogeneous set of metabolic disorders which has as a consequence hyperglycemia. Changes in balance and gait increase the risk of falls and foot injuries in individuals with DM.

**Objective:** To verify the influence of balance and plantar pressure in individuals with DM1, DM2 and healthy.

**Methods:** Observational, transverse, descriptive and comparative study performed at a Health Post in the city of Fortaleza, from August to October 2016. All participants performed an evaluation of static balance and plantar pressure through Baropodometry. For comparison between groups, we used the ANOVA test and for the correlations Pearson's correlation coefficient was applied, considering a significance level equal to or less than 5% ( $p < 0.05$ ).

**Results:** 99 individuals (19 individuals with DM<sup>1</sup>Group A, 61 with DM<sup>2</sup>Group B and 19 without DM—Group C) were recruited. Regarding the homogeneity between groups, there was a statistically significant difference between groups A and B and B and C with respect to age ( $p = 0.000$ ) and between A and B in relation to the diagnosis time ( $p = 0.000$ ) (Table 1). There was a significant difference between groups A and B in the latero-lateral mean deviation (Xlateral) ( $p = 0.0213$ ) and between groups B and C, Xlateral ( $p = 0.0192$ ) and in the mean velocity of anteroposterior deviation (Anterior vel.) ( $p = 0.05$ ). Groups A and B evidenced a significant statistic difference for right foot plantar pressure ( $p = 0.0137$ ) and left foot plantar pressure ( $p = 0.0137$ ). Between groups B and C, there was difference for the maximum plantar pressure of the left foot ( $p = 0.047$ ). When intra-group association was performed, in Group A was observed a strong association between Anterior Vel. with the mean velocity of latero-lateral deviation (Lateral Vel.) ( $r = , 7210$ ,  $p = 0.0005$ ). In group B, was verified a strong association between Anterior Vel. with the Lateral Vel. ( $r, 8466$ ,  $p = 0.0000$ ) (Table 2). An association between age and static balance was also verified in all variables, with the exception of anteroposterior deviation in group B (Table 2).

**Conclusion:** The participants with DM2 have worse values of static balance, and right and left foot pressures, beyond the maximum pressure of the left foot, when compared with the DM1 and control groups. Age appears to have been a harmful factor for group B participants (Fig. 1)

Table 1: Descriptive data of the sample in the shape of means and standard deviation (SD). Fortaleza, Ceará. n = 99.

Variable	Group A (n=19)	Group B (n=61)	Group C (n=19)	p
	Mean ± SD	Mean ± SD	Mean ± SD	
Age (years)	36,21 ± 11,88	60,81 ± 8,46	26,42 ± 7,14	*0,0000 #0,0001
Diagnosis time (years)	7,0 ± 9,06	11,42 ± 6,91	-----	0,0000

\* statistic difference between groups B and C; # statistic difference between groups A and B

Table 2: Correlation between age and static balance intragroup. Fortaleza, Ceará, 2016.

Group A	Age	Lateral Vel.	Xlateral	Anterior Vel.
Lateral Vel.	r <sup>-</sup> = -0,3408 p = 0,1533	-----		
Xlateral	r <sup>-</sup> = -0,1426 p = 0,5603	r <sup>-</sup> = 0,5283 p = 0,0201	-----	
Anterior Vel.	r <sup>-</sup> = -0,0370 p = 0,8806	r <sup>-</sup> = 0,3965 p = 0,0928	r <sup>-</sup> = 0,5029 p = 0,0282	-----
Yanterior	r <sup>-</sup> = -0,0813 p = 0,7407	r <sup>-</sup> = 0,7210 p = 0,005	r <sup>-</sup> = 0,5865 p = 0,0083	r <sup>-</sup> = 0,6114 p = 0,0054
<b>Group B</b>				
Lateral Vel.	r <sup>-</sup> = 0,4751 p = 0,0001	-----		
Xlateral	r <sup>-</sup> = 0,2685 p = 0,0364	r <sup>-</sup> = 0,6479 p = 0,0000	-----	
Anterior Vel.	r <sup>-</sup> = 0,4548 p = 0,0002	r <sup>-</sup> = 0,8466 p = 0,0000	r <sup>-</sup> = 0,5012 p = 0,0000	-----
Yanterior	r <sup>-</sup> = 0,1773 p = 0,1717	r <sup>-</sup> = 0,4350 p = 0,005	r <sup>-</sup> = 0,4466 p = 0,0003	r <sup>-</sup> = 0,5088 p = 0,0000

Group A: Diabetes mellitus type I; Group B: Diabetes mellitus type II; Xlateral: Latero-lateral mean deviation; Yanterior: Anteroposterior mean deviation; Lateral Vel.: Mean velocity of latero-lateral deviation; Anterior Vel.: Mean velocity of anteroposterior deviation

Fig. 1

#### A228 Influence of educational intervention in the knowledge of people with diabetes mellitus

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**Background:** Health education aims to change behavior in order to benefit the clinical condition, through the contact of health professionals with people diagnosed with chronic diseases, which is effective in relieving fear and anxiety and understanding the disease. Perception of self-care activities with the feet is important to measure the knowledge gaps of people with Diabetes Mellitus (DM), which favors the prevention of plantar lesions and consequent amputation. In this perspective, this study aimed to evaluate the effect of the educational intervention on self-care with the feet in the knowledge of people with DM.

**Methodology:** Descriptive study of the pre and post-intervention type developed in a FHS. Sample consisted of 45 (35 + 10 pilot) people diagnosed with DM for more than 5 years. An instrument was applied to characterize and evaluated the knowledge through a questionnaire composed of 16 questions with dichotomous answers (Sim-0 and No-1), in which "Yes" means knowledge of the prevention activities of the diabetic foot. In this way, the lower the average of the answers, the better the knowledge. Knowledge was evaluated before and after eight fortnightly household meetings, which had the intention to teach care with the feet. Data collected were tabulated in an Excel 2007 spreadsheet and analyzed by SPSS 21.0. Descriptive statistics were performed for sociodemographic characterization and to analyze the results pre- and post-intervention, Anova was used

with repeated measures with interest in the interaction. Project was approved by Institution's Ethics Board of the Federal University of Alfenas, number 20376013.2.0000.5142.

**Results:** 64.4% of the volunteers were women, with low level of education and family income; more than 80% reported that they never had their feet evaluated and in the same proportion they were never told about foot care. Regarding the knowledge of self-care activities, the study volunteers presented statistically significant better means in the second evaluation (1.94), when compared to the first one (8,17) ( $p < 0.001$ ).

**Conclusion:** Educational intervention contributed to the improvement in the knowledge of self-care activities with the feet of people with DM. Home health education allows the inclusion of family members, knowledge of individual needs and the adequacy of care according to the reality of each person, a determining factor for behavior change and knowledge acquisition.

#### A229

##### Influence of metabolic control in the stature of type 1 diabetes children diagnosed in the pre-school period

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**Backgrounds:** Some studies suggest that poor metabolic control may compromise linear growth and final height of children and adolescents with type 1 diabetes (T1DM), but it is still controversial. Others have demonstrated that some patients at T1DM onset had higher Z scores of weight and height.

**Aim:** To evaluate the influence of metabolic control on linear growth of T1DM children diagnosed at the preschool age.

**Methods:** Data were obtained from medical records of 67 T1DM children followed up for at least 3 years. Glycated hemoglobin-HbA1c (Immuno-turbidimetry, normal range value: 4.8–5.9%) was collected every 3–4 months and, considering the annual average for growth assessment (ideal: < 7.5%, acceptable: 7.5–8.5%, regular: 8.6–9.4% and poor: ≥ 9.5%). The anthropometric data (weight, height, body mass index) and growth velocity was defined according to World Health Organization (WHO) adjusted to age and gender and Z scores.

**Results:** The sample included 67 children, with a mean age of 4.3 ± 1.5 years at the 1st visit, age at T1DM onset of 4.0 ± 1.4 years and T1DM duration of 0.28 years (IQR: 0.16–0.41), 50.7% being male. In the 1st evaluation: Z weight, Z height and Z BMI scores were 0.62 (– 0.16–1.42), 0.26 (– 0.74–0.82) and 0.86 (0.19–1.81), respectively, with no differences between gender and over the years. In the course of the follow-up years, a worsening of HbA1c was observed ( $p = 0.002$ ). In the group overall, the growth velocity was significantly not different in comparison to metabolic control, nevertheless a tendency to a slower growth rate was observed in those with worse control ( $p = 0.07$ ). Notably, the Z height was significantly lower in the 4th year of follow-up ( $p = 0.046$ ) in those with regular/poor metabolic control.

**Conclusion:** Our results show that children with T1DM onset at pre-school age had increased Z weight, Z height and Z BMI scores at diagnosis. Additionally, the data suggest that poor metabolic control could influence growth and long-term Z height score in this age group.

#### A230

##### Influence of neuropathy in the range of motion, strength and discharge of weight and balance in type II diabetic patients

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**Introduction:** Static and dynamic changes in joint movement, muscle strength (MS) and balance modify plantar load distribution and increase the risk of ulcerations in patients with type II diabetes mellitus, and peripheral diabetic neuropathy (PDN) may aggravate these conditions.

**Objective:** To evaluate functional kinesiological possible changes in balance and gait in individuals diagnosed with type II DM with and without PDN.

**Method:** Observational, transversal, descriptive and comparative study, performed at a health post in the city of Fortaleza, from August to October 2016. A functional kinesiological evaluation (measures of ankle joint amplitude (AJA), MS of the lower members) and baropodometry (for evaluation of the plantar load distribution postural balance) were performed. T test was used for comparison between the groups and Pearson's correlation coefficient for the associations between the variables, being considered statistically significant when  $p \leq 0.05$ .

**Results:** 60 individuals were evaluated being allocated in two groups, 42 participants in group A (without PDN) and 18 in group B (with PDN). The groups were homogeneous in relation to the diagnosis time of the disease, but were different in relation to age ( $p = 0.002$ ) (Table 1). The vast majority of the participants presented altered AJA, below the values considered normal (Table 2), but without differences between groups. In MS, group A presented more force than group B ( $p \leq 0.05$ ), except for the right tibialis anterior and left sural triceps muscles. In baropodometry (mean deviation, mean velocity, static and dynamic mean pressure) no statistically significant differences between groups were found. In intragroup associations, was verified a moderate correlation between static mean pressure and dynamic mean pressure between right and left feet in both groups (Group without PN  $r = .571$ ,  $p < 0.0000$  and with PN  $r = .532$   $p < 0.0002$ ) and between latero-lateral deviation and the mean velocity of this deviation in both groups (Group without PN  $r = .471$ ,  $p = 0.0213$  and with PN  $r = .423$   $p = 0.0320$ ).

**Conclusion:** Patients with type II DM have decreased range of motion, regardless of whether they have PN or not. There is no difference

between the balance and the plantar pressure between the two groups. Individuals affected by PDN have more changes in muscle strength. Informed consent to publish had been obtained from the patient (Fig. 1).

**A231**

**Information tool for those who live with people who have diabetes**

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**Introduction:** Information about diabetes is directed primarily to diabetes and the risk of developing a dysfunction. However, it is forgotten that family members and friends of those who have diabetes also need these informations.

**Objective:** Educate people who live with those who have diabetes, through specific information published in Blog prepared for this.

**Methodology:** The blog "Meu amigo com diabetes" was created and the Facebook fan page of the same name was created to publish and disseminate the texts weekly (Monday), always accompanied by illustrative images. The method was to analyze the number of views in the texts and the number of visits to the blog. Along with the "likes" in the publications and on the Facebook page.

**Results:** The blog was created on June 15, 2015, and July 23, 2017, had more than 65,000 hits, from various parts of the world, including: Portugal, France, and the US has twice as much access to Brazil. The fan page of the blog, in the same period, was "like" by more than 1600 people. The publication with more access, had more than 2750 hits, reaches 6400 people on facebook, with 96 shares. In January 2017, the page received access to more than 7000 readers. In addition, an informative image had a reach of 26,400 people, with 113 shares. The publications have been very shared on Facebook, mostly by people who have diabetes find it useful to relay to their acquaintances. The blog has an average of 57 hits per day, including weekends and holidays. Publications are diverse, covering commemorative dates, diabetes reading tips, basic and advanced diabetes knowledge, and reporting on events that involve diabetes throughout the year.

**Conclusion:** What we can conclude is that this new form of education has pleased many people, even with diabetes or diabetes. Sharing this with friends and relatives who understand diabetes better and overcome challenges, overcoming myths and improving treatment, making it a motivator. We realize that with each publication, the blog increases the reach, which favors that our goals are achieved. In addition to the rapid growth in blog visits and fans, and the significant number of views, "likes" and sharing posts. We were commended for the initiative, the content of the blog and the page art, addressing a theme as delicate as diabetes.

**A232**

**Inos mediated by obesity in experimental models of aging induces increased post-translational mechanisms and hypothalamic insulin resistance**

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**Introduction:** Obesity and diabetes prevalence in elderly subjects has an important role in clinical-epidemiological. Life styles and poor food habits associate with body weight excess are factor that contribute for comorbidities and also aging process. In this sense, central nervous systems (CNS), in particular, the hypothalamus is pivotal for modulate the body weight maintenance by metabolic signals. Evidence suggests that aging process and type 2 diabetes (DM2) are related with inflammation and post-transcriptional mechanism of s-nitrosation (S-NO) of proteins. S-NO is characterized as a post-transcriptional modification that modulates cellular functions by iNOS protein. On the other hands,

TABLE 1. Characteristics of participants with type 2 diabetes mellitus Fortaleza, Ceará, Brazil, 2016 (n = 60).

Variable	Group A n=(42)	Group B n=(18)	p
Age (years ± standard deviation)	58,3 ± 9,2	67,8 ± 10,8	0,0002
Diagnosis time (years ± standard deviation)	11,2 ± 6,9	12,3 ± 6,9	0,321
Gender			
Female	n (%) 25 (59,5)	n (%) 17 (94,4)	
Male	17 (40,5)	1 (5,6)	

Group A: without diabetic neuropathy; Group B: with diabetic neuropathy

TABLE 2. Foot joint amplitude of type 2 diabetes mellitus participants. Fortaleza, Ceará, Brazil, 2016.

Variable	Group A n=(42)	Group B n=(18)	p
	Normal / Changed n (%) / n (%)	Normal / Changed n (%) / n (%)	
Dorsiflexion R	15 (35,7) / 27 (64,3)	02 (11,1) / 16 (88,9)	0,066
Dorsiflexion L	15 (35,7) / 27 (64,3)	04 (22,2) / 14 (77,8)	0,375
Plantar flexion R	10 (23,8) / 32 (76,2)	02 (11,1) / 16 (88,9)	0,317
Plantar flexion L	04 (9,5) / 38 (90,5)	05 (27,8) / 13 (72,2)	0,111
Inversion R	02 (4,8) / 40 (95,2)	00 (0) / 18 (100)	1,000
Inversion L	01 (2,4) / 41 (97,6)	00 (0) / 18 (100)	1,000
Eversion R	09 (21,4) / 33 (78,6)	05 (27,8) / 13 (72,2)	0,594
Eversion L	09 (21,4) / 33 (78,6)	03 (16,7) / 15 (83,3)	1,000

Group A: without diabetic neuropathy; Group B: with diabetic neuropathy; R: Right; L: Left

**Fig. 1** See text for description

the role of S-NO in the hypothalamus during aging process and DM2 remain unknown.

**Objective:** Investigate the role of iNOs and S-NO mechanism into insulin in the hypothalamus of old rats.

**Methods:** We used the western blotting techniques, biotinylation of proteins (S-NO), PCR real-time (pPCR), intracerebroventricular injection (ICV) of oxide nitric donor (GSNO), iNOS inhibitor (L-N6-(l-Iminoethyl) Lysine (L-NIL) and exercise protocol were combined for analyse the nitrosation in hypothalamics tissues of old rats. This study was approved by ethics committee (CEUA 2016-1).

**Results:** Chronic treatment ICV in the hypothalamus with GSNO in Young rats enhance S-NO of IRβ and Akt, following of increased food intake and body weight reducing insulin sensitivity. Also, in old rats, in basal conditions, was observed increase of hiperphagia, body weight and overexpression of (iNOS), S-NO of IRβ and Akt characterizing insulin resistance. Mechanically or by physical exercise inhibition of iNOS, recuperate IRβ and Akt expression in the hypothalamus improving insulin sensitivity in old rats promoting satiety.

**Conclusion:** Taken together, we suggest, at least in parts, that hypothalamic S-NO-induced iNOS is a post-transcription of insulin resistance and, may be a target against diabetes during aging process.

**A233**

**Inpatients diabetes education: analysis of the needs and the effectiveness of educators in knowledge and behavior change after discharge**

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During hospitalization, diabetes educators may identify difficulties and promote DM selfmanagement after discharge. Education promotes safety, better glycemic control and prevents readmission. However, inside the hospital, stress, concurrent procedures and the trend to lower length of stay compromise the patient’s adherence and the effectiveness of these approaches.

**Objectives:** To identify the main difficulties for self-care and to evaluate the impact of education on knowledge and behavior change after discharge.

**Results:** Since 2015, 430 patients with DM were evaluated (mean 66 years, range 15–97 years), including 82% with DM2 and 9% DM1. On average, length of stay was 18 days. The main reason for admission were respiratory and cardiovascular diseases and cancer, respectively. DM was the main reason for admission of 43 hospitalizations. In patients with previous DM, 73% had A1c > 7. The mean duration of DM and A1c was 24 years and 8.3%, respectively. The educational needs were assessed using a adapted questionnaire regarding diet, physical activity, medications, insulin, glycemic control, foot care, hypoglycemia and hyperglycemia. Each item was scored from 0 to 10 and those with lower scores were prioritized during education. The initial questionnaire was answered by 317 (74%) patients. The most frequent difficulties, were: insulin management, hypoglycemia and hyperglycemia, foot care and glucose monitoring. After initial intervention, 153 patients (48%) were reevaluated in 876 visits (mean 2.12 visits/patient). The level of knowledge about insulin use (n = 122) increased from 5 ± 4 to 7 ± 3. Scores for knowledge about hypoglycemia and hyperglycemia increased from 6 ± 3 to 9 ± 2 and from 6 ± 3 to 8 ± 3 (both P < 0.05), respectively. Foot care and glucose monitoring increased from 7 ± 3 to 8 ± 2 and 7 ± 3 to 8 ± 3 (both P < 0.05), respectively. After 30 days of discharge, 62 (19%) of 317 patients were contacted. In this subgroup, 82% were satisfied with the intervention, 84% were aware about the need for follow-up regarding DM, 73% improved their diet. Only 39% were more active.

**Conclusion:** Besides barriers in the hospital to DM education, the intervention of educators may improve knowledge for self-care and promote adherence to medical follow-up and healthy eating after discharge.

**A234**

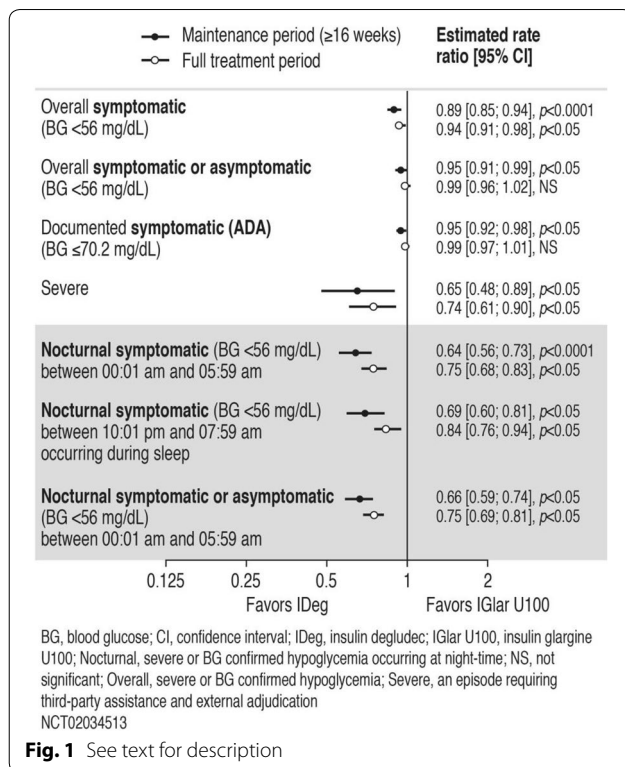
**Insulin degludec (IDEG) shows consistent risk reductions across hypoglycemia definitions vs. insulin glargine U100 (IGLAR) in the switch 1 and 2 trials**

Carol Wysham<sup>1</sup>, Janusz Gumprecht<sup>2</sup>, Wendy S. Lane<sup>3</sup>, Lone Nørgård Troelsen<sup>4</sup>, Deniz Tutkunkardas<sup>5</sup>, Simon Heller<sup>6</sup>

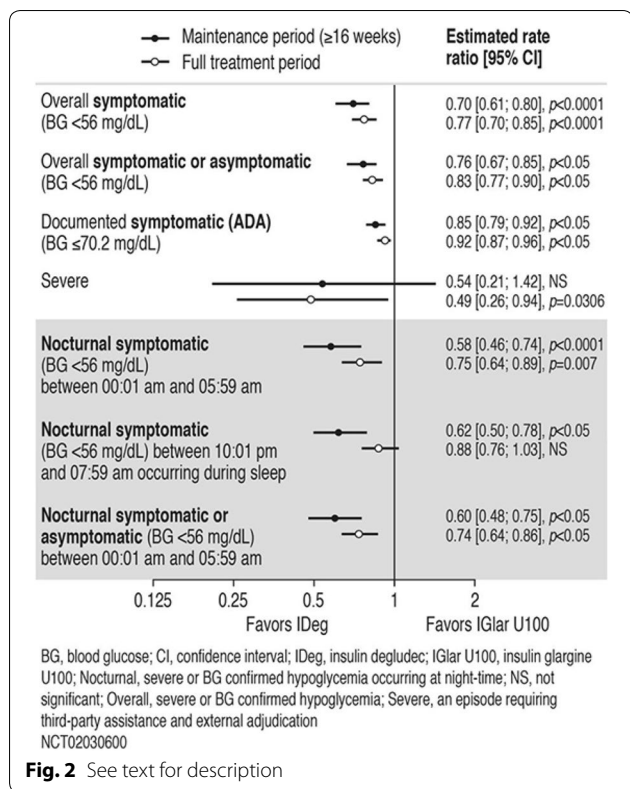
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Insulin degludec (IDeg) is a basal insulin with a mean half-life of over 25 h and a flat glucose-lowering profile. The phase 3a development program demonstrated HbA1c non-inferiority with IDeg in patients with type 1 (T1D) and type 2 (T2D) diabetes versus insulin glargine (IGlar) U100, and significantly reduced rates of overall symptomatic and asymptomatic hypoglycemia (T2D) and nocturnal symptomatic and asymptomatic hypoglycemia (T1D and T2D) that were most pronounced in the maintenance period. 4 In two phase 3b trials in patients with T1D (SWITCH 1) and T2D (SWITCH 2), rates of overall symptomatic and nocturnal symptomatic hypoglycemia with IDeg versus IGlar U100 were lower in both the maintenance and full treatment periods. Rates of severe hypoglycemia with IDeg versus IGlar U100 were lower in both the maintenance and full treatment periods in SWITCH 1, but only during the full treatment period in SWITCH 2. Two 64-week, double-blind, treat-to-target crossover trials compared the hypoglycemia risk of IDeg once daily (OD) vs. IGlar OD in type 1 (SWITCH 1) or type 2 diabetes (SWITCH 2). A1C non-inferiority was confirmed in both trials. SWITCH 1 had a significant reduction in hypoglycemia in the maintenance period across hypoglycemia definitions with IDeg vs. IGlar. SWITCH 2 also had a significant reduction across definitions in the maintenance period with IDeg, except severe hypoglycemia (due to the few events reported), although the rate ratio was comparable with the other definitions (Figs. 1, 2). Similar reductions were seen in the full treatment period. Overall, hypoglycemia reductions were consistent across hypoglycemia definitions, especially during the nocturnal period







**A235**  
**Insulin degludec in the treatment of extreme resistance to subcutaneous and intramuscular insulin- driasm**

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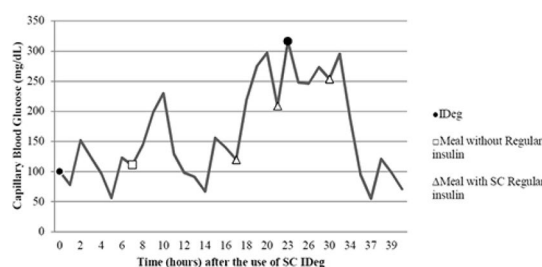
**Case report:** Two female patients with 26 (patient 1) and 22 (patient 2) years old were included in this report. They were diagnosed with type 1 diabetes mellitus (DM 1) at 5 and 6 years respectively and were referred to our service due to frequent episodes of diabetic ketoacidosis (DKA) despite the use of continuous subcutaneous insulin infusion pump. It was suspected of diabetes mellitus with resistance to insulin administered subcutaneously or intramuscularly (DRIASM). Patient 1 underwent an isolated pancreas transplantation (PTA), with chronic rejection after 13 months. After the loss of pancreatic allograft, she was hospitalized several times due to DKA. After that it was decided to perform a therapeutic test with IDeg. In December 2015, she started to use insulin degludec (IDeg), with reduction of hospitalizations. She remained in use of IDeg 80 UI/d and lispro 600 UI/d. Patient 2 was successfully submitted to PTA, with allograft loss after 15 months. An insulin challenge test was performed with SC and IM NPH/Glargin/Detemir and IV regular insulin. There was a reduction in plasma glucose and an increase in plasma insulin with IV insulin, as opposed to SC or IM routes. To prove the effectiveness of IDeg, we measured insulin, C-peptide and glycemia after SC administration of IDeg-70 UI (Table 1). The patient maintained glycemia between 55 and 107 mg/dL and a detectable plasma insulin (75.7 µUI/mL) with 2 episodes of hypoglycemia (Fig. 1). She remained in use of IDeg 80 UI/d and aspart 2000 UI/d.

Table 1. Insulin and glycemia after subcutaneous administration of Degludec

Time After IDeg	Receiving	Capillary glucose	Plasma glucose	Insulinemia* (2.6-24.9 µUI/mL)	Ketonuria
00 hour	IV Regular insulin 5ml/h + Glucose 5% 5ml/h SC IDeg 70UI	100mg/dL	92mg/dl	>1000 µUI/mL	Absent
01 hour	Suspended IV Regular insulin	78mg/dL	-	-	-
02 hour	-	152mg/dL	147 mg/dl	313,7µUI/mL	-
03 hour	-	124 mg/dL	-	-	-
04 hour	-	97 mg/dL	87mg/dl	75,7µUI/mL	Absent
05 hour	15g of glucose IV	56mg/dL	-	-	-
06 hour	-	123mg/dL	107mg/dl	1,7 µUI/mL	-

\*Laboratory test not specific for IDeg

Figure 1. Capillary glucose levels after insulin degludec administration.



**Fig. 1** See text for description

**Discussion:** DRIASM is a rare syndrome, characterized by extreme resistance to SC and IM insulin, whose pathophysiology remains unknown [1]. There are few treatments available and most are ineffective. The use of intraperitoneal insulin pump is the therapy with the best result so far, but it is not available in Brazil [2]. Another possibility is the PTA, initially proposed by our group and then performed in other countries [3]. IDeg is a new-generation basal insulin analogue, formulated in the presence of phenol and zinc to create a solution of di-hexamers. After SC injection, the di-hexamers form a stable depot of multi-hexamer chains, with gradual dissociation of these chains into absorbed monomers [4]. According to our test IDeg was able to be absorbed and to reduce plasma glucose differently from all previously basal insulins.

**Conclusion:** IDeg was effective in the treatment of DRIASM, with reduction in hospital admissions and DKA episodes.

**A236**  
**Insulin glargine 300 U/ml (GLA-300) provides more even 24-hour pharmacokinetic (PK) and pharmacodynamic (PD) profiles vs. insulin degludec 100 U/ml (DEG-100) in T1DM**

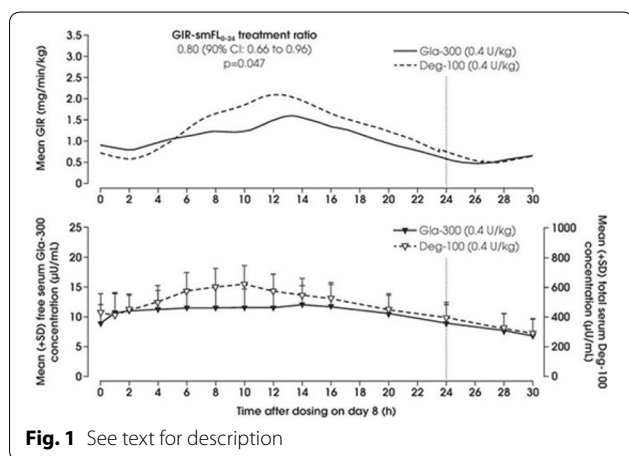
Timothy S. Bailey<sup>1</sup>, Jeremy Pettus<sup>2</sup>, Ronan Roussel<sup>3</sup>, Stephen Davis<sup>4</sup>, Karin Bergmann<sup>5</sup>, Magali Maroccia<sup>6</sup>, Nassr Nassr<sup>5</sup>, Oliver Klein<sup>7</sup>, Geremia Bolli<sup>8</sup>, Raphael Dahmen<sup>5</sup>

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The aim of this multiple-dosing, crossover, euglycemic glucose clamp study was to compare steady-state PK/PD profiles of Gla-300 vs. Deg-100 in two parallel cohorts with fixed once-daily dosing regimens in T1DM. For both insulins, participants received 0.4 (n = 24) or 0.6 U/kg/day (n = 24) at ~ 8 am for 8 days. Main endpoint: within-day variability

(fluctuation) of smoothed glucose infusion rate (GIR) over a 24-h dosing period (GIR-smFLO-24). Other endpoints: relative degree of serum insulin concentration (INS) 24-h fluctuation (Frel), area under the INS time curve (INS-AUC). Within-day GIR variability (GIR-smFLO-24) was 20% lower with Gla-300 vs. Deg-100 at 0.4 U/kg/day ( $p = 0.047$ ; Figure) but comparable at the 0.6 U/kg/day dose. Gla-300 provided more constant PK profiles than Deg-100 at both the 0.4 (Figure) and 0.6 U/kg/day dose levels; the relative degree of INS fluctuation (Frel) of Gla-300 was 13% and 17% lower vs. Deg-100 at 0.4 and 0.6 U/kg/day, respectively. Distribution of INS-AUC0-24 (6-h fractions; 0-6, 6-12, 12-18 and 18-24 h) was consistently more even with Gla-300 (25, 26, 26 and 23%) than with Deg-100 (23, 29, 26 and 21% [data the same at both dose levels]). Morning dosing of Gla-300 provides more even 24-h action profiles in T1DM at 0.4 U/kg/day and more constant steady-state serum concentrations vs. Deg-100, consistently across dose levels. This is an ENCORE abstract previously presented at ADA2017. Funding and editorial support provided by Sanofi (Fig. 1).



**A237**  
**Insulin glargine/lixisenatide fixed ratio combination improves glycaemic variability in type 2 diabetes**  
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**Background and aims:** iGlarLixi is a once-daily titratable, single injection of a fixed-ratio combination of insulin glargine 100 U/mL (Gla-100) and lixisenatide, and is in development for the treatment of type 2 diabetes.

**Materials and methods:** This post hoc analysis compared glycemic variability (GV) as measured by the high blood-glucose index (HBGI) and area under the curve (AUC) of patient self-monitored plasma glucose (SMPG) 7-point profile data from the Phase 3, 30-week LixiLan-O trial comparing iGlarLixi, Gla-100, and lixisenatide in 1170 patients uncontrolled on metformin ± 1 other oral antidiabetes drug [OAD], and the LixiLan-L trial comparing iGlarLixi with Gla-100 in 736 patients uncontrolled on basal insulin ± 1 or 2 OADs. In both trials, only metformin was continued upon study initiation and dosing was either optimized up to 2000 mg/day or stabilized ≥ 1500 mg/day.

**Results:** Compared with Gla-100 or lixisenatide alone, iGlarLixi resulted in a statistically significant improvement in GV profiles as indicated by the HBGI and AUC metrics (see Table), without a clinically significant change in the low blood-glucose index as a proxy for hypoglycemia (remaining < 1.0 for all). In addition, statistically significant mean blood-glucose level reductions were achieved.

**Table 1.** Patient characteristics and glycemic variability outcomes.

	LLO Study			LLL Study	
	iGlarLixi	Gla-100 n=284	Lixisenatide n=144	iGlarLixi n=246	Gla-100 n=238
<b>Baseline characteristics</b>					
Age, years	57.9	58.5	59.3	58.9	60.4
Female, %	56	53	44	57.3	52.9
A1C, %	8	8.1	8.2	8.0	8.1
FPG, mmol/L	9.8	9.6	9.8	7.5	7.3
<b>Mean SMPG, mmol/L</b>					
Baseline	10.4	10.2	10.4	9.2	9.0
Week 30	7.0	7.7	8.6	7.7	8.6
Change vs baseline	-3.4	-2.5	-1.9	-1.5	-0.4
p value	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.002
Mean change vs iGlarLixi		0.9	1.5		1.1
p value		< 0.0001	< 0.0001		< 0.0001
<b>HBGI*</b>					
Baseline	10.3	9.8	10.4	7.0	6.3
Week 30	2.0	3.4	5.1	3.7	5.7
Change vs baseline	-8.3	-6.3	-5.3	-3.3	-0.56
p value	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.116
Mean change vs iGlarLixi		2.0	3.0		2.79
p value		< 0.0001	< 0.0001		< 0.0001
<b>AUCn*</b>					
Baseline	2633	2592	2641	2355	2294
Week 30	1775	1973	2149	1954	2205
Change vs baseline	-858	-619	-492	-401	-90
p value	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.004
Mean change vs iGlarLixi		239	366		312
p value		< 0.0001	< 0.0001		< 0.0001

**Fig. 1** See text for description

**Conclusion:** In conclusion, iGlarLixi demonstrated a cumulative decrease in GV, greater than each of its components (Gla-100 and lixisenatide), in both the LixiLan-O and LixiLan-L trials. Study codes: NCT02058160 and NCT02058147. This is an ENCORE abstract previously presented at EASD2016. Funding and editorial support provided by Sanofi (Fig. 1).

**A238**  
**Interaction between obstructive sleep apnea, insulin resistance and non-alcoholic fatty pancreatic disease: signaling pathway design**

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**Introduction:** There is evidence of association between obstructive sleep apnea and insulin resistance, as well as, to fat deposition in the pancreas in a similar way to non-alcoholic fatty liver disease.

**Objective:** Demonstrate the interaction between obstructive sleep apnea, insulin resistance and non-alcoholic fatty pancreatic disease (NAFPD) by signaling pathway design.

**Method:** To investigate the involvement of metabolic signaling pathway, a search was performed using the Kyoto Encyclopedia of Genes and Genomes (KEGG), and the signaling pathway mapping was performed using the automatic annotation server of the KEGG. The signaling pathway map was realized using PathVisio program, a free available signaling pathway drawing software.

**Results:** The contigs were taken from the KEGG database and their mapped transcription represents the signaling pathway of the main biomolecules that triggers NAFPD. The interaction between obstructive sleep apnea, insulin resistance and inflammatory factors contributes to the possible development of fatty infiltration of the pancreas leading to the loss of β cells function, and even have links to the development of other metabolic disease (Fig. 1).

**Conclusion:** The interaction between obstructive sleep apnea and insulin resistance demonstrated through the signaling pathway, contributes to the possible development of NAFPD.

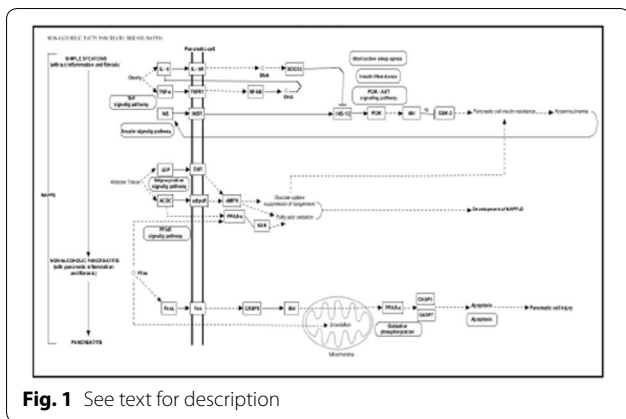


Fig. 1 See text for description

CTLA-4 is expressed on the surface of T lymphocytes and transmits an inhibitory signal through its B7-1/2 linker. In blocking the CTLA-4, Ipilimumab promotes an enhancement of T cell activation against neoplasms. During the treatment, the activation of these cells can also be directed to different organs/tissues and affect the skin (dermatitis), gastrointestinal tract (colitis, pancreatitis, hepatitis), lung (pneumonitis) and endocrine glands (thyroiditis, hypophysitis, adrenalitis). The purpose of this research is to narrate the case of a patient with metastatic melanoma submitted to adjuvant treatment with Ipilimumab who evolved with hypophysitis and pancreatitis, in addition to secondary diabetes, becoming insulin-dependent. The patient is a 66 years old male previously healthy, with a diagnosis of metastatic melanoma. He was subjected to surgical removal of the skin lesion and infraclavicular lymph node, in addition to adjuvant treatment with Ipilimumab. He performed four cycles of this medication and evolved with asthenia, headache, abdominal pain and hyperglycemia, about 3 weeks after the last cycle. He was hospitalized and during the medical investigation the following were detected: low ACTH, low cortisol and hyperprolactinemia—characterizing hypophysitis. Furthermore, there was an elevation of amylase and lipase and hyperglycemia, with levels above 400 mg/dL, requiring insulinization. The treatment with Prednisona 1 mg/Kg/dia lasted 1 month and the patient was discharged with a progressive weaning schedule program after such period. He remained with decompensated Diabetes at the outpatient level which made necessary frequent adjustments of dosage and full insulin therapy maintenance with Toujeo and Humalog insulins. Currently he is using Prednisone 10 mg/day, still without reevaluation of the corticotrophic axis. Given this scenario, we conclude that despite the undeniable advances on the treatments with monoclonal antibodies against solid neoplasias, especially melanoma, it is necessary an interdisciplinary follow up with these patients, besides the incorporation of guidelines for the effective management of side effects, allowing the safe use of this modality of treatment expanding (Fig. 1).

**A239**  
**Intestinal parasites infections and risk factors in diabetes type 2 patients**

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A239**

**Introduction:** Intestinal parasite are an important cause of morbidity and mortality in developing countries, and are now considered as an important health problem in immunocompromised people worldwide. Diabetes mellitus type 2 (DM2) is a group of metabolic diseases that affect an estimated 400 million persons. Diabetics have been reported to be immunocompromised, and are at increased risk of certain infections. However, few dates are shown about the prevalence of intestinal parasitic infections in DM2, as well the risk factors involved in the acquisition of these parasitic infections.

**Objective:** The purpose of this study was to determine the frequency and type of intestinal parasites in DM2 patients.

**Method:** This is a case-control study conducted in 149 individuals, being 97 patients with DM2, and 52 individuals not carrying DM2. Questionnaires were applied in all patients, A1c level were checked and three fresh stool samples were obtained and submitted to parasitological methods of Hoffman, Rugai and agar plate culture. Data were analyzed using Chi square and logistic regression tests.

**Results:** The positivity of parasitic infections in DM2 was 30.9% versus 23.2% in the control group (p = 0.308). The most detected infection in DM2 patients was Blastocystis hominis (12.4%), followed by Endolimax nana (13.4%), and no statistical difference was observed between the two groups analyzed. No condition was associated with intestinal parasites infections, including DM2, but patients with higher levels of A1c had more positive tests (p = 0.006), suggesting that poor metabolic control may be a risk factor.

**Conclusion:** Patients with DM2 might be at an increased risk of infections with intestinal parasites, especially opportunistic infection, and routine stool examination should be considered for those with worse metabolic control.

**A240**  
**Ipilimumabe and endocrinological colateral effects: case report**

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In the last couple of years, monoclonal antibodies have emerged as effective therapies for advanced neoplasms. Ipilimumab was the first inhibitor of cytotoxic T lymphocyte-associated antigen-4 (CTLA-4) to demonstrate an improvement in the survival of metastatic melanoma.

Data	Exame	Resultado	Valor de Referência
14/06/17	Cortisol	3,6 microg/dL	6,0 a 18,4 microg/dL
14/06/17	ACTH	< 1 pg/mL	7,0 a 63 pg/mL
14/06/17	Glicose	414mg/dL	74 a 99 mg/dL
14/06/17	T4-L	0,8ng/dL	0,78 a 2,19 ng/dL
14/06/17	TSH	1,76 uIU/mL	0,4 a 4,6 uIU/mL
14/06/17	HbA1C	8,2%	< 5,7 %
19/06/17	Creatinina/ Uréia	1,7 mg/dL / 15mg/dL	0,7 a 1,3 mg/dL / 19 a 43 mg/dL
19/06/17	Amilase	100 U/L	30 a 110 U/L
19/06/17	Lipase	84 U/L	23 a 300 U/L
20/06/17	Cortisol	1,5 microg/dL	6,0 a 18,4 microg/dL
27/06/17	Prolactina	50 microg/L	Até 24 microg/L

Fig. 1 See text for description

Informed consent to publish had been obtained from the patient.

**A241**  
**Is hypoglycemia a modifiable patient risk in type 2 diabetes? a pooled analysis of insulin glargine 300 U/ml (GLA-300) vs. 100 U/ml (GLA-100) trials**

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Repeated episodes of hypoglycemia are associated with an increased risk of adverse clinical outcomes. Underlying patient characteristics may predispose to repeated hypoglycemia. We evaluated potential patient predisposition to documented hypoglycemia in pooled data (N = 2488) from 3 T2DM clinical trials of Gla-300 vs. Gla-100 and their 6-month extensions (N = 1994). 14 patients were removed due to missing baseline data. Monthly study data were analyzed with general estimating equations (GEE) to assess the impact of patient characteristics on risk of repeated hypoglycemic events over 12 months. Baseline characteristics were comparable between groups: mean age 59 years, BMI 35 kg/m<sup>2</sup>, A1C 8.3%, diabetes duration 13 years, and Charlson Comorbidity Index (CCI) 0.56 for Gla-300 vs. 0.60 for Gla-100. Less documented ( $\leq 70$  mg/dL) symptomatic hypoglycemia was noted with Gla-300 vs. Gla-100 (57.0% vs. 63.3%, odds ratio = 0.77, 95% CI 0.65–0.90, P = 0.001). Female gender (P < 0.001), BMI  $\leq 35$  kg/m<sup>2</sup> (P < 0.001), CCI > 0.60 (P = 0.017), and diabetes duration > 10 years (P = 0.001) were associated with an increased number of documented, symptomatic hypoglycemia events. Poisson regression showed a lower event rate for Gla-300 vs. Gla-100 (4.4 vs. 5.2 events/year; rate ratio 0.84, 95% CI 0.76–0.92, P < 0.001) independent of patient characteristics. Furthermore, monthly percentage of patients experiencing documented hypoglycemia increased in Gla-100 but stayed unchanged in Gla-300 over CCI (P Interaction = 0.017). In conclusion, repeated episodes of documented hypoglycemia in T2DM are reflective of such patient characteristics as gender, BMI, diabetes duration and comorbidity. Gla-300 is associated with a lower event rate than Gla-100 through the 12 months period. In particular, increasing hypoglycemia risk due to patient burden of comorbidity appears to be mitigated with Gla-300 compared to Gla-100. This is an ENCORE abstract previously presented at ADA2015. Funding and editorial support provided by Sanofi.

#### A242

##### Judicial requisition of already given items for diabetes mellitus treatment in a medium county in Minas Gerais, Brazil

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**Introduction:** Article 196 of Brazilian Federal Constitution defines that health is a right of every citizen and a duty of the Nation and it is guaranteed by social and economic policies that aim to reduce disease risks and other injuries. There are an increased number of patients that sue the governments to request free items for diabetes mellitus treatment.

**Aims:** To analyse the items asked in the solicitations: insulins, oral medication and supplies that are already given for free by federal, state and county governments in 2014 due to legal actions to get diabetes mellitus treatments in the county of Juiz de Fora.

**Methods:** This was a descriptive retrospective documentary study in which document copies related to legal actions requesting material for diabetes treatment against Juiz de Fora City Council were analysed. There were included accepted or partially accepted treatments between 2005 and 2014. There were excluded treatments related to deceased patients before 2014 or discontinued treatment. Data bank was made using Excel 2010 and Statistical Package for the Social Sciences (SPSS) version 15.0.

**Results:** The sample was 254 documental copies of legal action. 26.38% have no free items required; in 23.23% all the items were already dispensed with no extra costs by Unified Health System (SUS); in 50.39% only some items were already dispensed by SUS. This means that in 73.62% of solicitations there were at least one item that is already free giving. There were 36 NPH insulin; 16 insulin regular; 40 glargine insulin; 11 metformin; 4 gliclazide; 1 glibenclamide; 58 disposable syringes; 73 lancets; 16 glucose test strips solicitations. When analysing these request annually there is a downward trend maybe because some judges started to refuse to give some SUS items to the patients after doing a technical research to verify if those were already dispensed by SUS.

**Conclusion:** There is more than one way to get free diabetes treatment items in Brazil but they are still requested and this indicates financial waste. These items when requested by legal actions are more expensive due to fewer amounts of items to purchase and the urgency involved. It is important to guarantee that the patient is getting his or her treatment in SUS pharmacies to avoid more expensive purchases and financial waste.

#### A243

##### Kidney impairment among fulni-Ô indigenous people with diabetes—the project of atherosclerosis among indigenous populations (PAI)

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A243**

**Introduction:** Indigenous health policy has been traditionally neglected in Brazil. It is unclear the prevalence of diabetes-related complications in this population.

**Aim:** To assess kidney impairment among Fulni-Ô indigenous people with diabetes.

**Method:** PAI is a transversal study that included in the pilot phase 47 low urbanized Fulni-Ô indigenous people from Águas Belas (Pernambuco), aged between 30 and 70 years, after excluding those with history of cardiovascular diseases or that refused blood collection. Diabetes was defined if HbA1c  $\geq 6.5\%$  or if in use of hypoglycemic drugs. Serum creatinine values were used to calculate the estimated glomerular filtration rate (eGFR) of each participant, using the modified MDRD formula:  $eGFR (ml/min/1.73 m^2) = 186 \times (creatinine)^{-1.154} \times (age) - 0.203 \times 0.742$  (if female). Then, kidney impairment was classified based on eGFR values: stage 1  $\geq 90$  ml/min/1.73 m<sup>2</sup>; stage 2 = 60–89 ml/min/1.73 m<sup>2</sup>; stage 3A = 45–59 ml/min/1.73 m<sup>2</sup>; stage 3B = 30–44 ml/min/1.73 m<sup>2</sup>; stage 4 = 15–29 ml/min/1.73 m<sup>2</sup>; and stage 5 < 15 ml/min/1.73 m<sup>2</sup>. Variables were described in their averages  $\pm$  standard deviation or proportions; t test was used to assess sex related differences. The study was approved by the National Ethics Committee, approval number 1.488.268. Informed consent to publish has been obtained from these patients.

**Results:** Of the 47 indigenous people, 15 had diabetes. Of those with diabetes, the average age was  $58.5 \pm 11.5$  years and 80% were females. The average serum creatinine of both sexes was 0.96 mg/dL. The average eGFR in male Fulni-Ô indigenous people was  $84.05 \pm 1.45$  ml/min/1.73m<sup>2</sup>, compared to  $63.75 \pm 2.55$  ml/min/1.73m<sup>2</sup> in female participants (p < 0.01). One female participant was in Stage 1 for kidney impairment, 72.7% were in Stage 2, and 18% were in stage 3A. All male participants were in kidney impairment Stage 2.

**Conclusion:** There was a high prevalence of initial staged kidney disease in Fulni-Ô indigenous people with diabetes (Águas Belas-Pernambuco). Indigenous with diabetes were mostly females above 40 years old, classified in Stage 2 kidney disease based on their estimated glomerular filtration rate.

#### A244

##### Laboratory goals proposed by the SBD for glycemic and lipidic control of women in post-menopause with type 2 diabetes served in reference service

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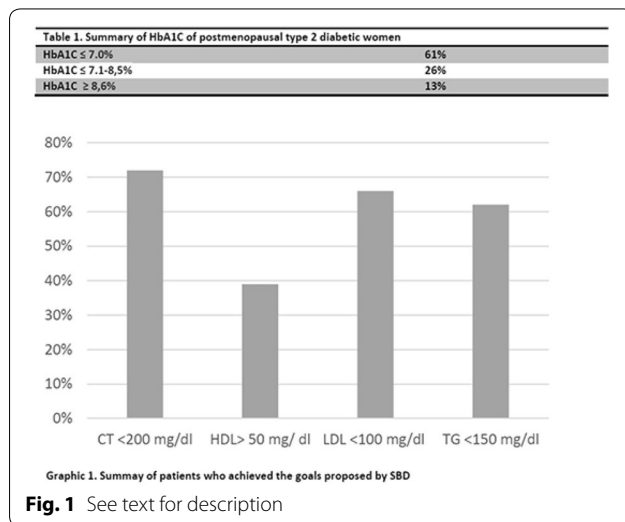
**Introduction:** Several studies have already demonstrated the importance of glycemic control among diabetic patients, as well as adequate blood pressure, lipid and obesity control. However, it is not uncommon for some of these factors to be poorly controlled in diabetic individuals, especially postmenopausal women, when the insulin resistance phenotype is accentuated, which may make it difficult to control the disease.

**Objectives:** To determine the glycemic and lipid profiles of postmenopausal women with type 2 diabetes (DM2) and to compare them with the goals established by the Brazilian Society of Diabetes (SBD).

**Material/methods:** A cross-sectional study was performed between August/2016 and March/2017 with postmenopausal type 2 diabetic women. To obtain the data, the information of anamnesis, physical examination and the following biochemical parameters were analyzed respectively: Glycated hemoglobin (HbA1c), fasting glycemia (GJ), total cholesterol (TC), HDL cholesterol, LDL cholesterol) and triglycerides (TG). The data obtained were compared with the values proposed as targets by SBD.

**Results:** A total of 238 patients were studied, mean age 59.5 years (46–73 years) and mean duration of diabetes  $12.3 \pm 8.4$  years. Fasting glycemia  $124.2 \pm 46.1$  mg/dl and HbA1c  $6.7 \pm 1.6\%$ . HbA1c  $\leq 7.0\%$ , 7.1–8.5% and  $\geq 8.6\%$  were found in 61, 26 and 13% of the patients, respectively. Patients who achieved the goals proposed by SBD were: 72% CT < 200 mg/dl, 39% HDL > 50 mg/dl, 66% LDL < 100 mg/dl and 62% TG < 150 mg/dl.

**Conclusions:** In our study, despite the heterogeneity in the achievement of the goals, the majority presented glycemic and lipid controls consistent with the current guidelines. We emphasize the need for effective therapeutic measures for the improvement of glycemic and metabolic controls, since a considerable percentage of patients did not reach the proposed goals, with a consequent impact on morbidity and mortality (Fig. 1).



#### A245

##### Laser effects in the healing process of plantar ulcers in neuropathic diabetics

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**Introduction:** Among the many complications caused by diabetes, late healing is one of the most recurrent. Angiogenesis deficiencies can also lead to delay the tissue repair and a great deal of effort has been devoted to the production of new drugs and other agents capable of promoting a safe and an effective healing. It is known that phototherapy has an important action on oxidative stress markers, due to the significant decreases of fibrinogen and nitric oxide plasma levels.

**Objective:** To analyze the effects of laser in the healing process of plantar ulcers and the quality of life of diabetics with peripheral neuropathy.

**Methods:** An intervention study accomplished at a Health Center in the city of Fortaleza, from May to July, 2017. Ten calls were performed, twice a week for each participant. Wounds were treated with the Laser As-Ga (Sonomaster, brand KW<sup>®</sup>), with an intensity of 7 J/cm<sup>2</sup>, an application time of 28 s, in a punctual way, with contact and with the pen perpendicular to the lesion, in equidistant points for 30 min. To evaluate the plantar ulcer size, the measurement was performed using an analog pachymeter at the beginning and at the end of the study, considering the dimensions (height x width). Beside this, was applied a questionnaire of quality life measure in diabetes and the questionnaire of self-care activity with diabetes. The results were expressed as mean  $\pm$  standard deviation and presented as a percentage. T test was used to compare the pre and the post therapy, being considered statistically significant when  $p \leq 0.05$ .

**Results:** In relation to ulcer size, a statistically significant reduction of 73.7% in wound size ( $0.95 \pm 0.48$  cm<sup>2</sup>– $0.25 \pm 0.13$  cm<sup>2</sup>, respectively, the pre and post therapy) was observed; In the quality of life questionnaire, was observed an increase in satisfaction of 19.3% and a reduction in impact and social concerns of 8.4 and 7.7% respectively. About the self-care questionnaire, an increase of 16.2% was observed when comparing the pre with the post therapy.

**Conclusion:** Were observed improvement of healing, quality of life and self-care after 10 physical therapy sessions with the application of Laser As-Ga in diabetic patients with neuropathy.

#### A246

##### Latent autoimmune diabetes of adults (LADA)—case report

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**Case presentation:** E. O. B., 56, body mass index (BMI) of 19.1 kg/m<sup>2</sup>, alcoholic, with history of diabetes in the family, was diagnosed with Diabetes Mellitus type 2 (DM 2) 2 years ago, because of the results of his fasting glycemia, glycated hemoglobin, and disease symptoms. He initiated treatment with anti-diabetic medications: first with Metformin, and then Glicazide, and Alogliptin, but demonstrated no success in decreasing his blood glucose. Due to his diabetes decompensation, he had to be hospitalized so that his poor condition could be evaluated. After being discharged from the hospital, he was still using insulin, when it became necessary to verify the antibody of the anti-glutamic acid decarboxylase (AB anti-GAD) and C-peptide to test for latent autoimmune diabetes of adult (LADA), because a refractory treatment to the hypoglycemic and low BMI was observed, even though his alcoholism was a well-known situation. The result of the AB anti-GAD was of 1078 UI/mL (negative – less than < 10), and low C-peptide = 1.05 ng/mL (1.10–3.0).

**Discussion:** There is a variation of the Diabetes Mellitus type 1 (DM 1) called Latent Autoimmune Diabetes of Adults (LADA) characterized by being a late-onset diabetes, and being often mistaken with DM 2. Especially in older patients, as seen in this case, therefore, these patients are treated by us, doctors, as someone whose diabetes is not

controlled because they do not want to change their eating, health and physical habits. Clinically, LADA appears in adulthood and it presents refractory responses to oral hypoglycemic for a short follow-up period. LADA has predominantly AB anti-GAD and low C-peptide, reflecting the endogenous insulinopenia. These patients develop a pancreatic beta-cell failure which is considered slower than the failure observed in juvenile DM type 1.

**Conclusion:** It is important to identify and investigate this clinical entity, so often mistaken with DM 2 and that, because of negligence, continues to be treated as DM 2. To evaluate the type of DM, an earlier introduction of insulin therapy would be necessary, and would avoid ineffective treatments, as well as the early and complete failure of the pancreas, especially in chronic macro- and microvascular complications of the disease.

Informed consent to publish had been obtained from the patient.

#### A247

##### Latent autoimmune diabetes of adults (LADA): particularities and diagnostic difficulties—case report

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C.M, a female patient, started her follow-up at the age of 29, BMI 19 kg/m<sup>2</sup>, with previous diagnosis of gestational diabetes without the need for insulin, which remained as type-2 diabetes. 3 years after the diagnosis, we evaluated her positive anti-islet antibodies (IAA) in low titration and negative anti-decarboxylase anti-GAD antibody establishing the diagnosis of LADA-type diabetes. 6 years after the diagnosis she presented thyroid disease with positive anti-thyrotropin (anti-TPO). For 6 years, the patient used oral hypoglycemic agents: Glibenclamide and Metformin. The use of insulin was introduced when the oral antidiabetics, even at maximum dose, weren't sufficient to maintain acceptable glycemic levels. LADA diabetes affects approximately 12% of the patients diagnosed with DM 2, with the diagnosis made more difficult due to lack of knowledge about the disease, the diversity of the population studied and the divergence of the criteria used and the antibodies evaluated. The Furlanos 2006 diagnostic criteria are among the most accepted and include ages < 50 to the diagnosis, the presence of acute symptoms, BMI < 25 kg/m<sup>2</sup>, personal or family history of other autoimmune diseases. If there are two of these clinical characteristics, the dosage of antibodies is requested to confirm the diagnosis; however, it is known that over time, the antibodies can become negative. Although anti-GAD is more prevalent, it isn't the only one capable of confirming the diagnosis. Other diagnostic criteria are the absence of ketoacidosis or symptomatic hyperglycemia during or immediately after the diagnosis, no need for insulin for 6–12 months. The patient was 29 years old at the beginning of the disease, positive IAA and a personal history of thyroid disease with positive anti-TPO; she presented acute symptoms and did not present ketoacidosis and symptomatic hyperglycemia. One particularity is that the patient didn't use insulin for 6 years, which is usually of 6–12 months, extrapolating for a maximum of 2 years. She is currently 49, maintains regular glycemic control and uses Glargine and Lispro insulin. The fact that the patient had an atypical latency period leads one to question whether the quantitative ratio of other antibodies, in this case IAA, influences in the prognosis in the same manner as anti-GAD.

Informed consent to publish had been obtained from the patient.

#### A248

##### Level of knowledge of students of the physical education course on types of diabetes correlated to physical exercise practice

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**Introduction:** Due to the increasing number of diabetic individuals worldwide, the practice of physical exercise has been recommended, not only as a prophylactic factor, but also as a low cost non-pharmacological intervention. But for the exercise to bring the necessary results to the diabetic individuals it is necessary that the Physical Education professional who will act in the prescription of the exercises understand about the existing types of Diabetes and which exercise strategy can be performed by them.

**Objective:** This study aimed to evaluate the knowledge of physical education students about the types of diabetes and correlate them with the types of physical exercise.

**Methods:** N of 10 students from the 6th period of Physical Education of the Federal University of Mining Triangle participated in our study, from which they had to answer five questions about types of Diabetes and exercises for this population. The data was tabulated in Microsoft Excel 2007.

**Results:** The results showed that only 40% (n = 4) of the students were aware of the existing types of diabetes and in relation to physical exercise, 60% (n = 6) knew which exercises could be used by this population.

**Conclusion:** In this way we conclude that the data obtained suggest that within this group, there is a lack of knowledge so that they can work with this population. Thus, measures such as increasing focus on disciplines dealing with this type of disease and the prescription of exercises could be better developed.

#### A249

##### Link between diabetes and cancer: signaling pathway design

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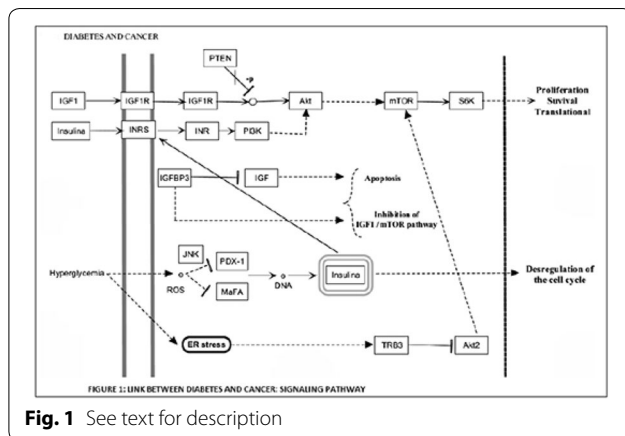
**Introduction:** Epidemiological studies have demonstrated the association between type 2 diabetes (DM2) with development of several types of cancer that could be explained by different biological processes of pathophysiology of the DM2.

**Objective:** Demonstrate the interaction between DM2, insulin resistance and cancer by signaling pathway design.

**Method:** To investigate the link between diabetes and cancer, a search was performed using the Kyoto Encyclopedia of Genes and Genomes (KEGG), and the signaling pathway mapping was performed using the automatic annotation server of the KEGG. The signaling pathway map was realized using PathVisio program, a free available signaling pathway drawing software.

**Results:** The contigs were taken from the KEGG database and their mapped transcription represents the signaling pathway of the main biomolecules that triggers cancer. The interaction between DM2 and insulin resistance contributes to the possible development of several types of cancer (Fig. 1).

**Conclusion:** At the cellular level, an excessive amount of molecules acting through distinct signaling pathways suggests a link between the multiple signaling pathways at the association between DM2 and cancer (Fig. 1).



### A250

#### Lipidic parameters of wistar rats treated with increasing doses of prednisone®

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**Abstract:** Lipids are organic components that plays as distributors of tissue fat, and their disorders can lead to side effects, such as in use of drugs like prednisone, a synthetic glucocorticoid with immunosuppressive action. In addition, experimental studies of effects of different doses are important in assessing the safety of a drug. The objective was to evaluate the lipid biomarkers in rats treated with several doses of prednisone. Male Wistar rats weighing 450–510 g were distributed in groups (n = 7 each): Control group (CONT) treated with vehicle; and treated groups with prednisone (PRED) at doses of 2.5 mg/Kg (PRD1 group) and 5.0 mg/Kg (PRD2 group). The treatment was daily for 21 days, with weekly measures of body weight, food consumption and calories ingested on days 0, 8 and 16 of treatment. On the last day, the caloric gain was evaluated and then the rats were anesthetized and killed by decapitation to collect the whole blood for serum biochemical analyzes. All data were statistically evaluated with significance of 5%.

**Results and conclusions:** There were no differences in body weight, dietary intake and serum triglyceride biomarkers, total cholesterol, VLDL and LDL lipoproteins, and non-HDL cholesterol (p > 0.05). However, in CONT and PRD2 rats, the amount of calories ingested on the 16th day of treatment was higher (CONT = 97.2 ± 16.9 and PRD2 = 93.2 ± 20.4 kcal/day) compared to days 0 CONT = 59.0 ± 14.6 and PRD2 = 63.7 ± 12.3 kcal/day) and 8 of treatment (CONT = 62.0 ± 24.6 and PRD2 = 69.0 ± 18.1 kcal/day). The caloric gain and the high density lipoprotein (HDL) levels were lower in the PRD1 group than in the CONT group (caloric gain: PRD1 = 0.079 ± 0.040 vs. CONT = 1.90 ± 0.031 kcal/day/weight and HDL: PRD1 = 14.80 ± 8.54 vs. CONT = 28.80 ± 4.16 mg/dL). The exposure of moderate doses of prednisone in a short period of time is capable of developing long-term dyslipidemia (mainly by HDL decreasing), suggesting its use with caution. In addition, longer exposure to the drug could induce more obvious and significant lipid changes.

### A251

#### Liraglutide and renal outcomes in type 2 diabetes: results of the leader trial

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**Background:** The effects of liraglutide, a long-acting glucagon-like peptide-1 (GLP-1) analog, on renal outcomes in type 2 diabetes are unknown. We conducted a randomized, double-blind, placebo-controlled trial comparing liraglutide vs placebo, both on a background of standard of care, in participants with type 2 diabetes and high cardiovascular risk.

**Methods:** The Liraglutide Effect and Action in Diabetes: Evaluation of cardiovascular outcome Results (LEADER) trial was initiated in 2010 and completed in 2015. Renal events were key secondary outcomes. The primary renal outcome was a composite of new onset of persistent macroalbuminuria, persistent doubling of serum creatinine, end stage renal disease (ESRD), or death due to renal disease. Risk of renal outcomes was determined using intention-to-treat in time-to-event analyses; competing risk of death was taken into account. Change of eGFR and loss of eGFR by > -30% was also analyzed.

**Results:** 9340 patients were randomized and median follow-up was 3.84 years. The primary renal outcome occurred in fewer participants treated with liraglutide (268 of 4668) than with placebo (337 of 4672; HR 0.787 [0.670;0.924] p = 0.003). The difference was primarily driven by new onset of persistent macroalbuminuria, occurring in fewer participants treated with liraglutide (161 of 4668) than with placebo (215 of 4672; HR 0.74 [0.61;0.91] p = 0.004). Doubling of serum creatinine and ESRD tended to be less frequent with liraglutide. eGFR decreased significantly less and albuminuria increased less with liraglutide than placebo. The difference in change of eGFR was driven exclusively by the subgroup with eGFR < 60 ml/min at baseline (N = 2458). The difference in change of albuminuria was independent of baseline eGFR or albuminuria.

**Conclusions:** In conclusion, liraglutide in addition to standard of care therapy reduced the progression of diabetic nephropathy.

### A252

#### Liver enzymes levels and their correlations with anthropometric measures and glycaemic control in diabetics

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Studies developed in the last decade have demonstrated an important relationship between the levels hepatic markers and the development of diseases associated with type 2 Diabetes Mellitus; the main condition that justified this connection was non-alcoholic steatohepatitis (NASH).

**Aims:** To analyse liver enzymes levels, correlating them with other clinical and laboratory variables, in a group of diabetics.

**Methods:** The 78 patients were evaluated in two moments, at intervals of 3–6 months, by the time of their routine endocrinological follow-up for the Diabetes, and data obtained in both occasions were compared. Concomitantly with the liver enzymes levels, age, body mass index (BMI), abdominal circumference, blood pressure, fasting glucose, and haemoglobin A1c were evaluated, in search for correlations between the enzymatic levels and the other clinical and laboratory variables.

**Results:** When the two moments were compared, there was not a significant difference regarding the levels of AST (26.5 ± 13.9 vs. 27.4 ± 24.7 U/L; p = 0.7271), ALT (28.5 ± 25.9 vs. 27.3 ± 18.1 U/L;

$p = 0.6964$ ) or GGT ( $45.0 \pm 52.0$  vs.  $39.4 \pm 40.2$  U/L;  $p = 0.1301$ ). The levels of alkaline phosphatase (AP) decreased from the 1st to the 2nd evaluation ( $74.2 \pm 35.6$  vs.  $67.7 \pm 28.0$  U/L;  $p = 0.0085$ ). In the multivariate analysis, BMI was the main predictive factor for the AST ( $r^2 = 0.0367$ ;  $p = 0.0170$ ) and GGT levels ( $r^2 = 0.0673$ ;  $p = 0.0149$ ), while abdominal circumference was the main determinant of those of ALT ( $r^2 = 0.0863$ ;  $p = 0.0070$ ). Regarding AP, a combined influence of age, systolic blood pressure, and AST levels was identified ( $r^2 = 0.3358$ ;  $p < 0.0001$ ).

**Conclusion:** In this sample, a relationship between hepatic enzymes and anthropometric measures indicative of abdominal obesity, opposed to the absence of relationship between hepatic enzymes levels and parameters of Diabetes control, suggests that measures capable of controlling obesity would be more efficient than glycaemic control per se to treat NASH in this population.

### A253

#### Low levels of vitamin D are associated with increased risk of gestational diabetes mellitus

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**Introduction:** It is in the interest of the scientific community the role of vitamin D in the pathogenesis and prevention of diabetes. While the exact mechanism which vitamin D deficiency may contribute to the development of type 2 diabetes, several different studies currently being developed point to one approach. Gestational diabetes mellitus increases risk of type 2 diabetes in consecutive years. Thus, studies correlating deficiency vitamin D and gestational diabetes mellitus complemented others covering type 2 diabetes. Several epidemiological studies have documented the vitamin D deficiency as a frequent problem identified in the Brazilian adult population in different clinical situations. However, the role of this a vitamin deficiency among patients with gestational diabetes (GDM) is not clear.

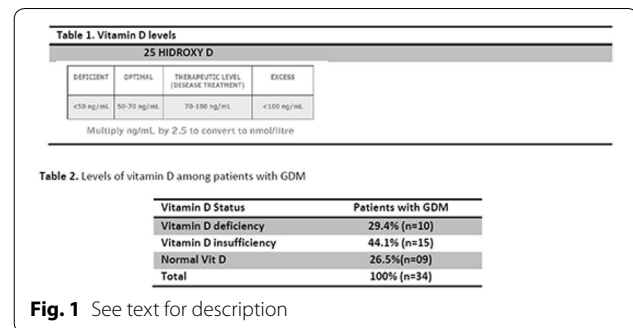
**Objectives:** The aim of the study was to evaluate the extent of vitamin D deficiency among pregnant women who have been diagnosed with GDM.

**Materials/methods:** This was a cross-sectional study of a convenience sample comprising pregnant women monitored between February 2016 and March 2017. All patients were diagnosed with gestational diabetes and they referred for outpatient treatment of Division of Endocrinology and Diabetes, Beneficencia Portuguesa Hospital, Sao Paulo, Brazil. For this purpose, we determined the plasmatic levels of vitamin D at the first routine medical visit. Vitamin D deficiency was defined as a 25(OH) D below 20 ng/ml (50 nmol/liter), and vitamin d insufficiency as a 25 (OH) D of 21–29 ng/ml (525–725 nmol/liter) (Table 1).

**Results:** We studied 34 patients, mean age of  $36.3 \pm 8.4$  years (27.9–44.7). The observed prevalence of vitamin D deficiency and insufficiency proved to be 29.4 and 44.1%, respectively (Table 2). The disorder was previously known in 53.3% of cases and newly diagnosed in 46.7% of patients.

**Conclusion:** Vitamin D acts as a potent immunosuppressor and its deficiency predisposes to type 1 diabetes in animal models and in humans. Based on another line of analysis, it is possible that the similar mechanism may be involved in other forms of diabetes, as type 2 diabetes and/or GDM. Vitamin D supplementation has shown to reduce the risk of developing type 1 diabetes or even minimize complications diabetes-related. And, once more, in an analogous way we may suppose that similar results shall be attested in future. With specific regard to GDM, vitamin D deficiency has been associated with an increased

risk of pre-eclampsia among pregnant women. The role of Vit D deficiency in GDM is not clear. According to our data, low levels of vitamin D were highly prevalent among patients with GDM. Due to the small sample size and absence of a control group, future randomized clinical trials are required to answer the precise role of vitamin D on glucose control after a gestational diabetes diagnosis was made (Fig. 1).



### A254

#### Low-protein diet disrupts the crosstalk between the PKA and PKC signaling pathways in isolated pancreatic islets

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Protein restriction in the early stages of life can result in several changes in pancreatic function. These alterations include documented reductions in insulin secretion and in cytoplasmic calcium concentration. However, the mechanisms underlying these changes have not been completely elucidated and may result, in part, from alterations in signaling pathways that potentiate insulin secretion in the presence of glucose. Our findings suggest that protein restriction disrupts the insulin secretory synergism between Cyclic adenosine monophosphate (cAMP)-dependent protein kinase (PKA) and Ca<sup>2+</sup>-dependent protein kinase C (PKC) in isolated islets. Western blot analysis demonstrated reduced levels of both phospho-cAMP response element-binding protein (phospho-CREB) at Ser-133 and substrates phosphorylated by PKCs (Phospho-(Ser) PKC substrate), suggesting that PKA and PKC activity was impaired in islets from rats fed a low protein diet (LP). cAMP levels and global Ca<sup>2+</sup> entry were also reduced in LP islets. In summary, our findings showed that protein restriction altered the crosstalk between PKA and PKC signaling pathways, resulting in the alteration of secretory synergism in isolated islets.

### A255

#### Lower risk of hypoglycemia and less health care utilization (HCU) in basal insulin-treated patients (PTS) with type 2 diabetes (T2D) after switching to insulin glargine 300 units/ml (GLA-300) vs other basal insulins in real-world clinical settings

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A255**

**Objective:** To evaluate clinical outcomes and HCU of pts with T2D using basal insulin (BI) who switched to GLA-300 or other BI (O-BI).

**Methods:** DELIVER2 used data from Predictive Health Intelligence Environment database of medical records representing 37 integrated



delivery networks. Pts were adults with T2D using BI who had baseline data for 12 months (m) before switching to either GLA-300 or O-BI from insulin glargine 100 units/mL or insulin detemir (index date [Dx]: first BI switch from Mar 1, 2015 to May 31, 2016); followed for 6 m after Dx; had baseline and follow-up (> 90 days after Dx) A1C measures. Final number of pts was 2185 for GLA-300 and 3921 for O-BI. Pts on GLA-300 and O-BI were matched 1:1 on a propensity score (PS) based on baseline characteristics. The endpoints were A1C change from baseline, incidence and event rate of hypoglycemia (hypo) (identified by ICD-9/ICD-10 and/or plasma glucose level  $\leq 70$  mg/dL), and HCU (incidence and event rate of all-cause, diabetes-, and hypo-related visits) within 6 m.

**Results:** After PS matching, each group comprised 1827 pts. Mean baseline A1C was 8.95% for GLA-300 and 8.93% for O-BI. A1C decreased significantly to 8.40 and 8.46%, respectively, during 6 m follow-up in both groups:  $-0.55\%$  for GLA-300 vs  $-0.47\%$  for O-BI;  $P = 0.14$ , but fewer pts experienced hypo on GLA-300 than on O-BI (15.9% vs 18.2%;  $P = 0.01$ ). Adjusted for baseline hypo, switching to GLA-300 was associated with fewer hypo events at 6 m (least squares means [LSM] difference: 0.23 events/patient per year [E/PPPY],  $P < 0.01$ ). Pts on GLA-300 had a lower risk of requiring all-cause inpatient and emergency room (ER) service vs O-BI at 6 m follow-up (adjusted odds ratio: inpatient 0.76 [0.63–0.93],  $P = 0.01$ ; ER 0.77 [0.66–0.91],  $P < 0.01$ ). Pts on GLA-300 had fewer all-cause ER and outpatient events (LSM difference: ER 0.18 E/PPPY,  $P = 0.01$ ; outpatient 0.99 E/PPPY,  $P < 0.01$ ). Similarly, the outcomes of diabetes- and hypo-related HCU favored GLA-300.

**Discussion:** Switching to GLA-300 was associated with lower hypo risk vs switching to O-BI. This translated into a lower incidence of inpatient and ER visits and fewer events of all-cause and diabetes-related outpatient services. This real-world study supports the effectiveness of GLA-300 in reducing risk of hypo and HCU while achieving similar A1C control vs O-BI for pts with T2D. This is an ENCORE abstract previously presented at AACE2017. Funding and editorial support provided by Sanofi.

## A256

### Maternal metabolic effect of morinda citrifolia treatment during pregnancy rats with mild diabetes

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**Introduction:** During pregnancy, hyperglycaemia can lead to maternal and fetal complications, causing metabolic changes. Alternatives are considered to treat diabetes and prevent its complications, and one of these alternatives is the use of medicinal plants, such as Morinda citrifolia, popularly known as Noni. However, there is no scientific evidence of this plant effect during gestation.

**Objective:** To evaluate the effects of the aqueous extract of Morinda citrifolia in the metabolism of pregnant rats with mild intensity hyperglycemia.

**Method:** Diabetes was induced in newborn female Wistar rats, at 24 h after birth, by subcutaneous injection of Streptozotocin at a single dose of 100 mg/kg. At 110 days of age (adulthood), oral glucose tolerance test (OGTT) was performed to confirm the mild diabetes model. After confirmation of the diabetes, the rats were mated and distributed into 4 experimental groups ( $n = 12$  animals/group): Control: Non-diabetic rats treated with water; Control Treated: Nondiabetic rats treated with the plant; Diabetic: Diabetic rats treated with water; Diabetic Treated: Diabetic rats treated with the plant. The administration of the Morinda citrifolia fruits aqueous extract, at dose of 750 mg/kg, was done daily, by gavage, throughout pregnancy. Corporal weight, water intake, food consumption and glycaemia were evaluated weekly and on the 17th day of pregnancy the OGTT was performed one more time. On the morning of the 21st day of pregnancy, the rats were anesthetized and blood was collected for biochemical measurements. Heart, liver, spleen, pancreas and kidneys were weighted.

**Results:** There was no change in the maternal organ weight and in the water intake among the groups. Body weight was decreased at the end of pregnancy in all groups, and food intake was decreased in both treated groups. It was showed that both diabetic groups presented higher glycaemia at the beginning of pregnancy and TOTG presented high values before and during pregnancy. In addition, HDL-c level was decreased in all groups in relation to Control.

**Conclusion:** Treatment with Morinda citrifolia failed to control hyperglycemia in diabetic rats, and caused changes in body weight, food intake and biochemical parameters, showed care of its use during gestation.

## A257

### Maternal metabolic repercussions of curatella americana treatment during the pregnancy of rats with mild diabetes

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**Introduction:** During pregnancy, hyperglycemia can lead to maternal and fetal complications, causing metabolic changes. Alternatives are considered to treat diabetes and prevent its complications, and one of these alternatives is the use of medicinal plants, such as Curatella americana. However, there is no scientific evidence of this plant effect during gestation. Objective: To evaluate the effects of the aqueous extract of Curatella americana in the metabolism of pregnant rats with mild intensity hyperglycemia.

**Method:** Diabetes was induced in newborn female Wistar rats, at 24 h after birth, by subcutaneous injection of Streptozotocin at a single dose of 100 mg/kg. At 110 days of age (adulthood), oral glucose tolerance test (OGTT) was performed to confirm the mild diabetes model. After confirmation of the diabetes, the rats were mated and distributed into 4 experimental groups ( $n = 12$  animals/group): Control: Non-diabetic rats treated with water; Control Treated: Non-diabetic rats treated with the plant; Diabetic: Diabetic rats treated with water; Diabetic Treated: Diabetic rats treated with the plant. The administration of the Curatella americana leaves aqueous extract, at dose of 300 mg/kg, was done daily, by gavage, throughout pregnancy. Corporal weight, water intake, food consumption and glycaemia were evaluated weekly and on the 17th day of pregnancy the OGTT was performed one more time. On the morning of the 21st day of pregnancy, the rats were anesthetized and blood was collected for biochemical measurements. Heart, liver, spleen, pancreas and kidneys were weighted.

**Results:** There was no change in maternal weight of body and organs, and in food and water intake between experimental groups. Moreover, both diabetic groups showed higher glycaemia at the beginning of gestation and OGTT presented high values before and during pregnancy. The treatment with the plant did not alter glyceimic metabolism, but a reduction in serum levels of triglycerides, cholesterol and VLDL-cholesterol in the Treated Diabetic group was observed.

**Conclusion:** Although treatment with Curatella americana failed to control hyperglycemia in diabetic rats, there was an improvement in the lipid profile, showing a beneficial effect of the plant in lipid metabolism.

**Financial support:** CAPES and CNPq.

## A258

### Matrix (matriciamento): a strategy to improve glyceimic control of patient with diabetes at the unified health system (SUS) basic care

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**Introduction:** Matriciamento is the cooperation between teams and health services to foment therapeutic projects and discourage user's "unresponsible" reference to subspecialties, aiming at horizontalization through the restructuring of the health system. Data on Matriciamento, focusing on diabetes (DM), are rare in the literature when compared to mental health area which drives most of all.

**Objectives:** To describe the epidemiological profile and glycemic control of diabetic patients treated at a unit of basic care (UBS) of SUS-DF who were followed by Matriciamento technique performed by endocrinologist and resident.

**Methods:** An observational, cross-sectional and retrospective study was performed involving DM1 and DM2 patients, evaluated between January-2015 and May-2016, by electronic medical record data (HbA1c, age, sex, insulin treatment and/or oral anti-diabetic agents -OAD). Incomplete, unavailable or not eligible registers were excluded. Statistical analysis: probabilities of bilateral significance ( $p < 0.05$ ), comparison of data obtained from bibliographic sources (Scielo and Pubmed).

**Results:** Initial inclusion was 1.575 records and final sample was 457 patients (70% incomplete records were excluded), divided into DM2 and DM1 groups. The DM2 group comprised 93 and 72.2% were female, mean age and HbA1c were  $65.16 \pm 11.2$  years and  $7.5 \pm 1.7\%$ , respectively, 46.4% of all had HbA1c  $< 7\%$ . Aging stratification subdivided sample into: Adults  $< 60$  years, Elderly 60–80 years a "super" Elderly  $> 80$  years; glycemic targets by means of HbA1c followed SBD 2016 Guidelines. The best control was verified among "super" Elderly patients: 77.2% showed HbA1c  $< 8.5\%$ ; in the Elderly group, 62% reached HbA1c  $< 7.5\%$ ; while the Adult group had the lower percentage of its target: 52.4% had HbA1c  $< 7\%$ . Among patients with DM2 and HbA1c  $< 7\%$ , 22% were treated with insulin, 53% OAD and 25% insulin + OAD. There was a significant difference in the proportions of insulin, OAD and insulin + OAD among groups with HbA1c  $< 7\%$  and HbA1c  $> 7\%$ : 15.7% vs 39.5%,  $p < 0.0001$ , respectively. DM1 sample of DM1 was too small: only 7% (32, 18 female, age  $37 \pm 16.3$  years and only 18.8% had HbA1c  $< 7\%$ ).

**Conclusion:** Good control was found in 46.4% of the sample mainly among patients over 60 years old, in contrast to only the 15% of the Brazilian multicentric 2007 study who achieved HbA1c  $< 7.0\%$ . In addition, in 2012 only 10.4% of patients with DM1 had HbA1c  $\leq 7\%$ , and 26.8% with DM2. The exclusion of incomplete data was expressive (70%) and translates failure of registration in SUS. However, horizontalization actions by Matriciamento, with focus on DM, are urged to be disseminated in the SUS by the possibility of improving clinical records, improving knowledge of the situation and increasing interventionist actions that result in better control and unnecessary referrals to medium and high complexity

#### A259

##### Maturity onset diabetes of the young (MODY)—case report

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**Case presentation:** T. K. O. M, 14, 76 kg, body mass index (BMI) of  $23.5 \text{ kg/m}^2$ , diagnosed when he was 6 years old with Diabetes Mellitus (DM) type 1, even though no diabetic ketoacidosis, and negative laboratory dosages of antibodies in the pancreas were observed. Insulin therapy was initiated. Over the years, his glycemic index became difficult to be controlled, even though the patient was treated with ultra-long acting insulin once a day and ultra-rapid acting insulin three times a day, followed a specific diet and exercised regularly. After re-evaluating his anamnesis, it was noticed that this pathology ran on three generations of the family (father, grandfather and great-grandmother from his father side of the family and some relatives from his mother side of the family.) After these conclusions, it was requested a genetic test for monogenic diabetes mellitus, Maturity onset diabetes of the Young (MODY), which showed a mutation in a transcription factor (HNF-1 $\alpha$ ), characterizing the DM MODY 3.

**Discussion:** MODY is considered a type of diabetes which runs in the family, and mostly, the patient is diagnosed in the young-adult phase or when there are glycemic alterations until the patient turns 55 years old. It is estimated that 5% of the DM 1 or 2 are, actually, MODYs. The disease presents an autosomal dominant transmission mode (mostly seen when three generations of the same lineage are affected). Health professionals tend to suspect cases of MODY when the diagnosis is made before the patient turns 25. Today, we are aware of fourteen different genes, being MODY 2 and 3 the most common ones. MODY 3 is secondary to mutations in a transcription factor (HNF-1 $\alpha$ ), and its role seems to be fundamental in the physiology of the pancreatic islets, appearing in a later phase, often after puberty (which was not our patient's case) and proving how important the family history is. From the clinical point of view, MODY 3 is usually more aggressive than 2.

**Conclusion:** It is fundamental to make a detailed anamnesis because the data acquired from the family history can guide the clinical diagnosis, since it is a pathology linked to often underdiagnosed autosomal dominant genetic inheritance. It is important to verify the type of diabetes to provide the best treatment possible, improving the prognosis with respect to chronic complications secondary to poor metabolic control that will allow the diagnostic of other family members who are not aware of their health conditions. The systematic routine evaluation of MODY has been made in many countries, and has become an important tendency to insert this extremely important test in the diabetology practice.

Informed consent to publish had been obtained from the patient.

#### A260

##### Medicinal plants with adjuvant action in the therapy of carriers of diabetes mellitus type 2: a literature review

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**Introduction:** Phytotherapy is an area designed to study plants in their various pharmaceutical forms, being they, through popular use and/or through scientific studies. After decades of forgetting its applicability, the medicinal plants return to be used in a significant way, with the intention of acting as a medicament, be it preventive, palliative or curative.

**Objective:** This research aims at a bibliographical review of plant species indicated for the treatment of Type 2 Diabetes Mellitus. According to the literature, some medicinal plants have studies proving its efficacy on the aforementioned pathology.

**Methodology:** The methodology applied in this research is a theoretical review in the main databases, of which: Lilacs, MedLine, PubMed and Scielo, as well as in technical literature, reference sites and scientific journals related to the main subject of study with based on the keywords. The survey of the studies related to this topic was analyzed in periodicals between the years 2000–2016, however, publications with a high impact value were not excluded if the period of validity is not adequate.

**Results:** In the light of the above, it was possible to verify or even prove the effectiveness of the use of the most diverse species of medicinal plants on the therapy of patients with type 2 diabetes mellitus, hoping to recover old conducts with current application and stimulate the prescription of professionals in the field of nutrition with safety in clinical practice.

**Conclusion:** The use of medicinal plants is a valuable resource to be used in patients with DM2, in which it was possible to verify the use of 11 phytotherapies in a beneficial way to the diabetic patient, but the main highlights of this research associated with pathology were (*Bauhinia fortificata*), its application can be proven from the empirical to the scientific studies and the shell of passion fruit (*Passiflora edulis*), in which it presents in its composition a great quantity of soluble fibers in particular the pectin, substance with potential important for glycemic control. However, it is up to the professional nutritionist to be able to know the plants versus the pathology to prescribe their phytotherapeutic in a suitable way.

**A261**

**Metabolic control and medication compliance relationship in patients with type 2 diabetes**

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**Introduction:** Characterized by a complex set of diseases, of multi-genic and multifactorial etiology, Diabetes is frequently associated with irreversible acute and chronic metabolic complications. In this direction, to stop the progression of the disease, it is necessary, among other measures, adherence to oral antidiabetics and the control of metabolic biomarkers. However, the inconsistency and lack of robustness of the data that trace a direct relationship between adherence and metabolic control brings to the fore the need for further study on the subject.

**Aim:** Analyze the relationship between adherence to oral antidiabetics and metabolic control of patients with type 2 diabetes.

**Method:** A cross-sectional study was carried out with 201 people with type 2 diabetes, followed by 17 Basic Health Units in the city of Floriano, Piauí. Included in the study were adults, exclusively for oral antidiabetic agents. Anthropometric and clinical data, as well as those related to drug adherence, were measured. As metabolic variables we investigated fasting glycemia, glycated hemoglobin, triglycerides, HDL cholesterol, LDL cholesterol and total cholesterol. The research was approved by the Committee of Ethics in Research with Human Beings of the Federal University of Piauí, under number 485.420.

**Results:** Of the 201 patients investigated, 72.6% were female, 71.1% were sedentary and 71.6% were overweight. When drug adherence was assessed using the adapted Morisky's test, only 23.9% of the sample was considered adherent. Regarding metabolic control, the values of glycated hemoglobin, fasting glycemia, triglycerides, LDL, HDL, total cholesterol and blood pressure were altered in 71.3, 68.9, 53.9%, 33, 8, 88.5, 47.6 and 29.4% of the sample, respectively (Table 1).

**Conclusion:** When adhering to antidiabetics, patients with type 2 diabetes have better levels of glycated hemoglobin and total cholesterol. Men have greater control of fractions of triglycerides, LDL and total cholesterol. In addition, blood pressure levels are better controlled among patients who exercise regularly and do not use alcohol, generating better control of fasting blood glucose levels. Intervention studies should be performed with new technologies in the quest to encourage healthy lifestyle habits, as well as stimulate adherence to antidiabetics. (Fig. 1)

**Table 1.** Association of metabolic control and medication adherence in individuals with Type 2 Diabetes mellitus.

Variables	Morisky test		p-value*
	Adherent n(%)	Nonadherent n(%)	
HbA <sub>1c</sub>			0.048
Normal	17 (38.6)	30 (25.0)	
Altered	27 (61.4)	90 (75.0)	
Fasting glycemia			<0.001
Normal	24 (54.5)	27 (22.5)	
Altered	20 (45.5)	93 (77.5)	
Triglycerides			0.533
Normal	20 (45.5)	56 (46.3)	
Altered	24 (54.5)	65 (53.7)	
LDL			0.154
Normal	31 (73.8)	75 (63.6)	
Altered	11 (26.2)	43 (36.4)	
HDL			0.267
Normal	06 (15.4)	11 (10.1)	
Altered	33 (84.6)	98 (89.9)	
Total cholesterol			0.028
Normal	26 (66.7)	51 (47.2)	
Altered	13 (33.3)	57 (52.8)	
Blood pressure			0.435
Normal	33 (68.8)	109 (71.2)	
Altered	15 (31.2)	44 (28.8)	

\*p-value Fisher exact test; HbA<sub>1c</sub> - glycated hemoglobin; HDL - high density lipoprotein; LDL - low density lipoprotein

**Fig. 1** See text for description

**A262**

**Metabolic control of type 1 diabetes mellitus patients in treatment with continuous subcutaneous insulin infusion system**

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**Backgrounds:** Some studies have shown that patients using the continuous subcutaneous insulin infusion system (CSII) have improved metabolic control and lower risk of hypoglycemia, especially when associated to continuous glucose monitoring system.

**Aim:** To access the metabolic control of type 1 diabetes (T1DM) patients using subcutaneous continuous insulin infusion system.

**Methods:** We retrospectively reviewed the medical records of 59 T1DM patients treated with CSII from a cohort of 3330 patients with diabetes diagnosed in the pediatric age group followed at a reference regional diabetes center. Glycated hemoglobin (HbA1c) was performed every 3–4 months (Immunoturbidimetry, normal range value: 4.8–5.9%) and mean average over the follow-up years.

**Results:** 132 therapeutic tests were performed with CSII. Of these 59 patients are currently using the system, 12.1% associated to the continuous glucose monitoring system. The current mean age was  $16.8 \pm 7.6$  years (1.7–38.0 years), at the time of CSII installation:  $13.4 \pm 6.7$  years (0.9–32.0 years) and duration of CSII treatment: 2.4 years (IQR: 1.0–5.8 years). The majority of the cases (83.1%) acquired the system by lawsuit. The main indications of the therapy with CSII were glycemic variability (54.2%) and the presence of hypoglycemia (32.2%), being severe in 15.2% or 47.4% (9/19). Other indications were: quality of life (11.9%) and lipoatrophy (1.7%). The HbA1c 12 months prior to CSII was  $8.1 \pm 1.5\%$ , -6 months:  $8.1 \pm 0.9\%$ , -3 m:  $7.9 \pm 0.9\%$ , CSII installation:  $8.1 \pm 1.1\%$ ; 3 months:  $7.8 \pm 0.8\%$ ; 6 months:  $8.0 \pm 0.7\%$ ; 12 months:  $7.9 \pm 1.0\%$ , 24 months:  $7.7 \pm 0.7\%$ , 36 months:  $7.9 \pm 0.7\%$ ; 48 months:  $8.3 \pm 0.8\%$  and 60 months:  $8.0 \pm 0.9\%$  and last evaluation:  $7.8 \pm 1.0\%$ . There was no significant improvement in HbA1c during the follow-up period ( $p = 0.391$ ), or between the CSII installation and the last evaluation ( $p = 0.0958$ ). Five patients (8.5%) presented severe hypoglycemia (1 episode) during CSII treatment because they did not follow the educational procedures, except for one patient who consciously induced severe hypoglycemia.

**Conclusion:** In our sample, the main indication of CSII were glycemic variability and hypoglycemia. CSII significantly reduced episodes of severe hypoglycemia, showing no significant improvement in HbA1c, probably due to lower previous HbA1c values.

#### A263

##### Metabolic syndrome in patients with DM1 treated in SUS: evaluation of diagnostic criteria by EGDR (estimated glucose elimination rate)

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**Introduction:** Metabolic syndrome (MS) has been described among Type 1 Diabetes (DM1) patients, but the various criteria used for the definition contribute to the heterogeneity of the different prevalence data available.

**Objective:** To evaluate the prevalence of MS in DM1 patients according to the WHO, IDF and NCEP-ATPIII diagnostic criteria and to compare with the estimated glucose disposal rate (eGDR).

**Methods:** A cross-sectional, observational study was performed in a sample of DM1 patients with > 13 years old treated at an outpatient clinic of endocrinology at the Hospital Regional da Asa Norte (HRAN) SUS-DF, between May and July-2015. DM1 defined based on age at diagnosis and clinical history (onset of insulin therapy, presence of diabetic ketoacidosis or autoantibodies). Anthropometric measures were evaluated (weight, waist/hip ratio [WHR], BMI), laboratory data (fasting glycemia, lipid profile and microalbuminuria), presence of hypertension (HTN) were collected in electronic charts (TrakCare®). Sample was divided into three tertiles according to insulin resistance (IR) degree, based on the eGDR which was calculated by Williams e cols formula

(Fig. 1): Insulin-resistant, Intermediate insulinresistant, Insulin-sensitive. Kappa coefficient was used to calculate concordance which was evaluated by Landis & Kock criteria. Statistical analysis by software R. (R Foundation, Vienna, Austria).

**Results:** Final sample included 95 DM1 patients, 51.6% male, mean age  $28.6 \pm 8.8$  years, weight  $68.4 \pm 11.7$  kg, BMI  $24.69 \pm 3.24$  kg/m<sup>2</sup>, WHR  $0.8 \pm 0.07$  and eGDR  $8.93 \pm 2.0$  mg/kg.min. Diagnosis of MS based on NCEP-ATPIII was present in 9.47%, IDF and WHO criteria were 16.84 and 54.74%, respectively. IR was verified in 13.7% and Intermediate IR in 40%. There was discrete agreement between eGDR and WHO criterion (kappa 0.192, 95% CI 0.072–0.313). After exclusion of Intermediate IR, concordance was moderate between WHO and eGDR (kappa 0.422, 95% CI 0.215–0.629) and regular agreement between IDF and eGDR (kappa 0.344, 95% CI 0.029–0.618).

**Conclusion:** MS was present in over half of DM1 of the study sample. The highest frequency was showed by using WHO criterion, although eGDR agreement was found to be moderate. The sample was limited by the short time of inclusion (only 3 months), however, it could show IR presence and addresses the need to include the evaluation of MS among DM1 patients towards further preventive cardiovascular measures. Figure 1: Williams and cols formula:  $= 24.31 - 12.22(Q) - 3.29(I) - 0.57(I)$

#### A264

##### Metabolic syndrome in patients with type 1 diabetes treated in SUS: risk factor for microvascular complications?

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**Introduction:** The presence of insulin resistance (IR) is increasing among Type 1 Diabetes (DM1) patients especially those with a family history of Type 2 Diabetes (DM2). Both DCCT and EDIC studies have shown that IR is an independent factor for the development of microvascular disease.

**Objective:** To investigate the association of IR with glycemic control, microvascular complications (retinopathy and diabetic kidney disease, DKD) and family history of DM2, hypertension (HTN), obesity and dyslipidemia

**Methods:** Patients > 13 years old were treated in an outpatient clinic of the SUS-DF hospital between May–July 2015 in an observational and cross-sectional study. Clinical data and laboratory data (fasting glycemia, lipid profile, microalbuminuria and glycated hemoglobin—HbA1c) and personal history and family history of comorbidities (HTN, HTN family history, DM2, obesity and dyslipidemia) were collected in an electronic medical record. Diagnosis of DM1 was based on age at diagnosis, early use of insulin, presence of diabetic ketoacidosis (DKA) and/or autoantibodies. The estimated glucose disposal rate (eGDR) was calculated by Williams e cols formula (Fig. 1) and sample was divided into three tertiles according to IR degree: insulin-resistant, insulin intermediate-resistant and insulin-sensitive. Glycemic control was assessed by mean of last two HbA1c and defined as good—HbA1c < 7.5%, intermediate HbA1c 7.5–9% and poor HbA1c > 9%. Statistical analysis was performed with R software (R Foundation, Vienna, Austria).

**Results:** Ninety five DM1 patients were included 51.6% male, mean age  $28.6 \pm 8.9$  years, weight  $68.4 \pm 11.7$  kg and BMI  $24.7 \pm 3.24$  kg/m<sup>2</sup> while mean abdominal circumference (AC) was  $80.17 \pm 9.52$  cm and waist-to-hip ratio (WHR)  $0.8 \pm 0.07$ . The mean eGDR was  $8.93 \pm 2.0$  mg/kg.min and HbA1c  $8.46 \pm 1.7\%$ . IR estimated by eGDR was present in 13.7% and intermediate IR in 40%. Patients on 1st tertile of IR were most male (69.2%), 76.9% had HTN and mean age

30.4 ± 8.3 years; weight 68.9 ± 8.44 kg, BMI 24.8 ± 3.77 kg/m, AC 85.85 ± 10.25 cm and WHR 0.84 ± 0.07. Glucose control was ranked as intermediate: HbA1c 8.97 ± 1.56% and mean eGDR 7.96 ± 1.65 mg/kg.min. The association with microvascular complications and FH of comorbidities showed no statistical difference between IR and glyce-mic control (HbA1c as well).

**Conclusion:** In this study no correlation between IR and glyce-mic control, FH of comorbidities and presence of microvascu-lar complications was found. The lack of evaluation of peripheral neuropathy is one of the flaws of the study whose short time of evaluation was another limitation. Thus, more studies are necessary to further evaluation of microvascular complications with the pres-ence of IR among DM1 in the SUS scenario. Figure 1: Williams and cols formula: = 24.031 – 12.022() – 3.029() – 0.057(1)

**A265**  
**Microbiological profile and antimicrobial resistance: rational strategy for treating patients with infected diabetic foot ulcers**

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A265**

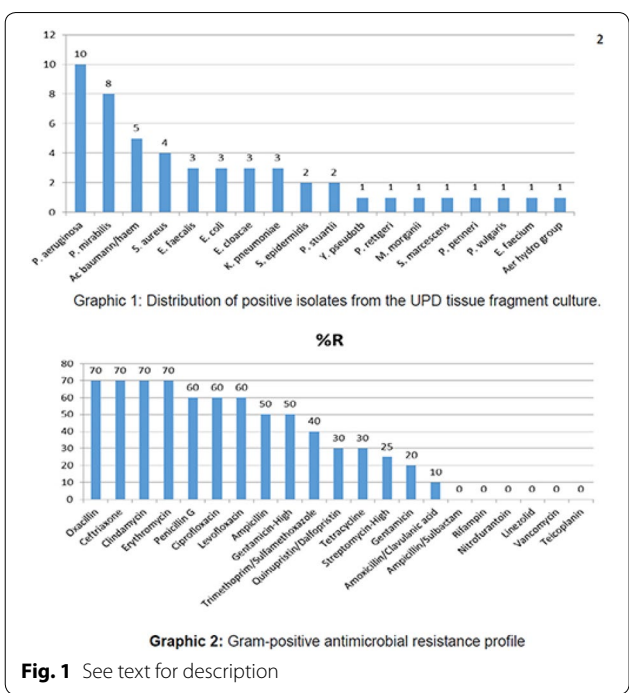
**Introduction:** Diabetes mellitus (DM) is a chronic disease and one of the most frequent complications are feet ulcerations (DFU) which are commonly associated with infection and favor devastating results as amputations and prolonged and costly treatment. DFU plus infection are not routiney based on microbiota database in most developing countries favoring treatment.

**Objective:** To determine the microbiological profile and antimicrobial resistance in patients with infection-related to DFU treated at a refer-ence center at the SUS-DF.

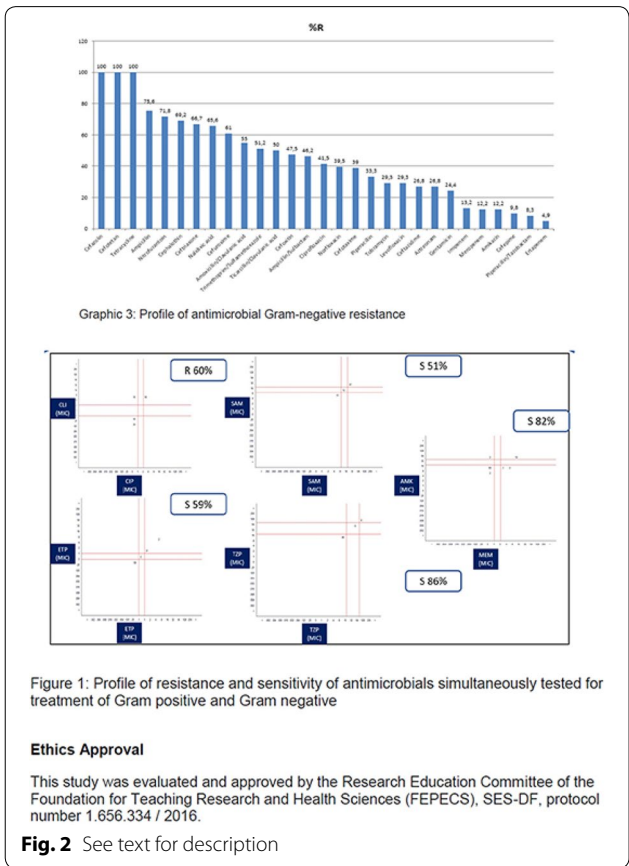
**Methods:** Descriptive, cross-sectional, retrospective study based on physical and electronic records (TrakCare®) of DM patients treated at the Neuropathy and Diabetic Foot Clinic (NDFC) of the Endocrinol-ogy Unit (ENDOUnit) of Hospital Regional de Taguatinga (HRT) and Research Center-FEPECS, between June 2014 and June 2016. DFU patients with tissue fragment culture and antibiogram were included in the study sample. Microbiota resistance profile analyzed through WHO freeware softwares BACLINK 2.0 and WHONET 5.6.

**Results:** Sample involved 107 DM patients, 63.3% male, mean age 60.6 ± 12 years, 92.5% had DM2 and diagnosis duration 15.9 ± 8.3 years. Monomicrobial infection found in 64.5% and Pseu-domonas aeruginosa the most common isolated microorganism followed by Proteus mirabilis and Acinetobacter baumann/haem (Graphic 1). Analysis of sensitivity profile and resistance in 51 cultures of tissue fragment showed: 70% Gram-positive resistance to oxaci-lin, ceftriaxone, clindamycin and erythromycin; 100% Gram-negative resistance to cefazolin, cefotetan and tetracycline. Association of ciprofloxacin and clindamycin resulted in 60% resistance (Graphics 2, 3; Fig. 1). Active monomicrobial infection was found in two-third of sample which differs from literature reports, usually polimicrobial, and tissue fragment culture may explain a better selection of cultures. Gramnegative strains were more frequent. However, the routine anti-microbial treatment (cipro + clinda) showed high resistance. Surpris-ingly, none DFU infection ha been evaluated by the current IDSA/ PEDIS classification.

**Conclusions:** An evaluation of the sensitivity and resistance profile of microbiota in diabetic foot centers constitutes a rational strategy to guide appropriate antimicrobial treatment. Sadly, this approach has not been widely implemented in most DFU clinics. That would prevent inappropriate treatment schemes that favor prolonged hospitaliza-tions and higher costs to public services in developing countries such as Brazil. Keywords: Diabetes mellitus; Diabetic foot; Antimicrobial resistance (Figs. 1, 2).



**Fig. 1** See text for description



**Figure 1:** Profile of resistance and sensitivity of antimicrobials simultaneously tested for treatment of Gram positive and Gram negative

**Ethics Approval**

This study was evaluated and approved by the Research Education Committee of the Foundation for Teaching Research and Health Sciences (FEPECS), SES-DF, protocol number 1.656.334 / 2016.

**Fig. 2** See text for description



**Results:** T1D patients had higher HbA1c levels when compared with Control and Ab+ groups ( $p < 0.0001$ ). Glucose levels were similar between T1D and Ab+ groups and higher than in Control group ( $p < 0.0001$ ). Higher median miR-101 expression ( $p = 0.0014$ ) were observed in T1D patients (threeFold Change-FC) in comparison with individuals with pancreatic autoantibodies (0.84 FC) and healthy controls (0.87 FC), which were similar to each other. In a sub-analysis of Ab+ group, considering only individuals who tested positive for two or more autoantibodies, the expression of miR-101 (3.74 FC) did not differ from those of T1D and were higher in both groups in comparison with Control ( $p = 0.0022$ ). Regarding miR-204, there was no significant difference between the groups studied.

**Conclusion/interpretation:** Our data suggest the involvement of miR-101 in the T1D pathogenesis.

## A269

### Mixed meal tolerance test utility for diagnosis of hyperinsulinemic hypoglycemia after bariatric surgery

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**Cases report:** Case (1) A 35-years-old woman developed postprandial hypoglycemic episodes 6 years after Roux-en-Y gastric bypass (RYGB). A mixed meal tolerance test (MMTT, 500 kcal, 20% protein, 20% fat and 60% carbohydrates) was performed, leading to symptomatic postprandial hyperinsulinemic hypoglycemia (PHH) with a nadir of 45 mg/dL at 120 min (insulin of 8 mU/L; C-peptide of 3.21 ng/mL). Pancreas tomography (PT) and magnetic resonance cholangiopancreatography (MRCP) showed no abnormalities. Despite frequent meals low in carbohydrates and acarbose, hypoglycemia was avoided with diazoxid. Cases 2 and 3). Two 34-years-old women presented hypoglycemia following meals 3 and 5 years after RYGB. MMTT (120 min): glycemia of 34 mg/dL, insulin of 17 mU/L and C-peptide of 6.23 ng/mL and, in the second one, glycemia of 52 mg/dL, insulin of 9 mU/L and C-peptide of 2.7 ng/mL. PT and MRCP were normal in both cases. Improvement occurred with acarbose. Case 4). A 44-years-old man who underwent RYGB 1.5 years ago reported hypoglycemic episodes in the last 6 months. MMTT: glycemia of 26 mg/dL at 150 min, insulin of 34 mU/L and C-peptide of 6.03 ng/mL. PT revealed tumor of 2.5 cm in pancreatic tail. He was submitted to distal pancreatectomy and symptoms disappeared after diazoxid and hydrochlorothiazide. Case 5). A 59-years-old woman developed hypoglycemia 10 years after RYGB. Echo-endoscopy revealed pancreatic cysts. MMTT: glycemia of 43 mg/dL at 120 min, insulin of 100 mU/L and C-peptide of 1.95 ng/mL. Acarbose controlled her symptoms. Antiinsulin antibodies were negative in all cases (Table 1).

**Discussion:** RYGB can induce remission of diabetes in 80% of morbidly obese type 2 diabetic patients. This effect is attributed to the weight loss but also to an improvement of insulin release by the beta cells of the pancreatic islets under the influence of increased levels of gut hormones, especially glucagon-like peptide-1 (GLP-1). Chronic stimulation by GLP-1 of beta cells after RYGB can lead to hyperplasia of the islets, resulting in PHH. Of all patients undergoing RYGB, 1–6% develops some degree of PHH and 5% have neuroglycopenic symptoms. MMTT is the appropriate test for diagnosis. Acarbose, diazoxid, octreotide, hydrochlorothiazide and pancreatectomy are useful tools for successful management.

**Conclusion:** HHP is recently recognized as a complication of RYGB although knowledge and experience with this condition are not well diffused. MMTT should be considered when there is a clinical suspicion. Informed consent to publish had been obtained from the patient (Fig. 1).

Table 1. Clinical and laboratorial characteristics.

	Case 1	Case 2	Case 3	Case 4	Case 5
Age at diagnosis (years)	35	34	34	44	59
Interval between surgery and symptoms (years)	6	3	5	1	8
Interval between symptoms and diagnosis (years)	3	3	4	0,5	2
MMTT					
Glycemia (mg/dL)	45	34	52	26	43
Insulin (mU/L)	8	17	9	34	100
C-peptide (ng/mL)	3.21	6.23	2.7	6.03	1.95
Antiinsulin antibody	Negative	Negative	Negative	Negative	Negative
Pancreas image	Normal	Normal	Normal	Tumor of 2.5 cm in pancreatic tail	Normal
Treatment	Diazoxid	Acarbose	Acarbose	Distal pancreatectomy, diazoxid, hydrochlorothiazide	Acarbose

MMTT = mixed meal tolerance test.

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**Fig. 1** See text for description

## A270

### Modulating activity of the alga chlorella in impaired glucose tolerance and type-2 diabetic patients

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Chronic inflammation is involved in the pathogenesis of insulin resistance being characterized by increased circulating levels of proinflammatory cytokines such as TNF- $\alpha$  and IL-6, in addition to reduced levels of IL-10 (anti-inflammatory cytokine)1–2. This chronic inflammatory state may impair the mechanism of normal glucose tolerance triggering impaired glucose tolerance (IGT) and type-2 diabetes (T2D) 3–4. Although several drugs are available for the treatment of these conditions, the disadvantages of conventional therapy5 lead to the search for alternative therapies, particularly natural products 6. In this context, the alga Chlorella (CV) is an alternative and natural agent that acts as a biological response modifier by directly modulating the production of cytokines7–8. Thus, our objective was to evaluate the effects of CV in the production of pro- and anti-inflammatory cytokines in IGT and T2D patients. Volunteers with T2D ( $n = 25$ ) and IGT ( $n = 20$ ) from Diabetes Group of the Centro de Saúde da Comunidade (CECOM), University of Campinas, Brazil, received oral doses of 3 g CV daily for 12 months. Serum levels of IL-10, TNF- $\alpha$  and IL-6 were quantified by sandwich enzyme-linked immunosorbent assay (ELISA) before use of CV (T0), after 6 (T6) and 12 (T12) months using CV. Data were analyzed for statistically significant differences using Wilcoxon t test. The results showed that the alga significantly ( $P < 0.05$ ) decreased serum levels of IL-6 and TNF- $\alpha$  at T6 and T12, in both groups IGT and T2D. There was a significant increase ( $P < 0.05$ ) of IL-10 at T6 in IGT and T2D groups. Our findings demonstrate that CV was able to restore the balance in the disturbed cytokine network in IGT and T2D, in which the unbalance of pro- and anti-inflammatory cytokines dictates the emergence and evolution of the pathological process. It seems that the supplementation with CV is promising in IGT and T2D, since it reduces the patient's inflammatory profile.

**A271****Modulation of SLC2A4/GLUT4 expression by estradiol-mediated sp1 transcription factor: participation of ER-alpha and ER-beta receptors**

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**Introduction:** The reduction in the expression of the glucose transporter GLUT4 (encoded by the gene *Slc2a4*), responsible for glucose uptake stimulated by insulin, significantly compromises glycemic homeostasis. It is known that estradiol (E2) via its receptors, ER-alpha and ER-beta, regulates the gene expression through direct binding to DNA, or through interactions with transcription factors, among them SP1 (Sp1 transcription factor). Our group has already demonstrated that E2 regulates the expression of the *Slc2a4* gene; and studies indicate the presence of four binding sites for SP1 in this gene, described as *Slc2a4* upregulator. Thus, the role of SP1 in the expression of estradiol-mediated *Slc2a4*/GLUT4 in 3T3-L1 cell line adipocytes was evaluated in an attempt to understand the role of each estradiol receptors in this regulation. For this, the adipocytes were treated with 10 nM estradiol plus 0.05% DMSO (used to solubilize the ER agonists) for 24 h. Cells were also cultured with selective agonists of the different ER isoforms. To evaluate the ER-alpha, the PPT was used, in the concentration of 10 nM, with or without 10 nM of E2 (10E2 + PPT); to evaluate the ER-beta, the DPN was used in the concentration of 100 nM, with or without 10 nM of E2 (10E2 + DPN); always for 24 h. In the control group (0E2), cells were treated with only 0.05% DMSO (vehicle of agonists). The analyzes were: quantification of total GLUT4 protein, nuclear SP1 and nuclear ER-alpha/beta (Western blotting); expression of the *Slc2a4* and *Sp1* (RTqPCR) genes; and binding activity of the ERs to the SP1 binding site on the *Slc2a4* promoter (electrophoretic mobilization, EMSA). Treatment with E2 increased the expression of *Slc2a4*/GLUT4. Cells that were treated with PPT (in the presence or absence of E2) showed an increase in *Slc2a4*/GLUT4 expression whereas treatment with DPN (in the presence or absence of E2) decreased, revealing the stimulatory action of ER-alpha and inhibitory action of ER-beta on the expression of GLUT4. However, it was observed that both ERalpha and ER-beta activation increased the nuclear content of the transcription factor SP1, however, only the ER-alpha effect, especially isolated, seems to involve SP1 in the observed regulation.

**A272****Mody phenotype by GCK mutation accompanied by continuous glycemic monitoring**

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**Case report:** JRP, 9 years, overweight, presenting asymptomatic fasted dysglycemias since her 3 years old. Investigation with oral glucose tolerance test, autoantibodies and laboratories tests normals. Paternal family history for type 1 and 2 diabetes. It evolved throughout

childhood with fasting glycemic changes, despite absence of symptoms and no progression. Continuous glycemic monitoring was performed during clinical followup, evidencing absence of postprandial hyperglycaemia, and low glycemic variability, despite recurrent morning dysglycemias. Investigated body composition profile suggesting 42% of total body fat, with adequate bone mineral density, although there are no reference values for age group. Molecular genetic diagnosis result positive by mutation of the glucokinase gene (GCK). Patient progresses with daily diet and physical activity, without pharmacological therapy.

**Discussion:** Maturity onset diabetes of the young (MODY) by mutation of the GCK gene, the most common form of monogenic diabetes, comes from autosomal dominant inheritance, resulting from heterozygous mutations in various transcription factors for the development of  $\beta$ -pancreatic cells, which inactivating the gene, determine subclinical hyperglycemia, decreasing the phosphorylation of glucose and the sensitivity of the  $\beta$ -cells. Its clinical manifestation predates 25 years, in the absence of autoimmune disease and insulin resistance. Increases in fasting glycemia and hepatic glucose production are observed, requiring higher serum glycemic concentrations to stimulate insulin secretion. Patients are asymptomatic, with incidental laboratory findings, and absence of microvascular complications. There is no evidence of need for clinical treatment, since exogenous insulin administration results in a compensatory decrease in endogenous insulin secretion, and blood glucose levels remain unchanged.

**Conclusions:** Through continuous glycemic monitoring it was corroborated that the GCK-MODY does not confer clinical repercussion to the patient, presenting low glycemic variability, despite fasting dysglycemia, without prejudice to the development of children or microvascular complications. However, continuous follow-up of these patients is necessary due to the possibility of overlapping type 2 diabetes and increased cardiovascular risk in the future.

Informed consent to publish had been obtained from the patient.

**A273****Morinda citrifolia treatment during pregnancy rats with mild diabetes: maternal/fetal repercussions**

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A273**

**Introduction:** During pregnancy, hyperglycaemia can lead to maternal and fetal complications, causing reproductive alterations and fetal impairment. Alternatives are considered to treat diabetes and prevent its complications, and one of these alternatives is the use of medicinal plants, such as *Morinda citrifolia*, popularly known as Noni. However, there is no scientific evidence of security use during gestation of this plant and in the fetuses.

**Objective:** To evaluate the effects of the aqueous extract of *Morinda citrifolia* on maternal reproductive performance and fetuses of rats with mild intensity hyperglycemia.



**Method:** Diabetes was induced in newborn female Wistar rats, at 24 h after birth, by subcutaneous injection of Streptozotocin at a single dose of 100 mg/kg. At 110 days of age (adulthood), oral glucose tolerance test (OGTT) was performed to confirm the mild diabetes model. After confirmation of the diabetes, the rats were mated and distributed into 4 experimental groups (n = 12 animals/group): Control: Non-diabetic rats treated with water; Control Treated: Non-diabetic rats treated with the plant; Diabetic: Diabetic rats treated with water; Diabetic Treated: Diabetic rats treated with the plant. The administration of the *Morinda citrifolia* fruits aqueous extract, at dose of 750 mg/kg, was done daily, by gavage, throughout pregnancy. On the morning of the 21st day of pregnancy, the rats were anesthetized and the uterus was removed. Pre- and post-implantation loss rates were calculated. Fetuses and placentas were weighed and fetuses were analyzed for the presence of external, skeletal and visceral anomalies.

**Results:** There was no change in fetal and placental weights, and also in the frequency of fetal anomalies (external and skeletal) among the groups. However, both treated groups exhibited higher rates of pre-implantation losses. In addition, the Control Treated group showed a high frequency of visceral anomalies in relation to the Control group.

**Conclusion:** Treatment with *Morinda citrifolia* is harmful during gestation, due to an anti-implantation effect and increase of visceral anomalies. Therefore, these findings showed that the use of plants without further studies proving their efficacy and safety can be dangerous.

**Financial support:** CAPES and CNPq.

**A274**

**Morphological changes and disorders in gastrointestinal motility in experimental models of hyperglycemia**

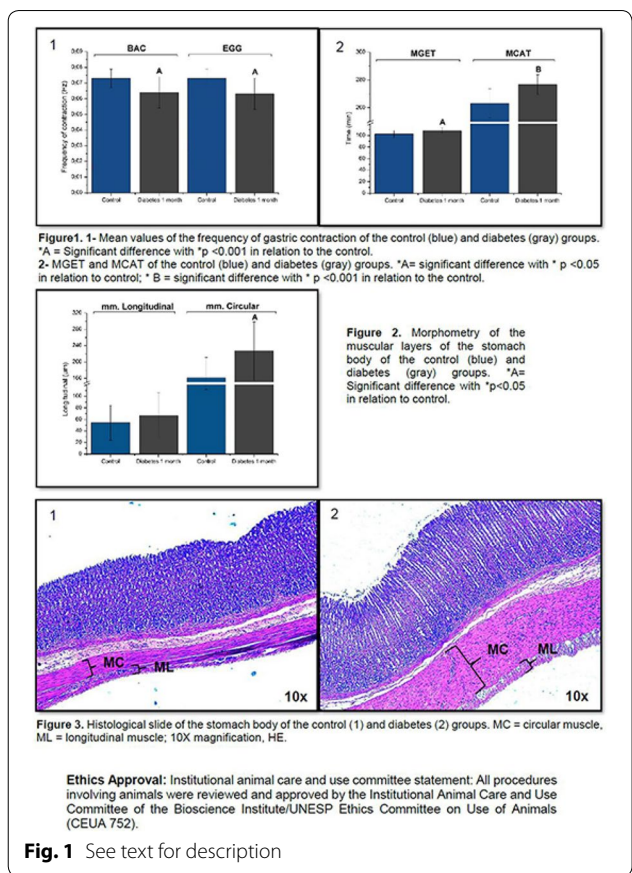
Juliana Fernandes de Matos<sup>1</sup>, Madileine Francely Américo<sup>2</sup>, Yuri Karen Sinzato<sup>3</sup>, Débora Cristina Damasceno<sup>3</sup>, José Ricardo de Arruda Miranda<sup>4</sup>  
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Acute changes in glucose concentration in the blood have important effects on motor and sensory function of the upper gastrointestinal tract (TGI), and at the same time, the TGI plays an important role in the regulation of postprandial blood. The aim is to characterize the profile of gastric motility in rats with severe diabetes model and evaluate the influence of glycemic variations in TGI. Biosusceptometry of Alternating Current (BAC) is a fairly simple technique, low cost and versatile in research related to the human TGI. BAC is composed of magnetic sensors based in inductions coil. An electrode was inserted for measurement of electrogastrography (EGG), and a ferrite bead to measure the BAC in the rats. Histological sections of the stomach were stained with hematoxylin and eosin, analyzed at a 10x magnification. Morphometry was performed to analyze the thickness of the muscular layers of the stomach. Severe diabetes was induced by a beta-cytotoxic agent (streptozotocin—40 mg/kg, ip) at adult rats. They were evaluated contractility and gastric emptying of serious diabetic and control animals. P < 0.05 as statistical significance limit. There was a significant decrease in contraction frequency and increase in gastric emptying time of the diabetic animals compared with control. There was a thickening of the circular muscle layer of the stomach of diabetic animals. There is an influence of glycemic status on the GI tract and may have alterations of frequency and gastric emptying. It is concluded that diabetes caused disorders in the gastric electrophysiology in the form of dysrhythmia, as well as delay in emptying and morphological changes.

**Acknowledgement:** FAPESP 2015/05045-8 (Fig. 1).



**A275**

**Mortality for the diabetes mellitus at Ribeirão Preto-SP, Brazil, 2010-2014**

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**Background:** Diabetes mellitus and systemic arterial hypertension, represent in the Brazil, the first time of mortality and hospitalizations, at the Brazilian National Health System. If on the one hand, as mortality trends from acute complications in diabetes decreasing in recent decades. On the other hand, there was a nonstandard increase in diabetes mortality in Brazilian capitals between 1980 and 2007, mainly in the capitals of the North and Northeast. Given this, it is relevant to know a mortality due to diabetes in the city of São Paulo in the period from 2010 to 2014, in such a way that there is a subsidy of public policies.

**Methods:** Ecological and temporal trend study carried out in the city of Ribeirão Preto, located in the northeastern region of the State of São Paulo. The study population was composed of DM mortality data from 2010 to 2014 provided by the Division of Epidemiological Surveillance

of the Municipal Health Department of Ribeirão Preto referring to the deaths of people living in the municipality and regardless of their place of death and individuals according to age, sex and address. The statistical descriptive analysis of the data was performed using the statistical program Statistical Program for Social Sciences (SPSS) version 22. The project was approved in the Committee of Ethics in Research of the School of Nursing of Ribeirão Preto of the University of São Paulo opinion number 1580375/2016.

**Results:** In the period from 2010 to 2014 in the city of Ribeirão Preto, there were a total of 583 deaths due to diabetes mellitus, with a mean of 117 deaths per year, varying from 97 in 2011 to 145 in 2014. Most deaths, 55.06% (321), was female and 44.94% (262) male. However, the mortality rate up to the age of 69 years shows a larger number in males, 22.13% (129 deaths), compared with females, 17.15% (100 deaths), indicating that men die from diabetes mellitus more prematurely than women.

**Conclusions:** Despite the reduction in the total number of non-communicable chronic diseases mortality, diabetes mortality remained unchanged in the period studied. These data can organize information about morbidity and mortality and its risk factors in the city of Ribeirão Preto

#### A276

##### Mucormycosis in diabetic patients: case report and literature review

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Mucormycosis is the 3rd most common invasive fungal infection in the world, with incidence estimated in 500 cases/year in the United States. Data in Brazil is scarce, limited to case reports; that are predominant in the North and Northeast regions. Although rare, it is potentially fatal, with morbidity and mortality above 60%. Glucocorticoids, haematological malignancies, AIDS, and uncontrolled diabetes mellitus are the major known predisposing conditions for mucormycosis. This report describes a 55 years old male with diabetes, complaining of odynophagia due to infiltrative and ulcerated lesion in the oral cavity. We also review the literature for studies on diagnosis, treatment, clinical course, and prognosis of mucormycosis.

**Case presentation:** Male, 55 years old, admitted with diabetic ketoacidosis. On the 5th day of hospitalization, he complained of odynophagia, without other symptoms. On examination of the oral cavity, was found an ulcerated, infiltrative, whitish, and non-removable lesion in the soft palate (Fig. 1). No abnormalities were found in laboratory tests. X-ray of the face and skull tomography with contrast showed alterations suggestive of sinusopathy, without evidences of lesion extension from the oral cavity to other tissues (Figures 2 and 3). Biopsy of the lesion demonstrated hyphae fungal structures, which were suggestive of mucormycosis. The patient had a favorable response after treated with amphotericin B for 10 days.

**Discussion:** Mucormycosis is a serious infectious disease caused by a Mucorales order fungus that affects particularly patients with immune deficiency, as uncontrolled diabetes mellitus. Contagion usually occurs through inhalation of spores, which have tropism for the vascular tissue and evolves to tissue ischemia and distress. It may be considered a disastrous interaction between angiopathy, acidosis and hyperglycemia, with a more common presentation, the rhinocerebral. Initial symptoms may include fever, headache, facial or ocular pain, epistaxis, and nasal congestion. Tissue invasion can lead to exophthalmos, cranial nerve palsy, or cerebrovascular disease caused by an occlusion of the carotid artery. The diagnosis is based on histopathological findings of the fungus invading vascular tissue. Treatment consists of antifungal therapy and surgical removal in selected cases (Fig. 1).



Figura 1



Figura 2



Fig. 1 See text for description

**Final comments:** We reported a rare case of oral mucormycosis in a patient with uncontrolled diabetes, which had early diagnosis and treatment, leading to a satisfactory outcome. Diabetes increases the risk of infectious complications possibly due to hyperglycemia-related changes in leukocyte chemotaxis, complement dysfunction, and microvascular angiopathy. Mucormycosis is a highly lethal infection in which adequate early diagnosis and treatment are critical for reducing morbidity and mortality.

Informed consent to publish had been obtained from the patient.

#### A277

##### Multidisciplinary care on type 1 diabetics: "ADINF doce vida Nova Friburgo" project

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Type 1 diabetes is a chronic disease, accounting for 5–10% of all diabetes cases in the world. Global guidelines recommend the management of this pathology by a multidisciplinary specialized team. As a result, the Adinf Doce Vida Project was implemented in Nova Friburgo (RJ-Brazil) on August 1st, 2015. It consists on a project based at the "Association of Diabetics of Nova Friburgo (ADINF)", and carried out by a multidisciplinary team of volunteers: four endocrinologists, one pediatric endocrinologist, two nutritionists, five psychologists, a dentist, a pediatric dentist, a socialassistant, two pharmaceuticals, a physiotherapist and two podologists.

**Objective:** To evaluate the outcome of the multidisciplinary intervention in the control of type 1 diabetics.

**Method:** 143 patients were attended by a team between August 1st, 2015 and July, 1st 2017. After excluding patients diagnosed with other types of diabetes and patients who did not attend the service for more than one year, it remained 91 patients all with basalbolus therapy with multiple doses of insulin.

**Results:** The mean age at admission was 17.83 years old (1–49). 64% of the patients were under 18 years old, of age and 52% of them where female. 11 patients had diabetic nephropathy, 6 patients had neuropathy and 6 other had retinopathy, diagnosed before the arrival at the project. No new microvascular complications were detected during the assessed period. The mean number of capillary glycemia tests performed before the project was 3.1 and after the project was 5. Carbohydrate counting was introduced for 31 patients. 28 patients had glycosylated hemoglobin tested before the project and 6 months to 1 year after been attended by the project's team. The results were compared and showed averages of 9.73% versus 9.01% ( $p = 0.7$ ).

**Conclusion:** Project's multidisciplinary care introduced basal bolus therapy in all patients promoting better patient adherence. There was a mean reduction in glycosylated hemoglobin of 0.72%, without statistical significance but this result may have been influenced by a significant reduction of the sample analyzed due to the difficulties of carrying out laboratory tests by the official Health System.

#### A278

##### Multidisciplinary treatment of patients attended in public health services: results of a structured care program

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**Theme:** Nutrition, behavioral medicine, education and exercise.

**Introduction:** Type 2 diabetes (DM 2) is a complex disease that requires a combination of behavioral approaches of lifestyle changes in terms of physical exercise and appropriate nutrition, in addition to drug treatment. The achievement of therapeutic control goals is universally hampered by failure to adhere to such treatment. The multidisciplinary approach is a mitigating strategy for this problem and can generate better glycemic control.

**Materials and methods:** Retrospective analysis of 96 patients, aged  $62 \pm 12$  years, attended at a multidisciplinary public health service composed of endocrinologist, pharmacist, specialized nurse, nutritionist, psychologist and social worker. Twenty-seven cases were excluded from the analysis due to incorrect referral (7), type 1 diabetes (1), death (1), early loss of follow-up (10), immediate hospitalization (1) and incomplete follow-up (8). The 68 patients (39 women and 29 men) analyzed were attended by the team in bi-monthly or quarterly appointments during a mean period of 10 months, and then were reassessed regarding the parameters of metabolic control.

**Results:** Patients were diagnosed with DM 2 for  $10 \pm 8.7$  years, with chronic complications of DM: retinopathy (16.12%), nephropathy (25%), sensorymotor peripheral neuropathy (20.56%), peripheral arterial occlusive disease (16.18%), diabetic foot with wounds (8.82%), macrovascular disease with previous events (17.65%), previous amputations (4.41%) and erectile dysfunction in 58.62% of men. After the intervention with a structured program of multidisciplinary attention the metabolic parameters improved significantly ( $p < 0.05$  for all): fasting glycemia from  $192 \pm 97$  to  $154 \pm 55$  mg/dL; A1c from  $9.4 \pm 2.2$  to  $7.7 \pm 1.4\%$ ; patients with A1c  $< 7\%$  from 7.35 to 33.82%; LDL cholesterol from  $115 \pm 40$  to  $83 \pm 27$  mg/dL; patients with LDL  $< 100$  mg/dL from 20.59 to 61.77%; triglycerides from  $217 \pm 164$  to  $158 \pm 101$  mg/dL; patients with TG  $< 150$  mg/dL from 35 to 60%.

**Conclusion:** Barriers to achieving appropriate metabolic control in type 2 diabetes in public health services can be partially overcome by a structured treatment scheme implemented by multidisciplinary teams. In the present study, the multidisciplinary therapeutic approach resulted in an overall improvement of metabolic parameters with more patients achieving therapeutic control goals.

#### A279

##### Multiprofessional station of diabetes education in specialized service in Fortaleza/CE

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**Introduction:** Education in Diabetes mellitus (DM) is a tool that promotes skills, self-care and integration of ways to reach goals in the treatment of the disease. The traditional outpatient models can be increased with the participation of multiprofessional team in educational strategies, in addition to the integral follow up of the patient.

**Objective:** To describe the experience of a multiprofessional station of diabetes education in a specialized outpatient clinic in Fortaleza-CE.

**Method:** A report on the experience of diabetes education through the use of conversation maps in a specialized outpatient clinic in Fortaleza-CE.

**Results:** The education activity is part of the routine on the Outpatient Clinic in Diabetes, Dyslipidemia and Metabolic Syndrome, from a perspective of attendance stations. The stations correspond to the services of endocrinology, nursing, nutrition, physiotherapy, ophthalmology and education in DM. The education station in DM is characterized by an educational group with application of conversation maps and presents routing criteria, such as patients with metabolic uncontrol, low adherence to treatment and/or complications of the disease. The group consists of 4–10 participants, among patients and companions, lasting 40–60 min and has nurses, physiotherapists and nutritionists as facilitators. During this season, emerges an exchange of experiences among the participants, regarding the experiences with DM, pathophysiology of the disease, strategies for self-care improvements and questions about insulin use, feeding mistakes, foot care, use of appropriate footwear and physical exercise. Besides that, doubts about the complications of DM and its prevention are frequent.

**Conclusion:** The participants acquire knowledge through the interaction between the group and clarify doubts with the facilitators. The execution of this station reflects in self-care promotion and empowerment about diabetes, enabling improvement of treatment and self-management of the disease. It is suggested to perform tests before and after tests to analyze the efficiency of this strategy.

**A280****Muscle function and beta cell function: an association of interest in healthy young from nutritionists' health study**

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**Background:** Sarcopenia has been considered as a predictor of disability and adverse outcomes in old age. The muscle compartment represents an important site of action for insulin. Therefore, changes in this tissue, typical of age, have an impact on glycemic metabolism.

**Aim:** To evaluate whether muscle compartment parameters are associated with beta cell function in healthy young women from the Nutritionists'Health Study (NutriHS).

**Methods:** The NutriHS is a cohort study of undergraduates and graduates from Nutrition courses in Brazil. This is a cross-sectional analysis of 110 women aged 20–40 years, who answered online questionnaires about their early life events, and had anthropometry data, muscle strength and performance, body composition (iDXA Lunar GE<sup>®</sup>) and blood sample collected. Associations between exposure variables: calf circumference (CC), muscle strength (MS), muscle performance (MP) and muscle mass—appendicular skeletal muscle mass index (ASMI) and outcomes: fasting glucose (FG), HOMA-β and HOMA-IR, were tested by multiple linear regression.

**Results:** Means values: age 24.3 ± 5.2years, BMI 23.4 ± 4.3 kg/m<sup>2</sup>, WC 78.2 ± 10.1 cm, CC 36.0 ± 3.1 cm, FM 25.4 ± 7.4 kg, ASMI 6.5 ± 1.3 kg/m<sup>2</sup>, FG 82.8 ± 8.3 mg/dL, HOMA-β 44.4 ± 20.8 and HOMA-IR 1.9 ± 1.0. Mean blood pressure and lipid levels were normal. Comparing means values among MS tertiles and ASMI tertiles, differences in BMI, WC, FG and HOMA-β and in BMI, WC, CC and MS were observed, respectively. In linear regression models, after adjustments for confounders, inverse association of MS tertiles with FG (r<sup>2</sup> = 0.07; p = 0.040) and direct with HOMA-β (r<sup>2</sup> = 0.11; p = 0,033) were detected.

**Conclusions:** Prospective studies are needed to confirm our findings that suggest that muscle function parameters may be useful in predicting early the risk of beta cell dysfunction in healthy young.

**A281****Mutations in the HNF1A gene and glucokinase as the cause of diabetes**

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**Introduction:** In the last years, some cases of diabetes were identified, which progress did not allow to classify them into the most prevalent types among the population (type 1 and 2), with 715% of these being incorrectly categorized. The advent of molecular biology testing allowed to identify gene mutations implied in the generation of certain types of diabetes and in their treatment, i.e. the monogenic types. Worldwide prevalence is estimated as 12%.

**Case report:** Two cases that fall into this new classification, since they do not behave typically as the most usual ones, will be reported. A 34-year old, male, eutrophic, asymptomatic patient diagnosed with diabetes at the age of 15, through fasting plasma glucose of 144 mg/dL, with familial history positive to diabetes in three consecutive generations. Insulin therapy was started short time following diagnosis due to low insulin reserve; however, it was stopped, and a good

glycemic control was maintained with oral drug (metformin and sulfonylurea). Genetic testing was conducted, thus identifying mutation in gene HNF1A. Another 37-year old, female, eutrophic, asymptomatic patient with familial history of diabetes in four consecutive generations, started investigation for diabetes at the age of 32, showing fasting plasma glucose of 113 mg/dL and glycated hemoglobin of 6%. Also, she had normal oral glucose tolerance test and negative anti-GAD antibody. Initially, a change in lifestyle was implemented, then low-dose metformin was started due to increased glycated hemoglobin in a single dose; however, the previous plasma glucose levels remained. Genetic testing revealed mutation in glucokinase gene.

**Discussion and conclusion:** Mutations in HNF1A and glucokinase genes are the most prevalent ones in monogenic diabetes, 52 and 32% respectively. The first one is characterized by a more prominent increase in post-prandial than in fasting plasma glucose, in a young adult patient responding to sulfonylurea treatment. The second one presents as a slight change in fasting plasma glucose, found out by chance, in an asymptomatic patient and with very low risk of complications caused by hyperglycemia, which treatment is based only on changes in lifestyle. It is important to identify mutations to define treatment, give genetic counseling, and conduct familial screening. Therefore, one should always have these in mind when diagnosing diabetes mellitus.

Informed consent to publish had been obtained from the patient.

**A282****Nanda-I nursing diagnosis and skin integrity and tissue injury interventions in the podiatric area**

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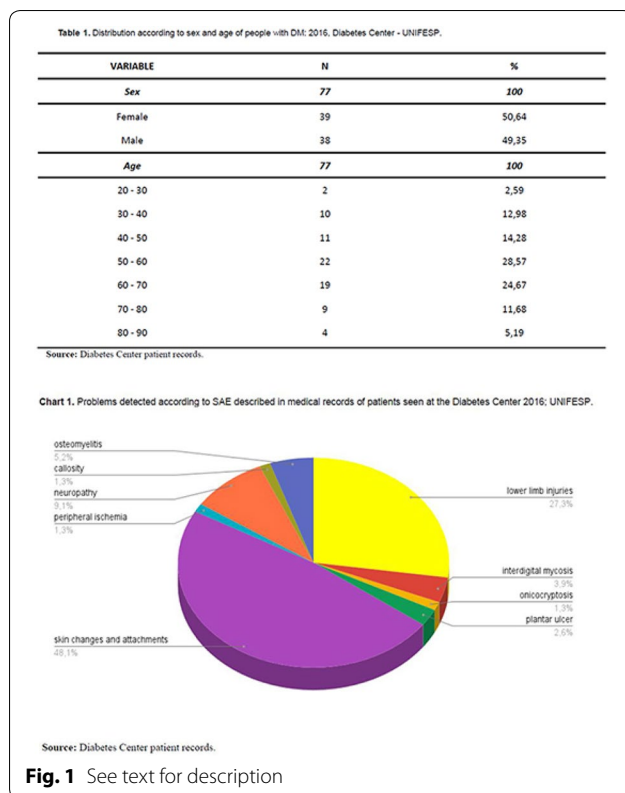
**Introduction:** A prevalence of Diabetes Mellitus (DM) has been acquiring alarming numbers globally, especially in developing countries. According to the latest data released by the International Diabetes Federation, 425 million people have diabetes. Among the complications caused by poor metabolic control are: alterations nails, deformities and ulceration in the feet, which may confer a risk for amputation in the lower limbs.

**Objectives:** To identify nursing diagnoses and interventions (NANDA-I) in patients with diabetes mellitus and peripheral neuropathy treated at a Diabetes Center.

**Method:** An exploratory study based on the systematic observation of podiatry nursing consultation for people with DM and with a presence of signs and/or symptoms of diabetic polyneuropathy, including a documentary analysis, performed at a Diabetes Center of a Public University, in the period 2016/17. Initially, the problems in the raised feet with the objective of anchoring nursing diagnoses analyzed by the defining characteristics according to the NANDA-I taxonomy of skin integrity and impaired tissue integrity were described, since there are no specific diagnoses for appendices, in this case, like nails. The project was approved by the Research and Ethics Committee of the University Hospital under No. 1508-2016 and is inserted in the graduate care line in the collective dimension.

**Results:** A total of 77 patients and their medical records were evaluated, 55.6% of which were classified as Impaired Skin Integrity and 44.4% as Impaired Tissue Integrity, as defining characteristics that integrate the diagnosis and as podiatric interventions are not proposed in the NANDA taxonomy. The most frequent problems are as onico: cryptoses-gyroses-mycosis, pre ulcerative lesions and inappropriate orthoses (Fig. 1)

**Conclusion:** The occurrence of foot problems related to DM, with me nails, pre-ulcerative lesions, deformities and pressures, are not defined in the NANDA taxonomy, as well as, there are no established interventions in the podiatry area, being a challenge to be confronted for the assistance of nursing in the area of dermatology.com emphasis on foot care.



### A283

#### Neck circumference and its correlation to other anthropometric parameters and finnish diabetes risk score (FINDRISC)

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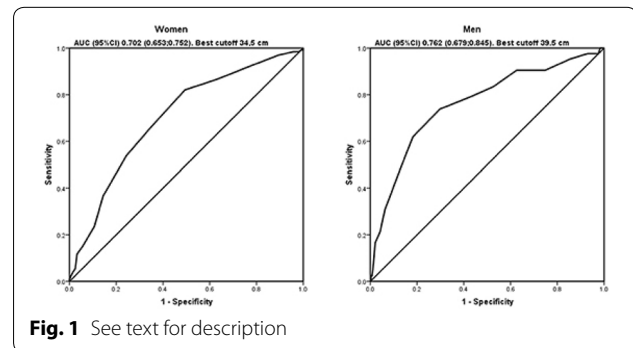
**Background:** The neck circumference (NC) is an anthropometric measure to evaluate obesity. The FINDRISC predicts the risk of developing type 2 diabetes mellitus. Our aims were to identify the mean value of NC in individuals with higher ( $\geq 15$  points) and lower FINDRISC and to establish cutoff values that indicate individuals with higher FINDRISC.

**Methods:** It is a population-based, cross-sectional study representative of the city of Curitiba, Brazil. We studied individuals ( $> 18$  years), without diabetes mellitus, between August 2013 and August 2014. We evaluated anthropometric parameters, glycaemia, socioeconomic situation, chronic conditions, and their risk factors. In a sex-specific analysis, data are presented as mean and standard deviation. We performed Pearson's and Spearman's correlation between NC and the waist circumference, body mass index and FINDRISC. Receiver Operating Characteristic curves were estimated for NC and higher FINDRISC. Logistic regression models were built to analyze the association between higher FINDRISC and 1-SD increase in NC.

**Results:** We studied 950 individuals (621 women) with a mean age of  $47.4 \pm 17.6$  years and body mass index of  $26.2 \pm 5.6$  kg/m<sup>2</sup>. The mean NC were  $34.1 \pm 3.1$  cm in women and  $38.2 \pm 3.5$  cm in men. Mean NC was lower in women ( $33.7 \pm 2.9$  cm vs  $35.8 \pm 3.2$  cm) and men ( $37.7 \pm 3.4$  cm vs  $41 \pm 3.6$  cm) with lower FINDRISC ( $p < 0.001$ ). All the correlations with NC were significant ( $p \leq 0.001$ ). The area under the curve for NC and the higher FINDRISC was 0.702 (95% CI 0.653–0.752) for women and 0.762 for men (95% CI 0.679–0.845), determining the best cutoff value of 34.5 cm for women and 39.5 cm for men

to discriminate individuals with higher FINDRISC. Fully adjusted odds ratios for higher FINDRISC per 1-SD increase in NC in women and men were, respectively 1.89 (95% CI 1.53–2.33) and 2.86 (95% CI 1.91–4.29).

**Conclusion:** NC is positively correlated to body mass index, waist circumference, glycaemia, and FINDRISC scores in a population-based sample of adults. We identified the mean values of NC in higher and lower FINDRISC and established cutoff values for NC and higher FINDRISC (Fig. 1)



### A284

#### Neck circumference helps in the characterization of atherogenic profile in middle-aged individuals: the brazilian longitudinal study of adult health (Elsa-Brasil)

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**Introduction:** Neck circumference has been proposed as an upper body obesity index and is associated with metabolic syndrome components. It is unknown whether this measure could be useful to characterize earlier atherogenic risk in large epidemiological studies.

**Objective:** This sub-study of the Longitudinal Study of Adult Health (ELSA-Brasil) evaluated associations of neck circumference—independent of body adiposity—with biomarkers of endothelial dysfunction and subfractions of lipoproteins, in middle-aged participants at low-to-moderate cardiovascular risk.

**Methods:** A sample of 804 individuals (35–54 years) without diabetes or cardiovascular disease was enrolled in this analysis. After having been characterized as normal weight and weight excess (body mass index—BMI  $\geq 25$  kg/m<sup>2</sup> and  $< 30$  kg/m<sup>2</sup>) they were sub-stratified into quartiles of neck circumference. Traditional risk factors, subfractions of lipoproteins, E-selectin and coronary artery calcium (CAC) score different from zero were evaluated across the tertiles by ANOVA or Chi squared test. In linear regression models, associations of neck circumference levels with subfractions of lipoproteins and E-selectin, adjusted for insulin resistance index, were tested.

**Results:** Worsening of traditional risk factors and novel biomarkers, as well as increased frequencies of abnormal risk factors were observed throughout the quartiles of NC values. Additionally, in the normal weight group, lower levels of both HDL2 and HDL3, and higher levels of small dense LDL were observed in the third and fourth comparing to the first and second quartiles. While, in the BMI  $\geq 25$  kg/m<sup>2</sup> group, progressive reduction for HDL2 and HDL3 and increasing for the small dense LDL were observed across the quartiles of NC. For those individuals with normal BMI, E-selectin concentration increased after the second quartile. In the group with excess of weight, this variable showed a linear increment across the quartiles of NC. The linear regression models identify a direct and independent association between

neck circumference and small-dense LDL and E-selectin and an inverse independent association with HDL2, in both categories of BMI.

**Conclusion:** Neck circumference may be a useful anthropometric measurement to identify a worse atherogenic profile independent of BMI and insulin resistance in middle-aged individuals at low-to-moderate cardiovascular risk.

#### A285

##### **Necrobiosis lipidica diabetorum: a descriptive study of 23 cases**

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**Background:** Necrobiosis lipidica diabetorum (NLD) is a disorder of collagen degeneration with a granulomatous response, thickening of blood vessel walls and fat deposition that affects individuals with diabetes. The main complication of the disease is ulceration, which usually occurs after mechanical trauma, exposure to the sun without protection and infections. Cases of squamous cell carcinoma developing in chronic ulcerated lesions have been reported.

**Objectives:** To describe treatments administered to individuals with NLD and the corresponding results.

**Materials and methods:** The study was a descriptive, cross-sectional study in which retrospective data were collected from the medical records of diabetic patients over 18 years of age who had been diagnosed with NLD and were treated and followed up at a lesions prevention and treatment outpatient unit at a diabetes center in Curitiba between 2013 and 2017. The study was approved by the Committee for Ethics in Research at the Pontifical Catholic University, Paraná, under ref. no. 2.125.287 and authorized by the management of the unit.

**Results:** The study sample consisted of 23 medical records of individuals with NLD. Patients were diagnosed clinically by a dermatologist. In 60.9% of the cases a biopsy was used for a differential diagnosis. Mean patient age was 32.4 years, 78.3% were women, 69.6% had type 1 diabetes and mean time since diagnosis was 10.2 years. At the first assessment, 56.5% of the patients had an ulcerated lesion. During follow-up, 86.9% had ulcerated lesions at least once and 100% of these were treated with photodynamic therapy (PDT) and porous cellulose membrane. Mean wound-healing time was 23 days. Discussion: Because the disease is a rare one, occurring in around 0.1 to 0.3% of the diabetic population, there is no consensus regarding treatment. Worsening of the inflammatory process and ischemic microangiopathy in the epidermis and deep dermis have been reported when occlusive dressings are used. A porous cellulose membrane was chosen because it does not completely occlude the lesion. Studies have shown that PDT can be used safely to treat ulcerated lesions and lesions with granulomas.

**Conclusion:** With the increasing prevalence of diabetes, diabetes-related lesions have led to a greater demand for wound treatment in outpatient units. It is important that diabetes specialists are increasingly better prepared to recognize and treat these types of lesions so that patients do not have to suffer the consequences of unsuitable treatment.

#### A286

##### **Neonatal diabetes: case report**

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**Case presentation:** A 3 months old patient, presenting hypoaactivity, sialorrhoea and seizures 2 days ago, was admitted to a university hospital. During hospitalization she was evaluated by neurology that identified a discrete delay in neuropsychomotor development. Laboratory tests showed high glycemic, low C peptide and negative auto-antibodies (anti-GAD and anti-islet cells). She performed a skull tomography that demonstrated a significant volume reduction of the right frontal lobe associated with some sparse calcifications in the cerebral parenchyma bilaterally more pronounced in the frontal and parietal lobes of subcortical location, suggested research of congenital infection by the radiologist. Serologies for toxoplasmosis, rubella and measles negative. History of maternal varicella during gestation. Initiated insulin glargine schedule and regular insulin for correction of high glycemia levels, even using more than 1 UI/kg/day it was not possible to obtain adequate disease control. Due to the delay in carrying out a genetic study to close the diagnosis, material was collected and sent to the genetic service and prescribed sulfonylurea (glibenclamide) as a therapeutic test. The oral medication was initiated in low doses with gradual elevation, and progressive reduction of the insulin until its suspension. The patient evolved with good glycemic control and improved neurological symptoms. She was discharged from the hospital using glibenclamide 20 mg/day. The patient is in outpatient follow-up at the endocrinology department of the João de Barros Barreto University Hospital. Endocrinology work team is still waiting for genetic analysis.

**Discussion:** Due to the neurological changes and manifestation of the disease before 6 months of life, the hypothesis of neonatal diabetes was raised. The associated neurological (convulsions, hypoaactivity and developmental delay) raises the hypothesis of DEND syndrome by mutation of the KCNJ11 gene, which would explain the combination of symptoms.

**Final comments:** The experience presented shows that the diagnosis of DEND Syndrome should be considered even in centers with difficult access to genetic tests. Consent to publish Informed consent to publish has been obtained from this patient (her guardians).

#### A287

##### **New-onset diabetes caused by atypical antipsychotic**

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**Case report:** A 38 year-old female patient, previously healthy, had been diagnosed with schizophrenia and started treatment with risperidone. Due to the lack of response, the medication was switched to olanzapine. After 2 years on the new treatment, however, she experienced polyuria, polydipsia and polyphagia, with a weight gain of approximately 12 kg in a period of 2 years. She was diagnosed with new-onset diabetes mellitus and hypertriglyceridemia and was referred to our center for evaluation. She was started on metformin 500 mg/day, NPH insulin 9 units before breakfast and 7 units bedtime, and bezafibrate 200 mg/day. Ophthalmologic consultation revealed bilateral cataracts and surgery was offered as treatment. On endocrinological evaluation, she denied family history of diabetes, weighted 60 kg with 1.54 m of height and a BMI of 25.2 kg/m<sup>2</sup>. Exams revealed HbA1c of 13%, triglycerides of 3455 mg/dl, total cholesterol of 570 mg/dl and HDL cholesterol of 65 mg/dl. LDL was not calculated due to the hypertriglyceridemia. Insulin was titrated to achieve glycemic control and autoantibodies (antiGAD, antiICA and anti-insulin) were requested, but they were negative. A letter was addressed to the psychiatry staff regarding olanzapine's adverse events, which was exchanged to ziprasidone. Follow-up revealed improved blood lipids and HbA1C (Table 1). Insulin dosing was reduced and further withdrawn 3 months after initiation of ziprasidone. Currently, 2 months thereafter, she is on good glycemic control with metformin and alogliptin.

**Case discussion:** Weight gain, hypertriglyceridemia and new-onset diabetes mellitus had been previously described after the use of atypical antipsychotics, in particular olanzapine and clozapine. Diabetes pathophysiological mechanisms, in this particular case, remains unknown, but it's believed it's not attributed to weight gain. This is not the case with ziprasidone, as American Diabetes Association stated. Our patient showed remarkable improvement in glycemic control, weaning off insulin and staying on oral low-dose antidiabetics after olanzapine's withdrawal.

**Final comments:** The prescribing physician should be aware of these metabolic disfunctions and intervene when necessary. Informed consent to publish had been obtained from the patient (Fig. 1).

	At schizophrenia diagnosis	After 2 years on olanzapine	After 3 months of olanzapine's withdrawal
Fasted glycemia (mg/dl)	81	402	85
HBA1C (%)		13%	6,5%
Total cholesterol (mg/dl)	208	570	176
LDL (mg/dl)	141	*	113
HDL (mg/dl)	58	65	40
Triglycerides (mg/dl)	78	3455	166
Hemoglobin (g/dl) /Hematocrit (%)	13.9/42,3%	14/42,5%	
Creatinine (mg/dl)		0,7	0,8

Table 1 – Exams follow-up

\*Consent to publish has been obtained from this patient.

**Fig. 1** See text for description

#### A288

##### New-onset diabetes mellitus caused by antiPD1 checkpoint inhibitor

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1)**:A288

**Case report:** A 58 year-old male patient was started on Nivolumab infusions every 15 days after chemotherapy refractory progressive metastatic lung adenocarcinoma, with no prior history of diabetes. After 4 infusions, he experienced xerostomia, polyuria, polydipsia and asthenia. Upon emergency evaluation, he was started on I.V. insulin after a capillary glycemia of 600 mg/dL. He was discharged home with 10 units of NPH insulin bedtime, with a referral to the endocrinologist. On consultation, he persisted with the above symptoms, with a BMI of 17.6 kg/m<sup>2</sup> (weight 47.3 kg and height 1.64 m); self-monitored blood glucose showed values between 200 and 500 mg/dL. Insulin was titrated for a total daily dose of 0.5 UI/kg. Laboratory evaluation showed C-peptide of 0.34 ng/dL, negative anti-GAD/anti-ICA/anti-insulin autoantibodies. Nivolumab was withdrawn and no glycemic improvement nor insulin dose reductions were noted.

**Case discussion:** Nivolumab is a monoclonal antibody targeted against PD-1, acting as a checkpoint inhibitor, used in the treatment of some forms of metastatic cancer, like melanoma, renal and non-small cell lung cancer. Acting upon regulatory molecules of T-lymphocytes can result in destruction of tumor cells which do not respond to chemotherapy. On the other hand, T-lymphocytes can react with autoantigens, resulting in autoimmune endocrinopathies like hypophysitis and thyroiditis. Autoimmune diabetes has been recently linked with this therapy, characteristically 1–5 months after its initiation. Humoral and cellular components are probably involved, as only a few patients develop autoantibodies.

**Final comments:** New-onset diabetes presenting with Diabetic Ketoacidosis and low levels of Cpeptide represents a possible adverse event from the use of antiPD1 monoclonal antibody Nivolumab. As novel treatments become more popular, prescribing physician should

be aware of adverse reactions, particularly those potentially fatal. \*Consent to publish has been obtained from this patient.

#### A289

##### Non-insulinoma pancreatogenic hypoglycemia after bariatric surgery—case report

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**Case report:** A 36-year-old woman underwent endocrinological follow-up for preoperative evaluation of Roux-en-Y gastric bypass surgery in January 2014 due to body-mass index (BMI) of 47.53 kg/m<sup>2</sup> and systemic arterial hypertension. From February 2016, 1 year and 5 months after bariatric surgery, the patient presented recurrent hospitalizations due to neuroglycopenic symptoms, and repeated symptomatic hypoglycemia was confirmed. The investigation by the arteriographic study with selective catheterization of the splenic, gastroduodenal and superior mesenteric arteries revealed a pattern suggestive of hyperinsulinism in the territory of all arteries. After the confirmed diagnosis by catheterization, the therapeutic management was dietary guidance and prescription of acarbose. With the partial improvement of the symptoms, the patient was discharged and received orientations for outpatient control were recommended.

**Discussion:** Non-insulinoma pancreatogenic hypoglycemia is the most frequent pancreatic beta-cells hyperplasia in adults. This diagnosis is rare, being necessary to investigate insulinoma and factitious hypoglycemia, as these are the most frequent causes of hypoglycemia in adults. The clinical scenario is marked mainly by hypoglycemia crisis, which may be explained by altered intestinal transit of nutrients and increased secretion of GLP-1, and often requiring frequent hospitalizations. It occurs mainly through the Roux-en-Y gastric bypass technique. The initial treatment of hypoglycemic seizures is clinical and consists of a restricted diet of carbohydrates and drug therapy, which includes diazoxide (K-channel agonist), octreotide (somatostatin analogue), acarbose (alpha-glucosidase inhibitor) and calcium channel blocker. If there is no response, surgical treatment is indicated for total or partial distal pancreatectomy.

**Final comments:** There is scant information and experience about non-insulinoma pancreatogenic hypoglycemia. Despite being rare, the number of cases is currently increasing with the great number of bariatric surgeries performed in the present times. Hypoglycemic episodes usually occur 1–3 years after surgery. The diagnosis and treatment of this pathology still present divergences: while some authors advocate for clinical treatment, others believe it to be primarily surgical, with clinical measures being used only to stabilize the condition before to the procedure.

Informed consent to publish had been obtained from the patient.

#### A290

##### Non-invasive evaluation of cardiovascular risk in patients with type 2 diabetes mellitus with and without thyroid dysfunction

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**Introduction:** There is a heterogeneity in the classification of cardiovascular risk (CVR) in patients with type 2 diabetes mellitus (T2DM). T2DM patients were always considered high risk however, recent evidence suggests the presence of low risk subgroups. Thyroid dysfunctions (TD), even subclinical ones, have significant effects on cardiovascular function. The identification of asymptomatic individuals who may be at increased risk and who could benefit from stricter control and treatment goals is a major challenge.

**Objective:** The objective is to determine the CVR of asymptomatic T2DM patients with and without TD, using non-invasive cardiovascular methods.

**Methods:** It is an observational cross-sectional study. We used clinical and laboratory parameters to determine the global risk score of Framingham (FRS) and cardiological exams: coronary calcium score (CCS) to determine the coronary calcification and carotid ultrasonography to determine the intima-media thickness (IMT).

**Results:** Sixty-two (62) patients with T2DM were evaluated, 72% women. Sixty-eight percent (68%) have arterial hypertension and 65% have dyslipidemia. All dyslipidemic patients used statins. Eleven percent (11%) had previous TD. Sixty-two (62) patients performed FRS, 31% (19) presented low FRS (< 10%) and 69% (43) intermediate FRS (between 10 and 20%). The mean FRS of the 55 patients without previous TD was  $11.92 \pm 5.16\%$  and of 7 patients with previous TD was  $14.75 \pm 1.86\%$ ,  $p = 0.043$ . Forty-four (44) of the 62 patients did the CCS and 26 (60%) had no calcification. After adjusting for age and sex, 18 were reclassified to the moderate to very severe degree of calcification, 14 belonged to the group without TD and 4 to the group with TD. No statistical difference was observed between these two groups,  $p = 0.25$ . IMT determination was performed in 58 of 62 patients. The mean and SD of the IMT were  $0.66 \pm 0.13$  mm in the patients without previous TD and  $0.64 \pm 0.12$  mm in the patients with previous TD with no statistical difference,  $p = 0.70$ .

**Conclusion:** Patients with TD had a higher CVR. Non-invasive cardiological exams, mainly the determination of the CCS, allowed the reclassification of patients to higher CVR levels. The individualization of goals to control the disease and its associated comorbidities, depends on the correct characterization of the risk.

#### A291

##### Nonketotic hyperosmolar state in pentamidine-induced diabetes mellitus: case report

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**Case report:** Patient M.A.Z, male, 44 years old, diagnosis of diffuse cutaneous leishmaniasis in treatment since 1995 without therapeutic response after several treatments. Regular follow up with infectology, in maintenance treatment with miltefosine and in treatment with pentamidine every 30 days from January 2017, with a marked improvement of cutaneous lesions. During the follow-up, in consultation in July 2017, he complained of weight loss, polydipsia and nocturia, with serum glycemia of 901 mg/dL. Patient was referred to the hospital where he was diagnosed with a non-ketosis hyperosmolar state, with tests showing serum osmolarity of 306 mOsm/L and glycated hemoglobin 10.31%. During hospitalization and after discharge maintained insulin use for glycemic control. Treatment of leishmaniasis with pentamidine was discontinued and will keep following-up with infectology and endocrinology.

**Discussion:** Glycemic disorders are important side effects of pentamidine, with hyperglycemia reported in 1-5% of cases. There are reports of glycemic change charts up to 11 months after the start of medication use. The pathophysiology of this change is still unclear, but it seems to be related to the cytolytic effect of pentamidine on beta cells, which are more sensitive to this drug than other cells. Initially the injury may cause excessive glucose release and lead to symptoms of hypoglycemia, with subsequent deficiency in insulin secretion and hyperglycemia. Permanent diabetes mellitus may succeed the use of pentamidine, and our patient will be monitored to assess whether diabetes mellitus will be transient or not. It is not yet clear whether this effect is dose dependent or idiosyncratic and further studies are needed to evaluate the pharmacokinetics of pentamidine. In addition, patients using pentamidine are often exposed to multiple drug regimens that can corroborate for cell injury, which as in the case of our patient may interfere with the evaluation.

**Final comments:** Pentamidine treatment may be related to severe cases of diabetes mellitus, in this case with decompensation in a non-ketotic hyperosmolar state. The association of the hyperosmolar state with pentamidine is noteworthy since there are few reports of this association in the scientific literature.

Informed consent to publish had been obtained from the patient.

#### A292

##### Nursing consultation of the diabetic patient in public ambulatory in São Paulo's interior

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**Introduction:** Nurses play an essential role in patient care diabetic, mainly for developing educational activities and contributing to their adherence to treatment. The educational activities carried out by nurses contribute to the control of diabetes, since the complications have been directly related to poor control and lack of knowledge of disease.

**Objective:** To characterize patients seen in the nursing in a multi professional outpatient clinic of the region of uncompensated and complicated diabetes mellitus. Encourage guidelines to adherence into proposed treatment.

**Methods:** Data were collected from January 2016 to June 2017, through the nursing consultation. This is a descriptive and quantitative study, with a sample of 274 patients who were outpatient clinic in the interior of São Paulo.

**Results:** The data revealed female prevalence (63%), with a mean age 57 year, a predominance of type 2 diabetes, mean disease time of 12 years and 249 mg/dl of blood glucose capillary. A lack of adherence was observed in 83%, considering as assessment criteria of adequate nutrition and regular physical activity. 58% of patients monitored capillary glycemia. All of them had episodes hyperglycaemia and 35% presented hypoglycemia in the last three months. Diabetes complications have led to hospitalizations in the last 12 months in 11% of patients. Among nursing diagnoses evaluated the most prevalent were: unstable glycemic risk (100%), sedentary life (81%), ineffective self-control of health (72%). In physical examination, guidelines on the complications of diabetes mellitus, emphasizing the importance of adherence to treatment. Nursing interventions were performed according to analyzed.

**Conclusion:** The most important nursing diagnoses are related to lifestyle and lack of adherence to treatment. Therefore, this study revealed the need for education, with guidelines that encourage adherence to treatment and self-care, for the prevention of complications.

#### A293

##### Nutritional profile of patients with diabetic kidney disease in a multidisciplinary ambulatory of a public hospital in the São Paulo city

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A293**

**Introduction:** Obesity has been associated with Diabetic Renal Disease (DRD), particularly in the non-dialytic phase. Therefore, the evaluation of nutritional status is fundamental for the interventions planning that make it easier to know the nutritional care of DRD patients.

**Objective:** To evaluate the nutritional profile of patients assisted by the Nutrition in a multidisciplinary team of the DRD clinic in a public hospital.

**Methods:** Retrospective study, in the multidisciplinary team composed of endocrinologists and nephrologists, nutritionists and nursing



staff. Data were analyzed of patients attended in the period between 2014 and March 2017. Nutritional data (Weight, Height and Body Mass Index (BMI)) and laboratory data (serum creatinine and glycated hemoglobin (HbA1c)) were obtained and results expressed in medians. Glomerular filtration rate (GFR) was estimated using the MDRD (Modification of Diet in Renal Disease) formula for serum creatinine, age, race, and sex.

**Results:** The sample consisted of 96 patients, with medians 65 years for age, 29.4 kg/m<sup>2</sup> for BMI, 25.1 mL/min/1.73m<sup>2</sup> for GFR and 8.0% for HbA1c, with 88.5% of the individuals used insulin therapy. Despite the predominance of the elderly in the sample (71%), there was no significant difference in GFR, HbA1c and BMI when compared to adults. Males accounted for 52% of the sample and, when compared with women, showed higher GFR (39.6 kg/m<sup>2</sup> vs. 25.3 mL/min/1.73m<sup>2</sup>, p = 0.0018), although similar results to BMI and HbA1c. Individuals with DRD stage 4 (GFR 22.3 mL/min/1.73m<sup>2</sup>, BMI 30.2 kg/m<sup>2</sup>, HbA1c 8.6%) corresponded to 46% of the sample, followed by those in stage 3B (25%, GFR 37.8 mL/min/1.73m<sup>2</sup>, BMI 28.2 kg/m<sup>2</sup>, HbA1c 8.8%), stage 5 (19%, TFG 10.7 mL/min/1.73m<sup>2</sup>, BMI 28.0 kg/m<sup>2</sup>, HbA1c 7.3%), stage 3A (6%, TFG 48.7 mL/min/1.73m<sup>2</sup>, BMI 29.3 kg/m<sup>2</sup>, HbA1c 7.6%) and stage 2 (4%, TFG 70.4 mL/min/1.73m<sup>2</sup>, BMI 31 kg/m<sup>2</sup>, HbA1c 6.8%).

**Conclusion:** There was a predominance of individuals in predialytic stages (stages 4 and 5) of DRD and the elderly. Excess weight was a common factor for the patients, regardless of the stage of DRD, reinforcing the importance of the nutritionist together with the multi-professional team to optimize the clinical treatment and nutritional evolution of these patients.

**A294**

**Nutritional status and prevalence of non-transmissible chronic diseases in elderly**

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**Introduction:** Although the aging process is not necessarily related to diseases and disabilities, non-communicable chronic diseases (NCCDs) are frequently found among the elderly. Many chronic conditions are also linked to lifestyle choices, such as smoking, alcohol consumption, sexual behavior, inadequate diet and physical inactivity, and genetic predisposition. Nutritional status has important implications in the context of population aging, since the control of a large number of NCCDs and the prevention of complications due to them depend on nutritional status.

**Objectives:** To evaluate the nutritional status and prevalence of NCCDs in the elderly.

**Methods:** This is a cross-sectional study examined 112 individuals of both sexes, aged 60 years, groups of the elderly in city of Roca Sales-RS. For assessment of nutritional status, they were measured waist circumference (WC), weight and height, and held calculating the body mass index (BMI). A questionnaire was applied to obtain the diagnosis of NCCDs and lifestyle.

**Results:** It was observed that 86% (n = 96) of participants were female and 75% (n = 84) were married. According to the BMI, 57% (n = 64) were overweight, and the men with the highest mean BMI (p = 0.011).

In the evaluation of WC, men also had higher average when compared to women (p < 0.001). Most participants (82.1%, n = 92) showed much increased risk for metabolic complications. The NCCDs diagnosed were: systemic arterial hypertension (SAH), dyslipidemia, osteoporosis and diabetes mellitus (DM). Of the patients included, 83% (n = 19) had at least one and three pathology was the average number of pathologies.

**Conclusions:** Given the results, it can be observed high prevalence of overweight, very high risk for metabolic complications associated with obesity and high diagnosis three NCCDs. Among the NCCDs, the most prevalent were SAH, osteoporosis and DM. The relation between the diagnosis of NCCDs, BMI and WC was observed. These results suggest that the evaluated elderly was in inadequate nutritional conditions. It is concluded that it is extremely important to create preventive and intervention measures for the control of obesity and NCCDs (Figs. 1, 2)

Tabela 1 – Características demográficas e estilo de vida de idosos do município de Roca Sales – RS (2013).

Variáveis	Amostra total (n=112)	Mulheres (n=96)	Homens (n=16)	p
Idade (anos) – média ± DP	66,1 ± 4,1	65,6 ± 3,9	69,1 ± 4,0	0,001*
Estado civil – n(%)				0,738**
Solteiro	2 (1,8)	2 (2,1)	0 (0,0)	
Casado	84 (75,0)	72 (75,0)	12 (75,0)	
Divorciado	14 (12,5)	11 (11,5)	3 (18,8)	
Viúvo	12 (10,7)	11 (11,5)	1 (6,3)	
Local de moradia – n(%)				1,000**
Área urbana	73 (65,2)	63 (65,6)	10 (62,5)	
Área rural	39 (34,8)	33 (34,4)	6 (37,5)	
Tabagista – n(%)				0,037***
Sim	6 (5,4)	3 (3,1)	3 (18,8)	
Não	106 (94,6)	93 (96,9)	13 (81,3)	
Tempo de tabagismo (anos) – md (P25 – P75)	25 (20 – 35)	20 (17 – 30)	35 (23 – 48)	0,033#
Etilismo – n(%)				0,004**
Raramente	24 (21,4)	23 (24,0)	1 (6,3)	
Eventualmente	24 (21,4)	16 (16,7)	8 (50,0)	
Frequentemente	10 (8,9)	7 (7,3)	3 (18,8)	
Nunca	54 (48,2)	50 (52,1)	4 (25,0)	
Prática de atividade física – n(%)				0,163**
Sim	70 (62,5)	63 (65,6)	7 (43,8)	
Não	42 (37,5)	33 (34,4)	9 (56,3)	

\*Teste t-student, \*\*Teste qui-quadrado, \*\*\*Teste exato de Fisher, #Teste Mann-Whitney, DP = desvio padrão, md = mediana.

Tabela 2 – Avaliação do estado nutricional de idosos do município de Roca Sales – RS (2013).

Variáveis	Amostra total (n=112)	Mulheres (n=96)	Homens (n=16)	p
Peso (kg) – média ± DP	69,7 ± 13,1	68,4 ± 12,9	77,3 ± 11,7	0,011*
Altura (m) – média ± DP	1,60 ± 0,07	1,58 ± 0,06	1,69 ± 0,04	<0,001*
IMC (kg/m <sup>2</sup> ) – média ± DP	27,0 ± 4,9	27,1 ± 5,0	26,6 ± 4,0	0,730*
Classificação do IMC – n(%)				0,901**
Desnutrição	17 (15,2)	14 (14,6)	3 (18,8)	
Eutrofia	31 (27,7)	27 (28,1)	4 (25,0)	
Excesso de peso	64 (57,1)	55 (57,3)	9 (56,3)	
CC (cm) – média ± DP	98,6 ± 11,2	96,6 ± 10,4	110 ± 9,0	<0,001*
Classificação da CC – n(%)				0,370**
Normal	7 (6,3)	7 (7,3)	0 (0,0)	
Aumentado	13 (11,6)	10 (10,4)	3 (18,8)	
Muito aumentado	92 (82,1)	79 (82,3)	13 (81,3)	

\*Teste t-student, \*\*Teste qui-quadrado, DP = desvio padrão.

**Fig. 1** See text for description

Figura 1 – Relação entre a prevalência de DCNT e gênero em idosos do município de Roca Sales – RS (2013).

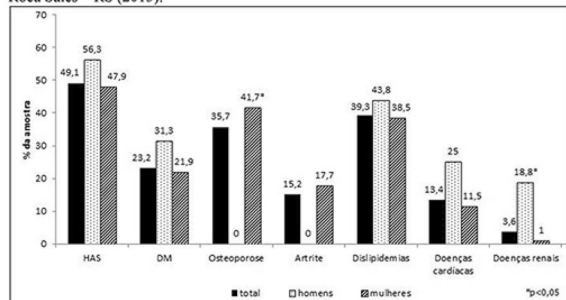


Tabela 3 – Relação entre a classificação nutricional pelo IMC e a prevalência de DCNT em idosos do município de Roca Sales – RS (2013).

Variáveis	Desnutrição (n=17)	Eutrofia (n=31)	Excesso de peso (n=64)	p*
Hipertensão Arterial	1 (5,9)	10 (32,3)	44 (68,8)	<0,001
Diabetes Mellitus	1 (5,9)	0 (0,0)	25 (39,1)	<0,001
Osteoporose	9 (52,9)	10 (32,3)	21 (32,8)	0,273
Artrite	2 (11,8)	3 (9,7)	12 (18,8)	0,468
Dislipidemias	5 (29,4)	9 (29,0)	30 (46,9)	0,165
Doenças cardíacas	2 (11,8)	1 (3,2)	12 (18,8)	0,112
Doenças renais	0 (0,0)	2 (6,5)	2 (3,1)	0,493

\* Teste qui-quadrado de Pearson.

Tabela 4 – Relação entre a classificação da CC e a prevalência de DCNT em idosos do município de Roca Sales – RS (2013).

Variáveis	Normal (n=7)	Aumentada (n=13)	Muito aumentada (n=92)	p*
HAS	0 (0,0)	3 (23,1)	52 (56,5)	0,002
DM	0 (0,0)	2 (15,4)	24 (26,1)	0,224
Osteoporose	6 (85,7)	2 (15,4)	32 (34,8)	0,007
Artrite	2 (28,6)	2 (15,4)	13 (14,1)	0,590
Dislipidemias	3 (42,9)	4 (30,8)	37 (40,2)	0,792
Doenças cardíacas	2 (28,6)	1 (7,7)	12 (13,0)	0,414
Doenças renais	0 (0,0)	1 (7,7)	3 (3,3)	0,629

\* Teste qui-quadrado de Pearson.

Fig. 2 See text for description

**A295**

**Obesity and diabetes mellitus in patients accompanied by the national reference service in filariases de Pernambuco: how are we?**

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**Introduction:** Filariasis is a chronic infectious tropical disease caused by a nematode parasite, *Wuchereria bancrofti*. Its most common form is the lymphatic filariasis (FL), due to the expressiveness of its numbers. In 2004, according to the World Health Organization (WHO), filariasis affected around 120 million people worldwide, especially in the tropical humid, high temperature regions of the African and Asian continents, especially where there was no proper water treatment and sewage. In recent decades, lymphatic filariasis has emerged as a growing problem of public health in various parts of the world.

**Objective:** To identify the prevalence of obesity and diabetes of patients attended by the National Reference Service in Filariasis (SRNF) of the Aggeu Magalhães Research Center (CPqAM), in Pernambuco.

**Method:** This is a cross-sectional study carried out through the analysis of secondary data (from the first nutritional consultation), collected from the medical charts, of the patients assisted by the SRNF nutrition, from October 2015 to June 2017 (BMI and waist circumference), lifestyle (smoking, alcoholism and sedentary lifestyle) and diagnoses of comorbidities were analyzed.

**Results:** Data were collected from 40 patients, adults and elderly, men and women. There were 5% of thinness and eutrophy, 90% of excess weight, distributed in 17, 5% (overweight); 45% (obesity I); 15% (obesity II), 12.5% (obesity III). The change in WC was a risk factor increased to 15% and greatly increased to 79% of the group. Regarding lifestyle, there was no habitual use (at least once a week) of alcoholic beverages or cigarettes. However, 87.5% were sedentary. Among the most frequent comorbidities are hypertension (60%), diabetes mellitus (27.5%), dyslipidemia (25%) and kali (10%).

**Conclusion:** The findings allow us to conclude that this group of patients integrate complications of infectious and chronic diseases. And that the prevalence of obesity and diabetes stands out because they further aggravate their clinical condition. It becomes relevant to discuss intervention strategies for lifestyle changes.

**A296**

**Obesity in type 1 diabetes (double diabetes) is associated with the increase in the prevalence of coronary arterial disease**

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**Introduction:** The Double Diabetes (DD) corresponds to Type 1 diabetes mellitus (DM1) associated with overweight and insulin resistance (IR) characteristics. The prevalence of individuals with DD has increased in recent years in parallel with the increase in the prevalence of obesity and sedentarism among young people. However, the impact DD can cause on the natural course of DM1 needs to be better studied.

**Objective:** To compare the clinical, metabolic and critical complications among groups of patients with DD and classical DM1 adjusted for the gender ratio and time to diagnosis of the disease (TDD).

**Patients and methods:** 46 patients with DD [DM1 and two of the following criteria: systemic arterial hypertension (defined by NCEP), overweight or obesity (WHO), dyslipidemia (NCEP) and clinical signs of peripheral insulin resistance] and 65 individuals with classical DM1 in relation to glycated hemoglobin, lipid profile and prevalence of microvascular and macrovascular complications of the disease. Statistic-ANOVA, paired t test, X<sup>2</sup> with p < 0.05.

**Discussion:** In this study it was observed that patients with DD had a higher age at diagnosis, a higher prevalence of dyslipidemia and coronary arterial disease (CAD) (10.9 vs 0.0, p < 0.05) than those with classic DM1. These results are in agreement with Merger et al. (2016). In 5 years of following-up there was an increase in the obesity degree of DD patients.

**Conclusion:** Patients with DD presents higher risk for CAD with the same time of diagnosis of classical DM1 patients, despite the clinical diagnosis in the 1st or 2nd decades. The informed consent of the patients was obtained for publication (Fig. 1)

Table 1- Clinical and Laboratory Characteristics of Individuals with Double Diabetes and T1D			
	Double Diabetes	T1D	
Individuals number	46	65	
Male (%)	43.5	45.4	P=0.20
Female (%)	56.5	44.6	P=0.20
Age (years)	32.0	27.7	P<0.001
Average Age at Diagnosis (years)	13.3	9.2	P=0.006
Mean Time of Diagnosis (years)	19.2	18.7	P=0.921
BMI (kg/m <sup>2</sup> )	30.9	23.8	P<0.001
HbA1C (%)	8.9	9.5	P=0.129
Total Insulin dose (U/kg-day)	0.74	ND	
SAH (%)	52.2	44.4	P=0.422
Dyslipidemia (%)	54.3	25.3	P=0.002
Retinopathy (%)	23.9	21.5	P=0.84
Nephropathy (%)	41.3	38.5	P=0.97
Neuropathy (%)	19.5	16.9	P=0.8723
Coronary Arterial Disease(%)	10.86	0.0	P=0.045
Family History T1D (%)	15.2	18.6	P=0.643
Family History DM2	36.9	61.0	P=0.014
Physical Activity	34.7	37.8	P=0.79
Hypothyroidism	19.6	21.6	P=0.80

Evolution of BMI In Double Diabetes patients at 5-year follow-up			
	Initial	Final	
BMI (kg/m <sup>2</sup> )	28,85	30,93	P<0.001

Fig. 1 See text for description

**A297****Older adults with type 2 diabetes (T2D) experience less hypoglycemia when switching to insulin glargine 300 U/ml (GLA-300) vs other basal insulins (deliver 3 study)**Fang Liz Zhou<sup>1</sup>, Fen Ye<sup>2</sup>, Vineet Gupta<sup>3</sup>, Rishab Gupta<sup>3</sup>, Jennifer Sung<sup>1</sup>, Paulos Berhanu<sup>1</sup>, Lawrence Blonde<sup>4</sup><sup>1</sup>Sanofi US, Inc., Bridgewater, NJ, USA; <sup>2</sup>TechData Service, LLC, King of Prussia, PA, USA; <sup>3</sup>Accenture, Florham Park, NJ, USA; <sup>4</sup>Ochsner Medical Center, New Orleans, LA, USA**Correspondence:** Fang Liz Zhou*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A297**

Older patients (pts) with T2D are disproportionately impacted by treatment-related hypoglycemia and its adverse consequences. The DELIVER 3 retrospective study examined the performance of Gla-300 in older pts with T2D in real-world clinical settings focusing on glycemic control and hypoglycemia risk. The Predictive Health Intelligence Environment database (representing 26 integrated healthcare delivery networks) was used to identify T2D pts aged  $\geq 65$  years of age on basal insulin who switched to either Gla-300 or other basal insulins (insulin glargine 100 U/mL, insulin detemir or insulin degludec) from March 1, 2015, through March 31, 2016. Pts had  $\geq 12$  months (mo) of baseline data and  $\geq 6$  mo of follow-up data. The effect of cohort on A1C reduction, hypoglycemia incidence/event rate, and achievement of A1C goal at 6 mo were assessed by generalized linear models or logistic regression models with adjustment for baseline characteristics. The analysis included 468 pts switched to Gla-300 and 1142 pts switched to other basal insulins; mean age was 71.8 and 73.1 years, mean baseline A1C levels were 8.52% and 8.34% for the two cohorts, respectively. Switching to Gla-300 vs. other basal insulins led to comparable changes in A1C (least squares [LS]-mean difference:  $-0.09$ ;  $P = 0.24$ ), and similar proportions of pts in each cohort achieved A1C  $< 7.0\%$  (OR: 0.798; 95% CI 0.581, 1.098;  $P = 0.166$ ) and  $< 8.0\%$  (OR: 0.967; 95% CI 0.749, 1.248;  $P = 0.797$ ). Pts switched to Gla-300 were 57% less likely to have hypoglycemia at 6-mo follow-up (OR: 0.432; 95% CI 0.307–0.607;  $P < 0.0001$ ). After adjusting for baseline characteristics, hypoglycemia event rates were also significantly lower in the Gla-300 cohort (LS-mean difference:  $-4.94$  events/100 pt-mo;  $P = 0.0002$ ). In real-world clinical settings, switching to Gla-300 in older pts with T2D is associated with significantly lower hypoglycemia risk and similar glycemic control vs. other basal insulins. This is an ENCORE abstract previously presented at ADA2017. Funding and editorial support provided by Sanofi.

**A298****Older people with T2DM: glycemic control and less hypoglycemia with insulin glargine 300 U/ml (GLA-300) vs GLA-100 at 1 year**Jean-François Yale<sup>1</sup>, Carlos Trescolli<sup>2</sup>, Avivit Cahn<sup>3</sup>, Michelle Lee<sup>4</sup>, Claire Brulle-Wohlhueter<sup>5</sup>, Soazig Chevalier<sup>6</sup>, Geremia B. Bolli<sup>7</sup><sup>1</sup>McGill University, Department of Medicine, Montreal, Canada; <sup>2</sup>Hospital de la Ribera, Unidad de Diabetes, Alzira, Spain; <sup>3</sup>Hadassah Hebrew University Medical Center, The Diabetes Research Center, Jerusalem, Israel; <sup>4</sup>Sanofi, Diabetes Division, Bridgewater, NJ, USA; <sup>5</sup>Sanofi, Diabetes Division, Paris, France; <sup>6</sup>Sanofi, Biostatistics and Programming, Chilly-Mazarin, France; <sup>7</sup>University of Perugia, Medicine, Perugia, Italy**Correspondence:** Jean-François Yale*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A298**

**Background and aims:** In people with T2DM, a patient-level meta-analysis of EDITION 1, 2 and 3 has shown insulin glargine 300 U/mL (Gla-300) provides more sustained glycemic control with less hypoglycemia over 1 year vs insulin glargine 100 U/mL (Gla-100). This post hoc analysis investigated these outcomes in the subgroup of adults aged  $\geq 65$  year.

**Method:** Patient-level meta-analysis of efficacy and safety outcomes in the population of participants aged  $\geq 65$  year in EDITION 1, 2 and 3 over 1 year of treatment.

**Results:** Gla-300 showed comparable glycemic control to Gla-100 (Table). The total number of confirmed ( $\leq 70$  mg/dL) or severe hypoglycemic events over 12 months was lower for Gla-300 vs Gla-100 (any time [24 h]: 4664 vs 5101; nocturnal [00:00–05:59 h]: 604 vs 839). The

risk of experiencing  $\geq 1$  confirmed ( $\leq 70$  mg/dL) or severe nocturnal hypoglycemic event was lower for Gla-300 relative to Gla-100 (relative risk [RR] 0.79 [95% CI 0.67–0.94]) (Table). Mean (SD) daily basal insulin dose increased from baseline to 1 year by 0.35 (0.27) U/kg for Gla-300 and 0.23 (0.25) U/kg for Gla-100. The mean (SD) increase in body weight from baseline to 1 year was small and comparable in both groups (Gla-300: 1.1 [4.0] kg; Gla-100: 1.3 [3.3] kg).

**Conclusion:** Comparable glycemic control with lower risk of nocturnal hypoglycemia with Gla-300 vs Gla-100 has been shown over 1 year of treatment in older people, aged  $\geq 65$  year. Study codes: NCT01499082, NCT01499095 and NCT01676220. This is an ENCORE abstract previously presented at IDF2015. Funding and editorial support provided by Sanofi (Fig. 1)

**Table 1.** Glycemic control and hypoglycemia in people with T2DM  $\geq 65$  years of age over 1 year in a patient-level meta-analysis of EDITION 1, 2 and 3 clinical trial data.

HbA <sub>1c</sub> (%) (mITT population)	Mean (SD)		Change from baseline to 1y*		
	Gla-300 (N=326)	Gla-100 (N=329)	Gla-300 LS mean (SE)	Gla-100 LS mean (SE)	LS mean difference (95% CI)
Baseline	8.17 (0.84)	8.13 (0.84)	-0.86 (0.05)	-0.79 (0.05)	-0.07 (-0.21 to 0.07)
1y*	7.23 (0.85)	7.29 (0.92)			
Participants with $\geq 1$ hypoglycemic event <sup>†</sup> , n (%) (safety population)					
	Gla-300 (N=327)	Gla-100 (N=332)	RR	95% CI	
Any time (24 h)	252 (77.1)	271 (81.6)	0.95	0.88 to 1.02	
Nocturnal (00:00–05:59 h)	130 (39.8)	165 (49.7)	0.79	0.67 to 0.94	
Annualized rate of hypoglycemia <sup>†</sup> , total number of events (events per participant-year) (safety population)					
	Gla-300	Gla-100	RR	95% CI	
Any time (24 h)	4664 (15.90)	5101 (17.15)	0.92	0.76 to 1.13	
Nocturnal (00:00–05:59 h)	604 (2.06)	839 (2.82)	0.72	0.50 to 1.03	

\*Mixed model for repeated measurements; <sup>†</sup>Confirmed ( $\leq 70$  mg/dL) or severe. RR, relative risk for participants with  $\geq 1$  event, rate ratio for annualized rates.

**Fig. 1** See text for description

**A299****Omega-3 fatty acids consumption decreases markers of alzheimer's disease in the hippocampus of obese and diabetic animals**Marcella Ramos Sant'Ana<sup>1</sup>, Marcella Datilo<sup>1</sup>, Patricia Rodrigues Brito<sup>1</sup>, Camilla Bertuzzo Veiga<sup>1</sup>, Andre Gustavo Vasconcelos Costa<sup>2</sup>, Leandro Pereira de Moura<sup>1</sup>, Adelino Ramos Sanches da Silva<sup>3</sup>, Eduardo Rochete Ropelle<sup>1</sup>, José Rodrigo Pauli<sup>1</sup>, Dennys Esper Cintra<sup>1</sup><sup>1</sup>UNICAMP, São Paulo, Brazil; <sup>2</sup>UFES, São Paulo, Brazil; <sup>3</sup>USP, São Paulo, Brazil**Correspondence:** Marcella Ramos Sant'Ana*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A299**

**Introduction:** Alzheimer Disease (AD) are closely related to hippocampal insulin resistance. Some evidences points to TAU protein hyperphosphorylation and b-amyloid accumulation, induced by insulin resistance.

**Objective:** The aim was to evaluate the omega-3 (w3) properties into delay early onset AD markers in the hippocampus of obese and diabetic mice induced by high-fat diet.

**Methods:** Swiss mice (n = 30) were separated into 3 groups: Control (CT), fed with standard diet for 16 wk; High-fat (HF) fed with high-fat diet (31% lard and 4% soy oil) for 16 wk; and high-fat and omega-3 (HF + w3) fed with high-fat for 8 wk and after, fed with high-fat diet substituted in 10% of lard by flaxseed oil (rich in omega-3–52.3% C18:3) for another 8 wk. At the end of experimental period we carried out glucose and insulin sensitivity, chromatography analyses from diet and hippocampus and mRNA and proteins markers by RT-qPCR and Western Blots respectively.

**Results:** The HF diet induced systemic insulin resistance and glucose intolerance. The obese and diabetic mice shown high gene expression and protein content related to inflammation (IL-1 $\beta$ , p-JNK), endoplasmic reticulum stress (p-eIF2 $\alpha$ ), apoptosis (BAX) and p-TAU, an AD

marker. The diet substituted in part by flaxseed oil (HF + w3) all of this genes and proteins were reduced. This diet was capable to increase the antiapoptotic protein (Bcl2) and insulin degrading enzyme (IDE), involved in b-amyloid clearance.

**Conclusion:** Even with the maintenance of high-fat diet, the omega-3 fatty acids present in higher concentration on flaxseed oil was enough to block the inflammatory and degenerative hippocampal state induced by obesogenic state.

### A300

#### Oral antidiabetic and antidyslipidemic agents used by elderly adults with otoneurological complaints

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**Background:** Diabetes is one of the most common diseases among elderly people. Diabetes is associated with dyslipidemia, among other comorbidities such as changes in vestibular function, which can compromise body balance and hearing in these patients. Pharmacotherapy is clinically important in these conditions but can cause risks due to the adverse effects of drug formulations.

**Objective:** The aim of the study was to evaluate the use of oral antidiabetic and antidyslipidemic medications in elderly patients with otoneurological complaints.

**Materials and methods:** A retrospective and descriptive study was carried out at the research laboratory of a private university in São Paulo, Brazil. The study was approved by the Institution's Research Ethics Committee, approval number 14610. Data were collected from a convenience sample composed of 88 elderly people from the community, who had some vestibular complaint and were in treatment for diabetes and dyslipidemia. Sociodemographic information was collected, as were the main complaints related to body balance and hearing, and the medications in use. We only included antidiabetic and antidyslipidemic medications identified through the Electronic Bulletin of the Brazilian National Health Surveillance Agency (ANVISA). A significance level of 5% was used for Chi square test and Fisher's exact test.

**Results:** In the study population, women predominated (85%) and participants' ages ranged from 60 to 88 years, with the most prevalent age groups 60-65 years (30%) and 66-70 years (34%); 9% of participants were over 80 years old. We found that 36% of elderly patients used oral antidiabetic drugs (mainly glibenclamide) and 63% used antidyslipidemic drugs (mainly simvastatin). Polypharmacotherapy was observed in most study participants. Fischer's exact test did not show a significant association ( $p > 0.05$ ) between the use of these two therapeutic classes and the most prevalent complaints, i.e., dizziness, tinnitus, vertigo, hearing loss, and body imbalance.

**Conclusions:** Otoneurological complaints, especially dizziness, were prevalent among elderly participants who used concomitant medications, including those for the treatment of diabetes and dyslipidemia. These are both important comorbidities in vestibular disorders because the metabolic changes in diabetes lead to vestibular dysfunction. The use of these drugs was not associated with the reported complaints, perhaps because of the limited sample size and/or because the elderly patients in this study did not have clinically severe conditions

### A301

#### Pancreatic catheterism with calcium stimulus as a tool for the investigation of endogenous hyperinsulinemic hypoglycemia: importance of defining diagnosis to chose between clinical or surgical approaches

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**Introduction:** The Endogenous hyperinsulinemic hypoglycemia (EHH), including insulinoma, pancreatogenic non-insulinoma hypoglycemia (PNIH) and autoimmune hypoglycemia, are rare and often difficult to diagnose. After biochemical confirmation of EHH, imaging tests are performed to identify culprit lesions. When a lesion is not found through imaging (in 20-30% of cases), pancreatic catheterism (PC) with calcium stimulus can be used as the gold standard exam to define the existence of inappropriate insulin secretion. An insulin increment of more than two times the basal value after the stimulus in any pancreatic territory (PT) defines an altered test. In general, clinical management is performed for cases of PNIH and surgical resection, for insulinomas.

**Patients and methods:** 4 PC were performed from 2010 to 2017. All female patients, aged between 32 and 42 years. The first had a history of primary hypothyroidism and presented with episodes of postprandial hypoglycemia with negative anti-insulin antibody and normal imaging tests. PC was suggestive of PNIH, with one altered PT. She had partial response to diet fractioning and medications. Patients 2 and 3 had prior bariatric surgery (Roux-en-Y gastric bypass) 3 and 7 years, respectively, before the onset of symptoms of postprandial hypoglycemia. They had normal imaging tests and the PC was suggestive of PNIH. Patient 2 had one compromised PT and did not respond well to medications, so she was submitted to distal pancreatectomy with good response. Patient 3 had two altered PT, with partial response to diet fractioning and oral medications. Patient 4 had no comorbidities and, after presenting with postprandial hypoglycemia, she underwent transgastric echoendoscopy that identified a 3.5 cm hypervascularized nodule in the uncinate process of the pancreas. PC demonstrated changes in superior mesenteric artery territory. After resection of the uncinate process, she presented with remission of hypoglycemia, without the need of medication. Anatomopathological exam revealed an neuroendocrine tumor.

**Conclusion:** PC, in suspected EHH cases, is useful to differentiate insulinoma from noninsulinoma EHH, which has direct implications when deciding the therapeutic approach

### A302

#### Pancreatic perfusion in patients with type 2 diabetes mellitus using perfusion computed tomography

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**Objective:** To compare quantitatively the pancreatic perfusion by CT in type 2 diabetes (T2DM) and non-diabetic subjects. Research design and

**Methods:** 17 patients with T2DM and 22 non-diabetic controls were examined with a dynamic 192-slices perfusion CT (Siemens, Munich, Germany) between October 2015 and September 2016 for estimating pancreatic blood flow (BF), blood volume (BV), time to peak (TTP) and mean transit time (MTT). Variables were compared by student t test and  $\chi^2$  between subjects with and without T2DM. Correlations between CT perfusion parameters and clinical and laboratory characteristics were performed by Pearson correlation coefficients.

**Results:** Patients with T2DM had lower BV in pancreatic head (with T2DM: 14.0 mL/100L  $\pm$  3.4 vs. without T2DM: 16.1 mL/100L  $\pm$  2.4;  $p = 0.033$ ), in pancreatic tail (with: 14.4 mL/100L  $\pm$  3.6 vs. without: 16.8 mL/100L  $\pm$  2.5;  $p = 0.023$ ), and in the whole pancreas (with: 14.2 mL/100L  $\pm$  3.2 vs. without: 16.2 mL/100L  $\pm$  2.5;  $P = 0.042$ ). Similar results were observed for MTT in pancreatic head (with: 7.0 s  $\pm$  1.0 vs. without: 7.9 s  $\pm$  1.2;  $p = 0.018$ ), in pancreatic tail (with: 6.6 s  $\pm$  1.3 vs. without: 7.7 s  $\pm$  0.9;  $P = 0.005$ ), and in the whole pancreas (with: 6.8 s  $\pm$  1.0 vs. without: 7.7 s  $\pm$  0.9;  $p = 0.016$ ). BV was inversely correlated with age (head—r: - 0.352,  $p = 0.032$ ; tail—r: - 0.421,  $p = 0.031$ ; whole pancreas—r: - 0.439,  $p = 0.007$ ) and with fasting plasma glucose (head—r: - 0.360,  $p = 0.031$ ; tail—r: - 0.483,  $p = 0.003$ ; whole pancreas—r: - 0.447,  $p = 0.006$ ). BV in pancreatic head showed also negative correlation with HbA1c (r: - 0.067,  $p = 0.021$ ).

**Conclusion:** Pancreatic BV and MTT were significantly lower in T2DM patients. These data suggest the possibility of perfusion changes in the pancreas of T2DM subjects, which may represent a new diabetic microvascular complication.

**A303**

**Patients with T2D treated with insulin degludec/liraglutide (IDegLira) have a greater chance of reaching glycemic targets without hypoglycemia and weight gain than with insulin glargine U100**

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Insulin degludec/liraglutide is a novel, fixed-ratio combination of the long-acting basal insulin analogue, insulin degludec and the human glucagon-like peptide-1 analogue, liraglutide. The efficacy and safety of IDegLira in the treatment of patients with type 2 diabetes (T2D) have been established in previous studies. IDegLira may serve as an intensification option for patients with T2D using basal insulin, a population where less than one-third of patients achieve an HbA1c of < 7.0%. The primary objective of this study was to determine the efficacy of IDegLira in subjects with T2D inadequately controlled with insulin glargine U100 (IGlarU100). Secondary objectives were to confirm superiority of IDegLira versus IGlar after 26 weeks of treatment in one or more of the following: change from baseline in HbA1c, confirmed hypoglycaemia, change from baseline in body weight. DUAL V was a 26-week, open-label, treat-to-target trial investigating the efficacy and safety of IDegLira vs IGlar in subjects with T2D inadequately controlled on IGlarU100 and metformin. In total, 557 adults with T2D and HbA1c 7.0–10.0% were randomised 1:1 to either IDegLira or IGlarU100 plus continued treatment with metformin. There were fewer confirmed hypoglycaemic episodes in subjects on IDegLira (223.0 episodes/100 patient-years of exposure [PYE]) than on IGlar U100 (505.4 episodes/100 PYE) (estimated rate ratio [ERR]: 0.43 [0.30; 0.61] 95% CI, p < 0.001). The rate of nocturnal confirmed hypoglycaemia (occurring between 00:01 and 05:59, both inclusive) was also significantly lower with IDegLira (22.4 episodes/100 PYE) compared with IGlarU100 (122.8 episodes/100 PYE) (ERR: 0.17 [0.10; 0.31] 95% CI, p < 0.001). Mean HbA1c decreased from 8.4% to 6.6% for IDegLira and from 8.2% to 7.1% for IGlar (estimated treatment difference [ETD]: - 0.59% [- 0.74; - 0.45] 95% CI, p < 0.001) after 26 weeks of treatment. Significantly more subjects on IDegLira than on IGlarU100 achieved HbA1c targets. Mean (SD) FPG change from baseline was -2.83 mmol/L (2.80) and - 2.77 mmol/L (3.02) for IDegLira and IGlarU100 respectively (ETD: - 0.01 mmol/mol [- 0.35; 0.33] 95% CI, NS). After 26 weeks, the mean fasting SMBG was close to the target of 4.0–5.0 mmol/L for IDegLira and IGlarU100 (5.9 mmol/L and 5.6 mmol/L, respectively; NS). At week 26, subjects on IDegLira displayed a mean (SD) weight loss of 1.4 kg (3.5) whilst those using IGlar had a mean increase of 1.8 kg (3.6) from baseline (ETD: - 3.20 kg [- 3.77; - 2.64] 95% CI, p < 0.001) (Fig. 1).

**A304**

**Patients with type 2 diabetes physically active presented better cardiac autonomic recovery post acute session of physical effort**

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**Introduction:** Cardiac autonomic neuropathy (NAC) is a disorder due to numerous pathological processes, such as Diabetes Mellitus. The slow recovery of the autonomic balance after physical effort observed in NAC represents a higher risk to cardiovascular health.

**Objective:** To evaluate the influence of physical activity level on the autonomic recovery after physical effort in individuals with type 2 diabetes (2-DM).

**Methods:** Fourteen 2-DM of both sexes with 55.8 ± 2.5 years of age were allocated in: physically active (PA-DM; n = 7) and insufficiently active (IA-DM; n = 7). The level of physical activity was assessed by short form of International Physical Activity Questionnaire. The resting heart rate variability (HRV) was performed through the electrocardiographic record. To evaluate the cardiac autonomic recovery, the volunteers performed an ergometric test by the Bruce protocol. The methods of time varying and HRV time frequency analysis were used obtained the HF and RMSSD vagal index from consecutive 30-second and 1-minute windows for a total period of 60 min after the physical effort test.

**Results:** The PA-DM group showed a higher resting bradycardia (67.1 ± 2.6 bpm) in comparison with IA-DM (77.6 ± 3.1 bpm; p = 0.025). The cardiac vagal modulation during rest represented by RMSSD index (21.1 ± 2.0 ms), pNN50 (2.4 ± 1.2%) and HF band (254.9 ± 47.8 ms<sup>2</sup>) was observed in PA-DM when compared to respective index of RMSSD (10.7 ± 1.7 ms; p = 0.002), pNN50 (0.2 ± 0.2%; p = 0.004) and HF band (133.0 ± 79.6 ms<sup>2</sup>; p = 0.038) in IA-DM. The PA-DM group had a lower mean of HR (78.2 ± 0.9 bpm) during the recovery period in comparison to the IA-DM group (89.1 ± 0.8 bpm; P < 0.001). The IA-DM group when compared to the PA-DM group in all recovery periods had low vagal index of RMSSD30 s (9.2 ± 0.1 ms vs. 16.1 ± 0.2 ms; p < 0.001) and HF1 min (43.9 ± 2.7 ms<sup>2</sup> vs. 97.4 ± 4.9 ms<sup>2</sup>; p < 0.001). We evidence that only the PA-DM group obtained a complete vagal reactivation after physical effort.

**Conclusion:** The data of the present study demonstrate that regular physical activity is effective to promote improvements in the autonomic behavior of rest, as well as in the post-exercise autonomic recovery, reducing the risk of arrhythmias and sudden death.

**A305**

**Perception of the severity of cardiometabolic risk factors and other diseases in diabetic individuals compared with non-diabetics attended at the teaching hospital of the federal university of Triangulo Mineiro with a random sampling**

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**Introduction:** Diabetes mellitus is a worldwide epidemic and is estimated to account for a contingent of 12 million diabetics in Brazil posing a public health challenge. In 2009, diabetes was the fourth cause of death in the country compared to groups with cardiovascular disorders, respiratory diseases and neoplasia. The prevalence of patients diagnosed with complications is high, justified by the insidious nature of the disease, the non-recognition of the risk factors by the population and the delay to seek care.

**Objectives:** To know the perception of the out-patients (OP), including diabetics, and general populace (GP) in their daily lives regarding

Table. Proportion of Patients Reaching A1c Target or FPG by End of Trial without Confirmed Hypoglycemia\* and/or Weight Gain\*.

	IDegLira	IG	OR	95% CI	p value
FPG < 130 mg/dL	77.7	73.8	1.19	0.80;1.79	0.3864
FPG < 130 mg/dL without confirmed hypoglycemia	57.9	40.9	1.95	1.38;2.76	< 0.0001
FPG < 130 mg/dL without weight gain	54.3	24.0	4.09	2.80;5.98	< 0.0001
FPG < 130 mg/dL without confirmed hypoglycaemia and weight gain	41.4	14.3	4.55	2.96;6.98	< 0.0001
A1c < 7%	71.6	47.0	3.45	2.36;5.05	< 0.0001

Data based on full analysis set and last observation carried forward. Estimated odds ratio and p-values are from a logistic regression with treatment and region as fixed effects and baseline FPG/A1c (and body weight, where weight gain was included in the composite) as covariates. \*Confirmed hypoglycemia was defined as requiring assistance or <56 mg/dL in the last 12 weeks of treatment; \*from baseline to week 26; OR, odds ratio.

Fig. 1 See text for description

the severity of the cardiometabolic risk factors, particularly diabetes, and other diseases.

**Method:** Observational, descriptive-exploratory, cross-sectional, population-based and institutional study using a severity scale of one to ten. The study was performed in a referral hospital in Minas Gerais, Brazil and in the general community of Uberaba, MG. It was conducted with 391 individuals, of whom 197 were treated at the outpatient ward – 89 diabetic patients and 108 non-diabetic patients, and 194 GP individuals.

**Results:** The female gender represented 54.48% (213), mean age  $52.2 \pm 14.7$  years, with 54.73% (214) whites, 24.55% were brown and 20.20% (79) were black people. As for education, 41.94% (164) had incomplete elementary education, followed by 28.39% (111) with a complete secondary school. In relation to dyslipidemia, cancer, stroke and infarction, mean scores among diabetics were  $8.18 \pm 1.89$ ,  $9.82 \pm 0.86$ ,  $9.70 \pm 0.78$ , and  $9.41 \pm 1.55$ , respectively, with  $p < 0.05$  compared to OP. Regarding smoking, mean scores among diabetics were  $9.39 \pm 1.25$ , with  $p < 0.05$  compared to GP. Arterial hypertension received mean scores among diabetics of  $8.66 \pm 1.60$ , with  $p < 0.05$  compared to OP and GP. As for diabetes, the mean score among diabetics was  $8.87 \pm 1.97$ , with  $p > 0.05$  compared to OP ( $p = 0.19$ ) and GP ( $p = 0.08$ ). The other variables were not statistically significant between groups.

**Conclusion:** There was a statistical difference regarding the perception of the severity of the main cardiometabolic risk factors in diabetic subjects, compared to non-diabetics and general population. It is assumed that the assistance and medical guidance provided to diabetics influenced their perceptions, although there was no statistical difference in the perception of the severity of diabetes itself, considered to be serious among the groups studied (Fig. 1)

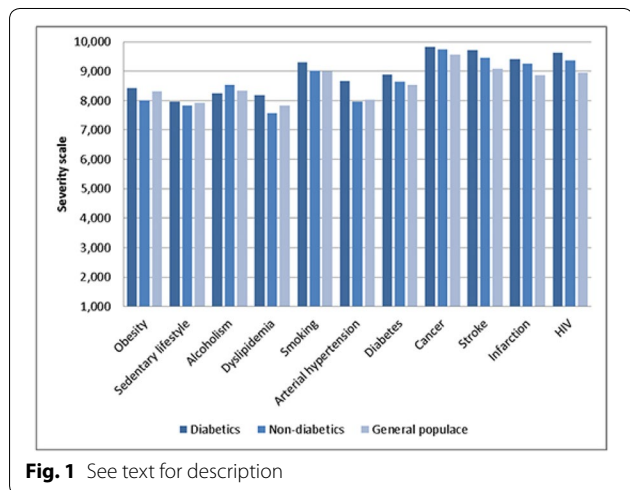


Fig. 1 See text for description

**A306**

**Persistent hyperinsulinemic hypoglycaemia of infancy: a case report**

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**Case report:** TRE, female, 16 yo, admitted in 2008, presented with weakness and syncope during episodes of hypoglycaemia, with resolution of symptoms after feeding. She reported episodes of lethargy

and absence crises since 3 months old, treated as epilepsy until 14 yo. The diagnosis of hyperinsulinemic hypoglycaemia was confirmed and scans (ultrasound, computed tomography and magnetic resonance imaging) were inconclusive at the time. We prescribed verapamil and frequent meals. The surgical team indicated subtotal pancreatectomy, refused by the patient’s family. She then lost follow up and returned with 20 yo, pregnant, without any medications. We prescribed diazoxide during pregnancy, with clinical improvement of symptoms, but medicine was discontinued later due to its high cost and lack of approval by Anvisa. She later returned in 2016 and a selective pancreatic arterial calcium injection was performed (Table 1). The results confirmed diffuse insulin secretion and persistent hyperinsulinemic hypoglycaemia of infancy by expanded islet beta cell mass. An endoscopic pancreatic ultrasonography with normal pancreatic biopsy and a somatostatin receptor scintigraphy were also performed. After discussion with the surgical team, it was opted for subtotal pancreatectomy, but again the patient denied it.

**Discussion:** The investigation of hypoglycaemia in seemingly healthy patients starts with documentation of the hypoglycaemic episode. The differential diagnosis includes exogenous hypoglycaemia and endogenous hyperinsulinism. The first hypothesis was excluded and laboratorial measures fulfilled the criteria for hyperinsulinemic hypoglycaemia (Table 2). The scans performed could not localize an insulinoma. The combination of different modalities of scans, both invasive or not, localizes most of the insulinomas preoperatively. However, about 4% of patients with endogenous hyperinsulinism will present with diffuse involvement and hypertrophy of islet cells, which is clinically indistinguishable from insulinomas. In uncertain cases between insulinoma and pancreatic cell hypertrophy, the selective pancreatic calcium infusion is an option. An endpoint greater than 2 to fivefold increase in hepatic venous insulin levels over baseline regionalizes insulinomas with high sensitivity. Management of hypoglycaemia can be clinical, but in severe and refractory cases, subtotal pancreatectomy is necessary and helps improve the symptoms of hypoglycaemia (Fig. 1).

**Table 1.** Description of insulin measures collected in RHV at baseline and after infusion of calcium gluconate 10% in all catheterized vessels\*

Catheterized vessel	Times of insulin collection (mU/L)				
	Baseline*	20 seconds	40 seconds	60 seconds	Increase
Gastroduodenal art.	7,5	40	29	20	6,6x
Splenic art.	4	20	17	14	5x
Superior mesenteric art.	6	55	28	19	9x

RHV: Right Hepatic Vein  
 \* Blood glucose varied between 39 and 55 mg/dL in assessed vessels  
 † Value calculated is the mean of venous and arterial measurements before calcium gluconate 10% infusion

**Table 2.** Comparison between laboratorial findings expected in patients with endogenous hyperinsulinism and in the presented case

	Signs and/or symptoms	Glucose (mg/dL)	Insulin (mU/L)	C-peptide (ng/ml)	Proinsulin (pmol/L)	β-hydroxybutyrate (mmol/L)	Antibody to insulin
<b>Insulinoma/ nesidioblastosis</b>	Yes	<55	≥3	≥0,2	≥5	≤2,7	Neg
<b>Patient</b>	Yes	29	15	1,8	6	Not measured	Not measured

Fig. 1 See text for description

**Conclusion:** The management of persistent hypoglycaemia in the adult can be challenging and the reported case illustrates the difficulties during follow-up and treatment, since the insulin diffuse secretion requires a more aggressive approach, refused by the patient.

**Patient consent:** Written informed consent was obtained from the patient for publication of the submitted article.

**A307****Personalized medicine in the prescription of continuous subcutaneous insulin infusion according to an age group in type 1 diabetes patients: insulin carb ratio and sensitivity factors**

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**Introduction:** In recent years, the prescription of continuous subcutaneous insulin infusion (CSII) in type 1 diabetes (T1D), has increased significantly. However, few studies have evaluated the parameters for calculating the insulin and carbohydrate ratio, and sensitivity factors at the beginning or during adjustment of this therapy according to age in Brazilian real-life eating patterns.

**Objective:** To evaluate the insulin:carbohydrate ratio(ICR) and sensitivity factor (ISF) in different age T1D patients with CSII compared with the internationally proposed "500" and "1800" rules.

**Methods:** We evaluated 85 patients divided into prepubertal (PPG: < 9 years, n: 20), pubertal (PG: 9 to 18 years, n: 30) and adults (AG: > 18 years, n: 35) with mean CSII time (3.8 ± 2.9 years). Mean age (years), BMI (kg/m<sup>2</sup>), total insulin dose (TID) (insulin/kg/day), basal and bolus %, ICR and ISF of rule to achieve ICR and ISF for each group.

**Results:** The mean age, BMI and A1c were, respectively, PPG (6.2 ± 2.3 years, 17.6 ± 2.7 kg/m<sup>2</sup> and 7.7 ± 2.1%), PG (13.8 ± 3.2 years, 21.2 ± 3.6 kg/m<sup>2</sup> and 8.8 ± 1.3%), AG (25.9 ± 5.2 years, 24.1 ± 3.4 kg/m<sup>2</sup> and 8.0 ± 1.7%). The TID was in PPG (0.8 ± 0.1 U/kg/day); PG(1.1 ± 0.4u/kg/d) and AG (0.7 ± 0.2 u/kg/d (P = 0.0001), and the proportion of baseline was PPG (41.7 ± 7, p < 0.001) 4%); GP (45.1 ± 12.0%); AG (52.5 ± 13.6%); p = 0.000. The mean ICR in PPG was (15.9 ± 3.9 g); GP (11.0 ± 2.4 g); AG (10.9 ± 4.1 g) p = 0.000 and ISF was for PPG (100.2 ± 29.8 mg/dl); PG (49.3 ± 16 mg/dl) and AG (46.3 ± 13.3 g) p = 0.000. In the intragroup evaluation, ICR and SF were significantly lower in breakfast than in the other meals (p = 0.00). When compared to the delta (expected values for rule "500" and rule "1800") in relation to the observed ones this was significant in PPG for both ICR and SF while in PG and AG only for FS. The rules that best fit the parameters of each group were for ICR: PPG (350), PG (540) AG (500) p = 0.00 and for SF: PPG (2100), PG (2350) and AG (2100) p = 0.000.

**Conclusion:** This study demonstrated that the insulin dose suggested by "Rule 500" for ICR is underestimated (-20%) for children and the "Rule 1800" is overestimated for SF (+ 10%) in all age groups in our country. One suggestion would be to initiate SCII therapy with the rule of 400 for ICR in children and 500 for adolescents and adults and SF of 2000 for all age groups. The complementation of this study will be verifying the relation of these factors to reach the targets of good glycemic control in T1D patients of different age groups.

**A308****Pharmacoeconomic evaluation of DPP-IV inhibitors in the Brazilian market**

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**Introduction:** Five dipeptidyl peptidase 4-inhibitors (DPP4) are available in Brazil for the treatment of type 2 diabetes mellitus (T2DM).

**Objective:** To compare the cost-effectiveness ratio of the available DPP4 inhibitors used as monotherapy for the T2DM treatment in Brazil.

**Methods:** Data for clinical outcome was taken from a systematic review and mixed treatment meta-analyses comparison (MTC) of randomized controlled trials comparing the efficacy of the available DPP4 drugs<sup>1</sup>. The interest outcome was the mean change of HbA1c from

baseline. Annual treatment costs included only drug acquisition costs based on the drug labels. Drug prices were obtained from an official public source (Kairos Magazine—April 2017)<sup>2</sup>. Costs are presented in Brazilian Reals (BRL). Since this is a one-year time horizon analysis no discount rate was utilized.

**Results:** All DPP4 presented a statistically significant change of HbA1c from baseline compared to placebo (alogliptin - 0.797 (95%CI - 0.943 to - 0.651); linagliptin - 0.734 (CI - 0.88 to - 0.588); saxagliptin - 0.593 (CI - 0.811 to - 0.375); sitagliptin -0.788 (CI - 0.954 to - 0.622); vildagliptin -0.60 (CI - 0.80 to - 0.40)). Based on drug acquisition costs, alogliptin monotherapy presented the lowest annual treatment costs and the lowest cost for every 1% HbA1c reduction followed by saxagliptin, linagliptin, sitagliptin and vildagliptin (Table 1).

**Conclusion:** The five available DPP-4 inhibitors showed similar efficacy data. alogliptin seems to be related to the lowest annual treatment costs and costeffectiveness ratio for the Brazilian patients when used as monotherapy (Fig. 1)

**Table 1.** Annual treatment costs and cost-effectiveness ratio of DPP-4 inhibitors treated as monotherapy in Brazil.

	Alogliptin 25 mg	Linagliptin 5 mg	Saxagliptin 5 mg	Sitagliptin 100 mg	Vildagliptin 100 mg
PF18% (Ex-factory price including VAT)	BRL 81.30	BRL 73.65	BRL 59.28	BRL 115.37	BRL 113.68
SKU	25mg x 30	5mg x 10	5mg x 14	100mg x 14	50mg x 28
Posology	25 mg once a day.	5mg once a day.	5 mg once a day.	100 mg once a day.	50 mg twice a day.
Annual treatment cost	BRL 989.15	BRL 2,688.22	BRL 1,545.51	BRL 3,007.86	BRL 2,963.80
Cost-effectiveness ratio	BRL 1,241.09	BRL 3,662.42	BRL 2,606.25	BRL 3,817.08	BRL 4,939.67

**Fig. 1** See text for description

**A309****Physical activity evaluation of grade II and III obese patients before and after bariatric surgery**

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**Background:** In the treatment of obese patients, after weight loss by using diet, with or without medications, increase of physical activity (PA) is considered a fundamental weapon for weight maintenance. In grade II and III obese patients the PA performance is impaired. Few studies evaluate the PA after bariatric surgery (BS).

**Aims:** Evaluate the PA level in grade II and III obese patients before and 6–8 months after BS.

**Methods:** In a cross-sectional study, we 305 grade II and III obese patients attending to pre-surgical clinic and 188 patients who underwent to sleeve gastrectomy (SG) or Roux-en-Y gastric bypass surgery (RYGB) at Centro de Tratamento da Obesidade of Santa Casa de Misericórdia de Porto Alegre were evaluated. All patients answered the International Physical Activity Questionnaire (IPAQ—short form) and were classified according to the frequency and duration of their PA. The achievement of 150 min or more of PA per week, according the World Health Organization (WHO) was evaluated. The patients' PA level on pre and post-surgery was compared through Fischer's Exact test.

**Results:** After BS (30.8% SG and 69.2% RYGB), the PA level by IPAQ and number of those who made at list 150 min per week was not different between SG and RYGB (p = 0.320 and 0 = 0.515, respectively).

After BS patients were more active (44.1%) and very active (16.1%) comparing to the pre-surgery group (39.0 and 4.6%, respectively). On pre-surgery group, the sedentary frequency of exercising < 150 min/week was higher (13.1%) compared with post-surgical patients (3.4%;  $p < 0.0001$ ). On PA time evaluation, a lesser percentage of pre-surgical patients (48.2%) realized 150 min or more of PA per week comparing with post-surgery group (62.8%;  $p = 0.005$ ).

**Conclusion:** After BS, patients are more active and less sedentary and some make 150 min or more of PA per week, but a lot of them do not achieve even the PA level recommended by WHO.

### A310

#### Physical exercise modulates the GPR120 expression, a nutritional receptor, and potentiates the non-pharmacological treatment against obesity and diabetes type 2 (DM2)

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**Introduction:** Inflammation in obese individuals dysregulates glyceric homeostasis, as regards insulin-dependent signaling. Omega-3 fatty acids (w3) act as anti-inflammatory agent through their GPR120 receptor. Moderate physical exercise acts in several molecular pathways, also reducing the inflammatory process, however it seems to interfere in the modulation of this nutritional receptor.

**Objective:** Different from the studies of simple interactions between the nutritional and sports sciences, we evaluated the ability of exercise into increase the GPR120 expression and its function as an anti-inflammatory receptor activated by w3 sources, as well flaxseed oil (52.3%) in different types of muscle fibers, from obese and DM2 mice.

**Methods:** Bioinformatics analysis used at least 40 animals per group. For experimental procedures, Swiss mice ( $n = 10$ /group), 4 weeks old, underwent acute exercise protocol (single bout), with muscle biopsy after 0-8-16-24 and 48 h for expression analysis of GPR120. Other set of animals were exposed during 8 weeks to a: standard diet (group CT) and high-fat diet (HF), to induce obesity and insulin resistance disturbances. After this, the HF group was redistributed into new groups: HF; HF diet plus chronic exercise (HF + Exe); HF diet plus flaxseed oil by gavage (100  $\mu$ L/day) (HF + FS); or HF plus exercise plus FS (HF + EXE + FS), for another 4 wk. Food consumption, weight gain, insulin/glucose tolerance, thermogenesis were carried out. GPR120 and  $\beta$ -arrestin2, insulin pathway (AKT), inflammation (IL1b, IL6, IL10, TNF $\alpha$ , TAK1 and IL-1 $\beta$ ), and glycogen synthesis proteins (GS,GF,AKT) were evaluated in the soleus, EDL and gastrocnemius muscles, through Western Blot, RT-Qpcr and immunohistochemistry. Lipidomics guaranteed the w3 incorporation by tissues. After ANOVA, statistical significance was assumed when  $P < 0.05$  (Tukey).

**Results:** The acute exercise induced an increase in the expression/protein content of GPR120 in all muscle extracts, but the chronic one, together with or not to flaxseed oil, only increased in the EDL. The HF + EXE, HF + FS and HF + EXE + FS groups reduced body mass (mesenteric and retroperitoneal adipose tissue), improved insulin/glucose sensitivity, increasing Akt activity and decreasing inflammatory status, compared to HF group. FS induced thermogenesis in obese animals (HF + FS). Lipidomic confirmed the incorporation of w3 in muscle tissues. Bioinformatics predicted the correlation between the increment on GPR120 gene expression and running, VO<sub>2</sub>max, locomotor activity.

**Conclusion:** The physical exercise positively modulated the GPR120 receptor in the muscle of dysmetabolic animals, potentiating the anti-inflammatory action of w3 fatty acids, partially restoring glyceric control.

### A311

#### Pilates versus combined training: comparison of post-training glycemia in diabetics type 2

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**Introduction:** Pilates and combined training have benefits for type 2 diabetics, but due to lack of more consistent data, the need to investigate the effects of these two methods arises.

**Objective:** To compare the posttraining glycemia of type 2 diabetic subjects submitted to different training methods.

**Method:** This study was characterized as pre-experimental, participated in the study five diabetics, of both sexes. They performed pilates and combined training twice a week, lasting 40 min, over a 9 weeks period. The measurement of capillary blood glucose (CBG) was performed before and after each training session. The Wilcoxon test was used for the analysis of repeated measurements of CBG before and after the training methods. The nonparametric Kruskal-Wallis test was also performed. A significance level of  $p \leq 0.05$  was adopted for all tests.

**Results:** There was a significant reduction in post-training blood glucose in pilates (179.3 mg/dL  $\pm$  46.7 mg/dL versus 136.2 mg/dL  $\pm$  31.6 mg/dL) and combined (170.5 mg/dL  $\pm$  38.6 mg/dL versus 131.9 mg/dL  $\pm$  29.4 mg/dL). No difference was found between the two methods in reducing blood glucose.

**Conclusion:** The Pilates Method and Combined Training were effective in controlling the capillary glycemia of type 2 diabetics in this study. Comparing the two methods, no statistically significant difference was observed.

### A312

#### Plummer disease and gestational diabetes mellitus—case report

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**Case report:** A 31-years-old woman, overweight (BMI = 28 kg/m<sup>2</sup>) and irregular treatment for hyperthyroidism from Plummer disease diagnosed one year ago, is referred to assistance at 8th week of pregnancy, complaining about dysphagia and tremors. At that time, she wasn't taking any anti-thyroid drug (ATD). She did not have family history of diabetes or thyroid disease. Laboratorial findings included: Total T4 = 22.4 mcg/dL (RR: 5.1–14.1); TSH < 0.01mcU/mL; TRAb = 0.6 UI/L (RR: < 1.75); fasting blood glucose = 107 mg/dL. Thyroid ultrasound showed a nodule in the right lobe, cystic, measuring 80  $\times$  41  $\times$  53 mm. Diagnosis of Gestational Diabetes Mellitus (GDM) was confirmed in the first trimester with two fasting blood glucose between 92 and 125 mg/dl, leading to the onset of insulin therapy and ATD. Due to the persistence of compressive symptoms and the need for high doses of ATD, partial right thyroidectomy was performed at 17 weeks of pregnancy, without complications. After surgery, levothyroxine was started. Insulin dose was gradually reduced and suspended at 29 weeks of gestation. Throughout the rest of gestation time, self monitoring of pre and postprandial blood glucose was within the target. Baby was born at term, with adequate weight for gestational age, without complications. At 6 weeks postpartum, the oral glucose tolerance test ruled out diabetes and levothyroxine dose was adjusted.

**Discussion:** Thyroid dysfunction during pregnancy can lead to unfavorable outcomes for both the mother and the fetus. Considering the relationship between hyperthyroidism and insulin resistance, metabolic stress during pregnancy may be considered an additional risk



factor for the development of GDM. There are controversies in the literature, with more studies associating hypothyroidism with GDM and few studies establishing this relationship with hyperthyroidism, being even rarer with Plummer Disease. In this case report, after controlling thyroid function, the patient progressed with diabetes remission, suggesting hyperthyroidism as the cause of glycemic decompensation.

**Conclusion:** This report highlights how hyperthyroidism aggravates insulin resistance and may be an additional and potentially reversible risk factor for the development or aggravation of GDM, which may increase maternal and fetal morbidity and mortality.

Informed consent to publish had been obtained from the patient.

**A313**

**Polyneuropathy before and after a bariatric surgery: association with serum triglycerides levels?**

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**Introduction:** Peripheral polyneuropathy (PNP) has been described as a complication of obesity and bariatric surgery (BS).

**Objective:** To define prevalence of PNP and associated factors in patients of a center of treatment of obesity before and 12,3 ± 5,7 months after being submitted to BS.

**Methods:** 294 patients were evaluated before the BS and 113 patients were evaluated after being submitted to Y-in-Roux gastric by-pass (n = 80) or to Sleeve Gastrectomy (n = 32). Presence of PNP was defined by the Michigan Neuropathy Screening Instrument (MNSI) and by the Neuropathy Disability Score (NDS).

**Results:** Prevalence of PNP in the pre bariatric period was 26.2% by the MNSI and 5.2% by the NDS. After BS, prevalence of PNP was 18.6% with MNSI and 4.4% with NDS. By using the MNSI, before and after BS, presence of PNP was associated with higher serum levels of 25 hydroxy-vitamin D on univariate analysis (p = 0.023 and p = 0.044, respectively). By using NDS, no significant associations were found, but evaluation of the results of the two tests of NDS that are not used on MNSI (temperature sensation and pin-prick) showed an association of positivity of these tests with triglycerides serum levels (p = 0.035 before BS and p = 0.030 after BS) and with body weight (p = 0.016 after BS) on univariate analysis. On three models of Poisson multivariate analysis, positivity of temperature sensation and/or pin-prick test was associated with triglycerides levels after BS (95% IC of 1.007–1.028; 1.007–1.029; 1.008–1.028).

**Conclusion:** PNP is probably related to serum triglyceride levels after BS.

**A314**

**Postprandial glycaemic outcomes of a fixed-ratio combination of insulin glargine and lixisenatide in the LixiLan-L trial**

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**Background and aims:** In patients with type 2 diabetes (T2D) inadequately controlled on basal insulin, the LixiLan-L trial demonstrated the efficacy and safety of LixiLan (iGlarLixi), a novel titratable fixed-ratio combination of insulin glargine 100U (iGlar) and lixisenatide (Lixi), compared with iGlar alone, with up to two oral glucose-lowering drugs. By itself, Lixi is a once-daily, prandial glucagon-like peptide-1 receptor agonist with a predominant postprandial plasma glucose (PPG)-lowering effect brought about mainly by delaying gastric emptying. This mechanism is complementary to the fasting plasma glucose-lowering effect of iGlar, and, therefore, the combination of the

two agents as iGlarLixi could potentially lead to better glycaemic control compared with individual agents in patients with T2D. Here we report an exploratory analysis of iGlarLixi PPG outcomes from the LixiLan-L trial. Materials and

**Methods:** LixiLan-L had a 6-week run-in when iGlar was introduced or optimized; participants were then randomized to iGlarLixi or iGlar. Post hoc analyses were performed to assess the percentage of patients reaching PPG < 7.8 (AAACE target) or < 10 mmol/L (ADA/EASD target) at 0.5, 1 and 2 h after a standardized liquid meal at baseline and Week 30, PPG 0–2 h area under the curve (AUC<sub>0-2h</sub>; after breakfast liquid meal) change at Week 30 (end of treatment), and 7-point self-monitored plasma glucose (SMPG) at selected times. P-values were calculated between treatment groups for all parameters analysed.

**Results:** At Week 30, the percentage of patients with PPG < 7.8 mmol/L and < 10 mmol/L at 0.5, 1 and 2 h post standardized liquid meal (Table) was greater in the iGlarLixi group versus the iGlar group; this difference was greatest at later time points post-meal. Compared with iGlar, treatment with iGlarLixi also resulted in a significantly greater reduction in PPG AUC<sub>0-2h</sub> (Figure). SMPG profiles at time points after three daily meals showed larger percentages of iGlarLixi patients at the PPG targets compared with iGlar, with the difference decreasing post-dinner (Table) (Fig. 1).

Table 1. PPG outcomes from the LixiLan-L trial

				LixiLan (iGlarLixi)	Insulin glargine 100U (iGlar)	p-value <sup>†</sup>
				n=335*	n=342*	
% pts PPG <7.8 mmol/L (meal test)	Baseline	0.5 h	11.7	12.8	0.654	
		1 h	4.9	3.9	0.530	
	2 h	3.1	1.2	0.096		
		0.5 h	41.4	25	<0.0001	
	Week 30	1 h	30.7	8.3	<0.0001	
		2 h	33.6	5.4	<0.0001	
% pts PPG <10 mmol/L (meal test)	Baseline	0.5 h	39.0	39.9	0.808	
		1 h	15.5	14.3	0.660	
	2 h	8.0	8.7	0.742		
		0.5 h	71.2	59.5	0.002	
	Week 30	1 h	55.6	27.7	<0.0001	
		2 h	58.1	17.3	<0.0001	
		n=294*	n=298*			
% pts PPG <7.8 mmol/L (SMPG)	Week 30	10 am	61.2	28.7	<0.0001	
		3 pm	41.1	24.6	<0.0001	
		10 pm	45.9	33.7	0.005	
% pts PPG <10 mmol/L (SMPG)	Week 30	10 am	86.7	62.9	<0.0001	
		3 pm	78.7	54.7	<0.0001	
		10 pm	74.9	65.5	0.019	
		n=320	n=326			
Mean change ± SE in PPG AUC <sub>0-2h</sub> (mmol/L)	Week 30		-6.28±0.35	-2.78±0.35	<0.0001	

n\* = number of patients with data at baseline and Week 30 at time 0h; †p-values for % pts PPG AUC<sub>0-2h</sub> are from trapezoid method with two-sample t-test; AUC=area under the curve; iGlar=insulin glargine 100U; iGlarLixi=insulin glargine 100U/lixisenatide fixed-ratio combination; PPG=postprandial plasma glucose; pts=patients; SE=standard error; SMPG= self-monitored plasma glucose.

Fig. 1 See text for description

**Conclusion:** In patients with T2D uncontrolled with basal insulin in LixiLan-L, iGlarLixi demonstrated greater postprandial glycaemic control compared with iGlar, with consistently more patients reaching PPG targets after all meals throughout the day.

**Study code:** NCT02058160. This is an ENCORE abstract previously presented at EASD2016. Funding and editorial support provided by Sanofi.

**A315**

**Practices of self-care in the use of npH and regular insulin in a specialized ambulatory in Brazil**

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1)**:A315

**Background:** For the treatment of DM and prevention of acute and chronic complications, it is necessary that the patient achieve good glycemic control, which is possible through self-care actions that are based on changes in lifestyle and correct use of medications and insulins.

**Objective:** To describe self-care practices in the use of NPH and Regular Insulins in an ambulatory of the Unified Health System of Goiânia-GO-Brazil.

**Methods:** Cross-sectional study with type 2 diabetic patients. Data from nursing consultation sheets were collected during the period from October 2015 to March 2016. Patients whose insulin therapy data were complete were included. The data were analyzed in STATA 12.0, using descriptive statistics: means, absolute and relative frequency. The project was approved in the CEP of the HC/UFG.

**Results:** From 107 DM2 patients taking insulin, 57% were female and 46% female, with a mean age of 56 years ( $\pm 11.3$ ). As for comorbidities, 64.7% were hypertensive, 41% had dyslipidemias, 18% had thyroid diseases. The mean values of fasting, postprandial and glycated hemoglobin were respectively 219 mg/dl, 303 mg/dl and 9.8%. As for the use of insulin 80% applied without help and 17% needed another person, being mostly elderly. As for sites, 45.9% apply only in one place, being: 16.7% in the arm, 30.0% in the abdomen, 13% in the legs and 1% in the gluteus. In addition, 86.4% applied cold insulin and 35.4% kept it in the refrigerator door, 21.5% reused needles 1 to 2 days and 71.8% discarded them in household trash.

**Conclusion:** The results showed that some care taken by diabetics is not consistent with the recommendations of the Brazilian Society of Diabetes (SBD, 2014) and the Ministry of Health (BRASIL, 2013). Despite the evolution of the practices regarding insulin therapy, practices such as material reuse, lack of rotation, inadequate preservation and disposal are still frequent. The health services need to invest in permanent education of professionals and actions to manage matters that allow better treatment to users.

### A316

#### Preeclampsia and maternal hospital admission in women with pregestational diabetes

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**Introduction:** Pregestational diabetes has been recognized as a risk factor for adverse pregnancy results. Our objective was to evaluate maternal outcomes in women with pregestational diabetes, either type 1 or type 2 diabetes.

**Methods:** We analyzed 220 women, 85 (39%) with type 1 diabetes and 135 (61%) with type 2, attended in a specialized prenatal care facility. Preeclampsia and maternal hospital admission were the outcomes; type and duration of diabetes and maternal characteristics were studied as risk factors. Simple and multiple Poisson robust regression were performed with SPSS version 18; results are expressed as relative risk and 95% confidence interval (RR, 95% CI, p).

**Results:** The Table presents baseline maternal characteristics according to the type of diabetes. Preeclampsia was diagnosed in 38.1% of type 1 women and in 24.8% of type 2 women ( $p = 0.056$ ); hospital admission occurred in 78.3% of type 1 women and in 67.2% of type 2 women ( $p = 0.111$ ), with median duration of 14 days [interquartile interval 8-24]. Multivariable regression models showed that risk for preeclampsia was associated with gestational age at booking (1.032, 1.003-1.062,  $p = 0.033$ ), duration of diabetes (1.032, 1.001-1.064,  $p = 0.041$ ) and chronic hypertension (2.100, 1.274-3.462,  $p = 0.004$ ). Previous diagnosis of preeclampsia and type of diabetes did not impact in current preeclampsia risk. Hospital admission was associated with duration of diabetes (1.018, 1.006-1.030,  $p = 0.003$ ), gestational age at booking (1.010, 1.001-1.020,  $p = 0.042$ ) and the initial A1c test (1.110, 1.056-1.167,  $p < 0.001$ ). Each 1% increase in the A1c test conferred a 10% higher risk of hospital admission; each year of diabetes

conferred a 3% increased risk for preeclampsia and a 2% risk for hospital admission. Pregestational body mass index was found to be a protective factor for hospital admission (0.981, 0.965-0.998,  $p = 0.025$ ); each lower kg/m<sup>2</sup> reduced 2% the risk.

**Conclusion:** Preeclampsia and hospital admission were frequent events in pregnancies with previous diabetes and were related to duration, but not to the type of diabetes. Hospital admission was mainly related to poor glycemic control; and preeclampsia, to previous maternal hypertension. Management strategies for preeclampsia prevention and intensive metabolic control should be firmly encouraged in this population (Fig. 1).

Table. Baseline characteristics in 220 women with pregestational diabetes

Characteristic	Type 1	Type 2	p
	N=85 (39%)	N=135 (61%)	
Age (years)	27.3 (5.7)	33.5 (5.5)	<0.001
Ethnicity (white)	88.2	76.3	0.044
Education >11 years	22.4	5.2	<0.001
Years from diagnosis	13.0 (6-20)	3.0 (1-7)	<0.001
	[84]	[133]	
With DM complications	25.9	11.1	0.008
Family history of diabetes	21.2	39.5	0.008
	[85]	[124]	
GDM antecedent	1.2	34.1	<0.001
Current smoking	11.8	9.7	0.795
	[85]	[134]	
Gravidity	2.0 (1-2)	3.0 (2-5)	<0.001
Previous preeclampsia	8.2	20.7	0.023
Chronic hypertension	14.1	29.6	0.013
Macrosomia antecedent	4.7	21.5	0.001
GA at booking	13 (6.8)	18 (8.1)	<0.001
Prepregnancy BMI categories			<0.001
Normal	69.4 <sup>a</sup>	4.0 <sup>b</sup>	
Overweight	25.9 <sup>a</sup>	21.4 <sup>a</sup>	
Obese	4.7 <sup>a</sup>	74.6 <sup>b</sup>	
	[85]	[126]	
A1c (initial)	8.4 (1.8)	7.6 (1.6)	<0.001
	[83]	[129]	

DM: diabetes; GDM: gestational diabetes mellitus; GA: gestational age; BMI: body mass index

[ ] indicates numbers evaluated for each variable; a, b:  $p < 0.001$ ; data presented as number (standard deviation) or %

Financial disclosure: FIPE-HCPA. Project number 016/331.

**Fig. 1** See text for description

### A317

#### Pregnancy after kidney transplant in patients with type 1 diabetes

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**Clinical case:** AFG, 34 years old, with type 1 diabetes mellitus (DM) for 21 years (prepregnancy HbA1c:8%), systemic arterial hypertension, proliferative diabetic retinopathy, neovascular glaucoma (left amaurosis), previous kidney transplanted, currently with ClCr:80 ml/min and proteinuria:630 mg/24 h, 2 previous stillbirths (32 and 34 weeks). In a new pregnancy, patient developed a hypertensive peak and decreased

CrCl (39 ml/min), without infection or other disorders, evolving with the pregnancy interruption at 27 weeks due to pre-eclampsia (PE), worsening renal failure and fetal distress. Newborn with Apgar 6/7 and weight:838 grams. Weight gain in pregnancy:5 kg (BMI pre:23). Made use of: Insulins (Detemir/Lispro); Methylodopa, hydralazine, Tracolumus and Azathioprine, with poor adherence to glycemic control. After birth, the patient presented clinical improvement; was discharged in 7 days. Fetal echocardiogram: mild pulmonary valve stenosis, dilatation of the RV outflow tract; USG morphological: normal. The newborn had infectious and pulmonary complications and underwent retinopathy (retinopathy of prematurity). Discharge in 4 months. Ambulatory follow-up with favorable evolution. Tests of the foot, ear, heart and tongue, in addition to echocardiography: normal. USG transfontanela: moderate extra-axial fluid collection.

**Discussion:** In transplanted pregnant women, hypertension and DM increase the risk of prematurity, restricted intrauterine growth (IUGR) and graft loss. Data indicate a mean gestational age (GI) of 35 weeks for birth, with 54% of premature newborns, a fact attributed to maternal complications (worsening renal function and PE), as well as our patient. In addition, there is a higher rate of small newborns for GI. Other evidence suggests a 6 times increase in perinatal mortality. As for immunosuppressants, there are few reports. Tacrolimus appears safe (prevalence of congenital malformations: 4-5%, general population: 3-4%). Azathioprine (AZA) rarely courses with neonatal leukopenia, more common when maternal leukocytes < 7500/mm<sup>3</sup>. There is evidence of IUGR but not of abortion or stillbirth. Data suggest risk of cardiac malformations (irregular use of AZA + graft rejection?).

**Final comments:** Renal transplantation improved fertility and viability of pregnancies in these patients. However, data suggest a high risk for mother and children and their follow-up should be rigorous regarding the use of immunosuppressants and maternal and fetal monitoring. Informed consent to publish had been obtained from the patient.

### A318

#### Presence of lactose in oral medications for treating diabetes and main comorbidities in elderly adults

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**Background:** Diabetes is one of the most prevalent chronic diseases in elderly populations and may be associated with other changes due to cellular aging. Therefore, the use of drugs in this age group is very common. In addition to the adverse effects of drugs, pharmaceutical excipients used to manufacture drug formulations cannot be neglected, despite being considered therapeutically inert.

**Objective:** The aim of the study was to investigate the presence of the pharmaceutical excipient lactose in formulations of oral medications used by elderly patients to treat diabetes, as well as the most frequently associated comorbidities. Materials and

**Methods:** A retrospective and descriptive study was carried out at the research laboratory of a private university in São Paulo, Brazil. The study was approved by the Institution's Research Ethics Committee, approval number 14610. Sociodemographic and pharmacological information was collected from 245 elderly people. Drugs indicated for the treatment of diabetes and the main patient comorbidities were identified. The lactose component in the various formulations was identified using therapeutic reference sources, mainly the Electronic Bulletin of the Brazilian National Health Surveillance Agency (ANVISA).

**Results:** Participants were aged 60-92 years; 227 patients (92%) used some type of medication regularly (1 or more), of which 80% were

women. The most prevalent age groups were 60-65 years (30%) and 66-70 years (26%); 11% of participants were over 80 years old. We identified the most frequently used therapeutic classes of medicines; the presence of lactose in the drugs used by participants was as follows: hypoglycemic agents (lactose in 56%); antihypertensive agents (lactose in 87%); diuretics (lactose in 95%), and antidiabetic agents (lactose in 100%). Many elderly patients in the study had concomitant use of 2 or more lactose-containing medications of different therapeutic classes.

**Conclusions:** Lactose is used as an inert ingredient in the manufacture of tablets and capsules. Extremely sensitive patients can develop gastrointestinal symptoms even with the small amounts found in oral medications, especially with polypharmacotherapy, which is common in the elderly population. These symptoms may improve with lactase enzyme supplementation, but it is important to evaluate the medications in use and to check for undesirable symptoms. If possible, certain formulations should be replaced or discontinued in cases of very sensitive elderly patients.

### A319

#### Prevalence and severity of periodontal disease in diabetic adults

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A319**

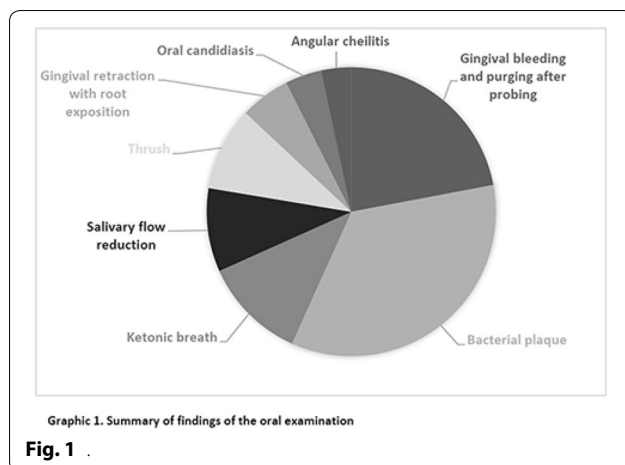
**Introduction:** While periodontal disease (PD) may precipitate the onset of Type 2 Diabetes Mellitus (DM2), some systemic factors and habits may increase the severity of PD, such as HIV, smoking and diabetes itself, triggering a vicious circle.

**Objectives:** The present study aimed to verify the prevalence and intensity of PD in adult diabetic patients.

**Materials and methods:** A cross-sectional study was carried out between March and December/2016, based on the oral conditions of 179 adult diabetic patients, who received periodontal examination. The prevalence and severity of PD were estimated from the CPITN (periodontal community need for treatment index), according to the WHO methodology.

**Results:** The mean age of participants was 57.5 years, the majority of them male (65%), non-white ethnicity (82.7%) and mean duration of DM 11.3 ± 3.4 years. Regarding PD, 47% presented mild CPITN (scores 1 and 2), while 21.2% presented moderate to severe CPITN (scores 3 and 4). Other findings of the oral examination were: 33% gingival bleeding and purging after probing, 52% bacterial plaque, 17.3% ketonic breath, 19% salivary flow reduction, 14% thrush, 8.4% gingival retraction with root exposition, 6,1% oral candidiasis and 5% angular cheilitis.

**Conclusion:** For the sample studied, the prevalence and severity of PD were high, providing important epidemiological elements for the implementation of actions aimed at the prevention and treatment of PD among diabetic patients. **ACKNOWLEDGMENTS:** No funding was obtained from pharmaceutical companies to carry out this study. All authors were involved in the data collection and analysis. **DISCLOSURE:** The authors declare no conflict of interest (Fig. 1).



### A320

#### Prevalence of amputations associated with diabetic foot infections at a reference hospital of the federal district

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**Introduction:** Diabetes mellitus (DM) is a global public health problem and cause disabilities, premature death, great economical burden due to high costs to achieve control and to treat its complications. Diabetic foot ulcers (DFU) are the most frequent chronic complications and precede amputations when associated with infection in many developing countries.

**Objectives:** To determine the prevalence of amputations in patients with DFU associated with infection treated at a reference clinical service at SUS-DF.

**Method:** Descriptive, cross-sectional, retrospective study, based on physical and electronic medical records (TrakCare<sup>®</sup>) of patients treated at the Neuropathy and Diabetic Foot Clinic (NDFC) of the Endocrinology Unit (ENDOUnit) and Research Center—FEPECS-SES-DF at Hospital Regional de Taguatinga (HRT), from June 2014 to June 2016. Type 1 (DM1) and Type 2 (DM2) diabetic patients of any age, gender or diagnosis time with DFU, which had tissue culture and antibiogram, were included in the study. For statistical analysis the SPSS<sup>®</sup> 17.0 program was used for all test applied (statistically significant  $p < 0.05$ ).

**Results:** Final sample had 107 patients, 63.6% male, 92.5% had DM2, diagnosis duration  $15.9 \pm 8.3$  and age  $60.6 \pm 12$  years. DFU were classified as neuropathic (80.4%), neuroischemic (17.8%) and only 1.9% ischemic; 43% were associated with osteomyelitis. Prior to the study period, 61.7% patients reported DFU history. Of these, 36.4% had a history of amputation, one major (above ankle) and 38 minor (below ankle). In the study period, 35.5% patients underwent amputation as an outcome of DFU, 34 of which were minor amputations and four were major amputations. No surgical procedure was registered in 55.1% patients; in 6.5%, surgical debridement was performed; and angioplasty was main treatment for only 4.6%, two of these with neuroischemic DFU underwent minor amputation. There was a positive correlation between patients submitted to surgical procedure and previous antibiotic therapy ( $p = 0.04$ ).

**Conclusions:** The findings of this study draw the attention of international similar profile for amputation (male,  $\geq 60$  years old, long DM2 duration), both minimum surgical intervention and angioplasty. Neuropathy is the main cause of DFU and the combination of surgical and previous antibiotic use is the most appropriate approach. The results warn the policy makers to the need of improving and standardizing the access and intervention in order to prevent and control diabetic foot complications.

**Keywords:** Diabetes mellitus; Diabetic foot infection; Amputation Ethics Approval This study was evaluated and approved by the Research Education Committee of the Foundation for Teaching Research and Health Sciences (FEPECS), State Health Secretary of Federal District (SES/DF), protocol number 1.656.334/2016.

### A321

#### Prevalence of androgenic deficiency and its correlation with cardiovascular risk factors in men with type 2 diabetes mellitus

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**Introduction:** Low testosterone levels have been reported in men with type 2 diabetes. Androgen deficiency was also associated with metabolic syndrome. Background: To assess the prevalence of androgen deficiency in diabetic patients followed at the Endocrinology Clinic of Hospital do Servidor Público Municipal (São Paulo) and to correlate cardiovascular risk factors with hypogonadism.

**Methods:** Cross-sectional study that included men with type 2 diabetes mellitus. Total testosterone assay was performed to determine the prevalence of androgen deficiency. This prevalence was correlated with age, BMI, hypertension and dyslipidemia.

**Results:** The prevalence of androgen deficiency in the 45 analysed patients was 26.7%. This prevalence increased with advancing age (22.2, 23.8 and 33.3% in the age groups 30–45, 46–60 and 61–70 years, respectively) and with increasing BMI (11.1, 28.6, 40 and 50% in patients with normal BMI/overweight, obesity grade 1, grade 2 and grade 3, respectively). It was also higher in hypertensive patients compared to non-hypertensive (34.3% x 0) and in those with low HDL-c compared to normal HDL-c (33.3 x 19%). There was no difference in prevalence in relation to triglycerides.

**Discussion:** The prevalence of androgen deficiency found in the study is compatible with that described in the literature. There are several proposed mechanisms for the association between secondary male hypogonadism and diabetes, with obesity and insulin resistance being the central components. The relationship between obesity and androgen deficiency occurs through complex mechanisms, such as the high activity of the aromatase enzyme in visceral adipocytes, the resistance of the hypothalamic-pituitary axis to leptin and the action of inflammatory mediators. Regarding insulin resistance, it was shown that its action on hypothalamic neurons contributes to the release of GnRH. Therefore, the state of resistance with consequent reduction of its signaling in these neurons may play a role in this pathophysiology. In addition to its association with obesity and glycemia, studies have shown an association between hypogonadism and hypertension and dyslipidemia, just as shown in our study, except for triglycerides, which could be justified by the fact that half of the patients in the study were on statins.

**Conclusion:** The study confirmed the high prevalence of androgen deficiency in this population and its association with cardiovascular risk factors (Figs. 1, 2, 3, 4, 5, 6).

Tabela 1: Características dos participantes do estudo

Variável	n (%)
<b>Idade (anos) - Média = 54,7 ± 9,8</b>	
30 - 45	9 (20%)
46 - 60	21 (46,7%)
61 - 70	15 (33,3%)
<b>Duração do DM (anos)</b>	
≤ 10	31 (68,9%)
11 - 20	10 (22,2%)
> 20	4 (8,9%)
<b>IMC - Média = 32,4 ± 7,5 kg/m<sup>2</sup></b>	
Normal/Sobrepeso	18 (40%)
Obesidade grau 1	14 (31,1%)
Obesidade grau 2	5 (11,1%)
Obesidade grau 3	8 (17,8%)
<b>Hipertensão</b>	
Ausente	10 (22,2%)
Presente	35 (77,8%)
<b>Triglicérides (mg/dL)</b>	
< 150	23 (51,1%)
≥ 150	22 (48,9%)
<b>HDL-c (mg/dL)</b>	
> 40	21 (46,7%)
≤ 40	24 (53,3%)
<b>HbA1C (%) - Média = 8,54 ± 1,84</b>	
≤ 7	9 (20%)
> 7	36 (80%)
<b>Nefropatia diabética</b>	
Ausente	18 (40%)
Presente	27 (60%)
<b>Testosterona total (ng/dL)</b>	
≥ 300	33 (73,3%)
< 300	12 (26,7%)
<b>Terapia para o DM2</b>	
Oral	24 (53,3%)
Insulina	5 (11,1%)
Oral + insulina	16 (35,6%)
<b>Terapia com estatina</b>	
Ausente	23 (51,1%)
Presente	22 (48,9%)
<b>Terapia com fibrato</b>	
Ausente	39 (86,7%)
Presente	6 (13,3%)
<b>Terapia anti-hipertensiva</b>	
Ausente	14 (31,1%)
Presente	31 (68,9%)

n = número de pacientes

Fig. 1 See text for description

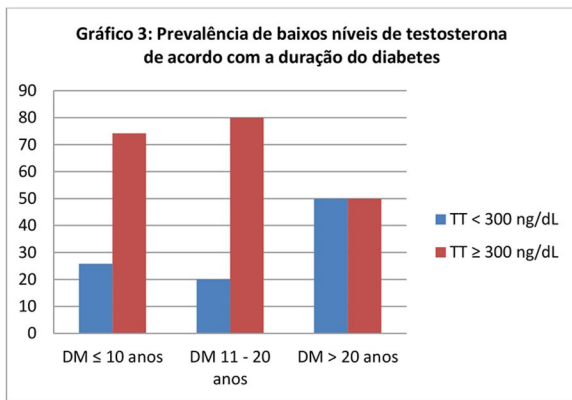
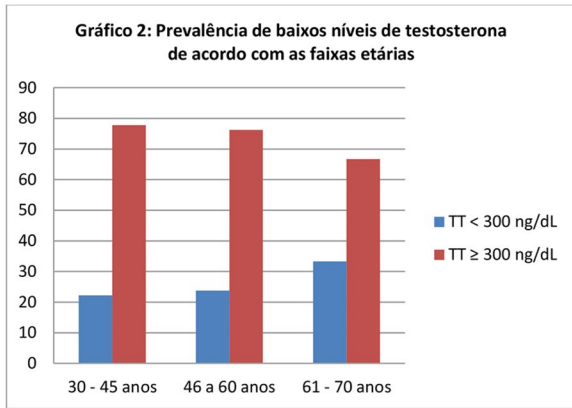
Gráfico 1: Prevalência de baixos níveis de testosterona na população diabética estudada



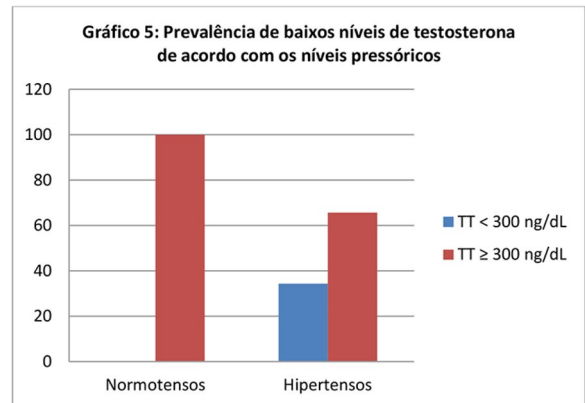
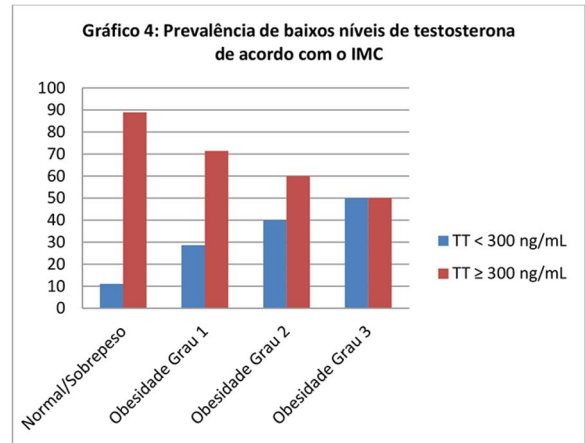
Tabela 2: Prevalência de baixos níveis de testosterona de acordo com as variáveis estudadas

Variáveis	TT < 300 ng/dL (12)	TT ≥ 300 ng/dL (33)
<b>Idade (anos)</b>		
30 - 45	2 (22,2%)	7 (77,8%)
46 - 60	5 (23,8%)	16 (76,2%)
61 - 70	5 (33,3%)	10 (66,7%)
<b>Duração do DM (anos)</b>		
≤ 10	8 (25,8%)	23 (74,2%)
11 - 20	2 (20%)	8 (80%)
> 20	2 (50%)	2 (50%)
<b>IMC</b>		
Normal/Sobrepeso	2 (11,1%)	16 (88,9%)
Obesidade grau 1	4 (28,6%)	10 (71,4%)
Obesidade grau 2	2 (40%)	3 (60%)
Obesidade grau 3	4 (50%)	4 (50%)
<b>Hipertensão</b>		
Ausente	0	10 (100%)
Presente	12 (34,3%)	23 (65,7%)
<b>Triglicérides (mg/dL)</b>		
< 150	6 (26,1%)	17 (73,9%)
≥ 150	6 (27,3%)	16 (72,7%)
<b>HDL-c (mg/dL)</b>		
> 40	4 (19%)	17 (81%)
≤ 40	8 (33,3%)	16 (66,7%)
<b>HbA1C (%)</b>		
≤ 7	2 (22,2%)	7 (77,8%)
> 7	10 (27,8%)	26 (72,2%)
<b>Nefropatia diabética</b>		
Ausente	4 (22,2%)	14 (77,8%)
Presente	8 (29,6%)	19 (70,4%)

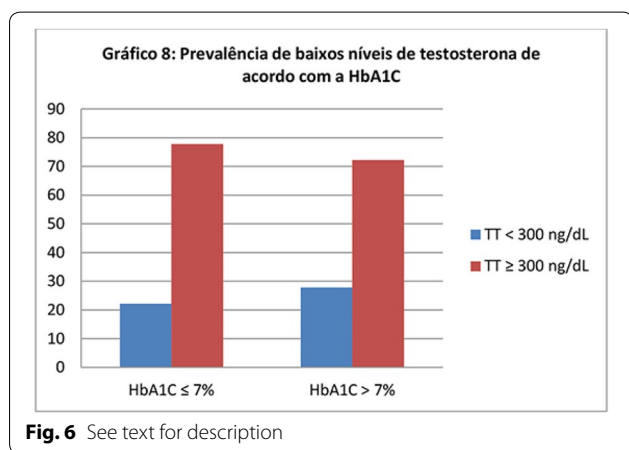
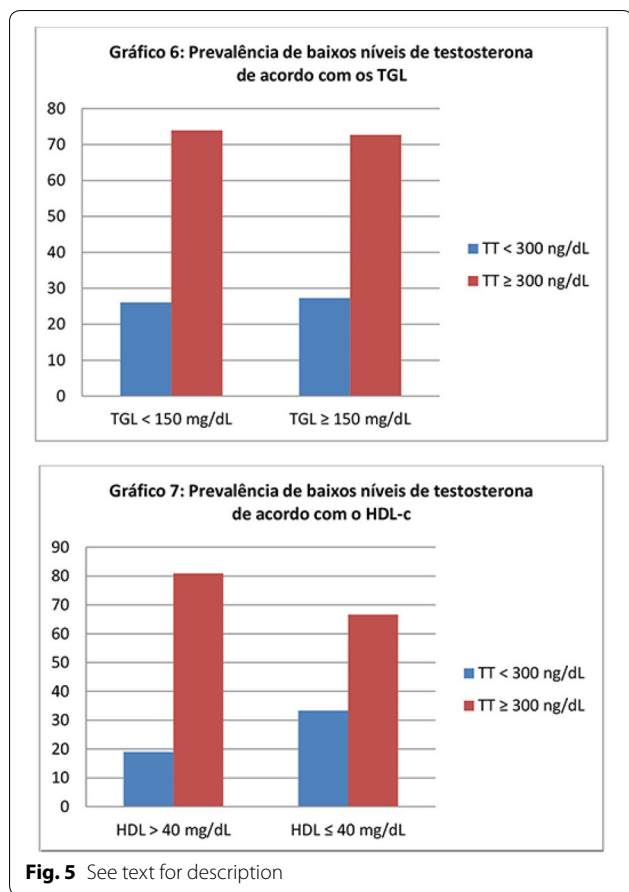
Fig. 2 See text for description



**Fig. 3** See text for description



**Fig. 4** See text for description



**A322**  
**Prevalence of antibodies to thyroid disease and celiac disease in patients diagnosed with DM1**

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**Introduction:** Type 1 Diabetes Mellitus (DM1) is caused by the autoimmune destruction of pancreatic beta cells causing deficiency in insulin production. DM1 may be associated with the presence of autoantibodies from other autoimmune diseases, such as Hashimoto’s thyroiditis and celiac disease. Thyroid autoimmunity is the most commonly related to DM1, being more prevalent in females. World studies reveal different prevalence values of anti-thyroid antibodies in DM1 patients, varying from 3 to 50%.

**Objectives:** The objective was to evaluate the incidence of thyroid autoimmunity and antibodies to celiac disease in patients with DM1.

**Methods:** We reviewed 135 medical records of patients diagnosed with DM1. The following data were collected: the presence of anti-thyroid antiperoxidase (anti-TPO), antithyroglobulin (anti-TG) antibodies, the presence of anti-TSH antibodies in those with a diagnosis of hyperthyroidism and also transglutaminase IgA and antiendomysium antibodies in the investigation of celiac disease. Thyroid function in patients with autoimmunity was also analyzed and the sex distribution of them.

**Results:** There were 36 patients (26.66%) with one or more autoantibody for the diseases studied. Hashimoto’s thyroiditis was diagnosed in 31 patients (22.96%), distributed in 32.25% of males and 67.7% of females. In patients with Hashimoto’s thyroiditis, 54.83% had hypothyroidism and 51.61% were in euthyroidism. Graves’ disease was observed in 3 patients (2.22%), 100% female. The presence of antibodies to celiac disease was found in 2 patients (1.48%), one female and one male.

**Conclusion:** The incidence of autoimmune diseases in our study is consistent with worldwide research. The most frequent association was between DM1 and Hashimoto’s thyroiditis.

**A323**  
**Prevalence of depression in patients with type 2 diabetes mellitus in childhood and adolescence and its relation with the metabolic control**

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**Backgrounds:** Type 2 diabetes mellitus (T2DM) patients are at greater risk of having depression, including those diagnosed during childhood and adolescence. Some studies have suggested that these patients might have worsening of the metabolic control associated to poor adherence.

**Aim:** Evaluate the prevalence of depression among T2DM patients diagnosed in childhood and adolescence and its relation to metabolic control.

**Methods:** The study enrolled 57 T2DM patients from a cohort of 121 patients diagnosed with T2DM in the pediatric age group, regularly followed by an interdisciplinary team, including psychological and psychiatric support. The diagnosis of depression was performed by the psychiatrist. A cross-sectional study was conducted, clinical and laboratory (Glycated hemoglobin-HbA1c, Immunoturbidimetry, reference normal value: 4.8-5.9%) data were obtained from chart reviews. Body mass index (BMI) was defined according to World Health Organization (WHO) or National Center for Health Statistics (NCHS) adjusted to age and gender.

**Results:** The mean age at T2DM diagnosis was 14.1 ± 3.2 years, current age: 21.4 ± 5.7 years and the average duration of diabetes: 7.3 years (IQR: 3.6–9.0 years), with predominance in females (70.9%, n = 41). The mean HbA1c was 7.9 ± 1.9% (female: 8.1 ± 1.7% vs. male 7.5 ± 2.5%, p = 0.219). The mean BMI was 30.7 ± 5.3 kg/m<sup>2</sup>, with 52.2% showing obesity and 40.4% overweight. The prevalence of depression in our sample was 29.8% (17/57), with 64.7% (11/17) being female. Patients with depression had slightly higher HbA1c values than those without

depression ( $8.6 \pm 1.9\%$  vs.  $7.7 \pm 1.9\%$ ,  $p = 0.546$ ), but without statistical significance. However, these differences were more evident in the age group > 18 years of age ( $9.1 \pm 1.8\%$  ( $n = 13$ ) vs.  $6.9 \pm 1.4\%$  ( $n = 4$ ),  $p = 0.06$ ). No other differences were found between the groups.

**Conclusion:** The prevalence of depression in young patients with T2DM was high in our sample, reaching almost 30.0% and was predominantly observed in overweight or obese patients and in those > 18 years of age.

**A324**

**Prevalence of diabetes mellitus (DM) in São Paulo, an observational study**

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**Introduction:** Diabetes mellitus (DM) is a group of metabolic disturbs that has the presence of hyperglycemia. Mostly of people with diabetes (PwD), appears to have the type 2 and are above 40 years old. Nowadays, it is estimated that there are 415 million PwD around the world. The greater part of them are in developing countries. In 2016, in Brazil, DM prevalence was estimated over 9.4% of the population (14.3 million people). Thus, since DM can bring a lot of chronic conditions and high cost of healthcare system, it is important to know its prevalence to provide better knowledge, diagnostic and prevention. Our target is to verify the prevalence of DM in the local population in a period of 3 years.

**Methods:** The information were collected for 3 years in health events held in places with a huge circulation of people in the city of São Paulo. In these events, medical students measured arterial blood pressure (BP), body mass index (BMI), waist circumference (WC) and capillary blood glucose (BG), as well as data about comorbidities and drugs. These people came by free will, and after the data collection, were oriented about physical activity, weight adequacy, self-medication and diseases' screening. A MD supervised all these activities. The collected data was stored and compared with IDF diagnostic criteria for improved glucose tolerance (IGT), considering that the last meal referred by the individuals was comparable to an OGTT (IGT if  $BG \geq 150$  mg/dl 2 h after meal) and the prevalence was calculated accordingly to specific treatment for DM.

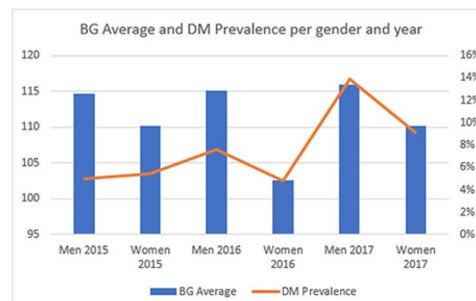
**Results/discussion:** In three years, we have obtained 838 entries (CI = 95%). The prevalence average in three years was of 10.45% (women) and 12.45% (men), 11.45% for both. Detailed results can be seen in Table 1 and 2 and Graphic 1. We had satisfactory representation in the sample. Women with diabetes had higher prevalence of overweight and higher prevalence in comparison with men with diabetes. Data variation may indicate that MDs and medical students gave variable importance to DM, concerning about medical education and professionals prepare. There is a chance that the individuals did not know how to inform about their diseases, once the responsible one for the patients' instruction is the MD, this reinforces the concern. The prevalence above national average is a factor that must be taken account for the basic attention in the city, as well as for the healthcare expenditures and new screening and control strategies (Fig. 1).

Year	Sex	Blood Glucose			DM	
		Average	SD	% altered	%	
2015	F	110.17	31.99	4.87%	12.72%	
	M	114.75	32.26	2.00%	9.90%	
2016	F	102.58	31.19	4.80%	10.60%	
	M	115.17	56.35	2.54%	13.85%	
2017	F	110.25	40.03	7.69%	8.05%	
	M	115.93	49.55	8.69%	13.60%	

Table 1 - Prevalence of DM and BG average per sex in the period

	Mean Age	SD	30-44	45-59	60+	Overweight	Obesity
Women	62.14	10.07	6.38%	21.27%	72.34%	82.97%	36.17%
Men	63	11.28	8%	28%	64%	69%	26.53%

Table 2 - Age Groups and prevalence of Obesity and Overweight per sex among people with DM in the period.



Graph 1 Blood Glucose (BG) Average and Diabetes Mellitus (DM) Prevalence per gender and year, 2015 to 2017

**Fig. 1** See text for description

**A325**

**Prevalence of diabetes mellitus in frequenters of the free fair in Lagarto/SE**

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**Background:** According to the American Diabetes Association (2017), the finding of random glycemia  $\geq 200$  mg/dL associated with the presence of symptoms of hyperglycemia or in hyperglycemic crisis is diagnostic criterion for Diabetes Mellitus (DM). Due to the low complexity to perform capillary glucose at random, low cost and rapid diagnosis, this method, with high reproducibility. Can be used efficiently for the diagnosis of DM in populations. This research was approved by the Committee of Ethics in Research CEP/UFS, according to Norms and Guidelines for Research Involving Human Beings—Res CNS 196/96, II.

**Methods:** The objective of this study was to present the data from the random capillary glycemia survey performed in the population attending the free fair in the city of Lagarto/SE and the relationship with the classic symptoms of the diabetes. This is an observational study. Data were collected between October 2016 and May 2017 using two units of glucose meter and tapes, and a questionnaire was applied to hyperglycemic symptoms and risk factors for type 2 DM. The researchers were trained to ensure reproducibility of the study. Data were collected from 108 people, chosen with the sole criterion of being 18 years or older.



**Results:** Regarding glycemic values, 96 (88%) were below 200 mg/dL, 10 (9%) were above this value and 2 (1%) were not measured. The sample ranged from 78 mg/dl to 354 mg/dl, with a mean of 131.29 mg/dl. When asked about classic symptoms, 33 (30%) claimed polyuria, 32 (29%) reported polydipsia, 20 (18%) reported unexplained weight loss, and 13 (21%) reported having polyphagia. Considering those with glycemia  $\geq$  200 mg/dl, only 1 denied all symptoms. Among those with glycemia above 200 mg/dL, 6 (60%) denied the previous diagnosis of DM, and were instructed to seek the health service.

**Conclusion:** Our sample presented a prevalence of 12% (14 respondents). Among the 6 participants who presented altered glycemic values and who did not have a previous diagnosis of DM, polyuria and polyphagia were the most reported symptoms, reported by 4 (66.6%) people. Considering the importance of early diagnosis of the disease, screening practices such as these are feasible alternatives (Fig. 1).

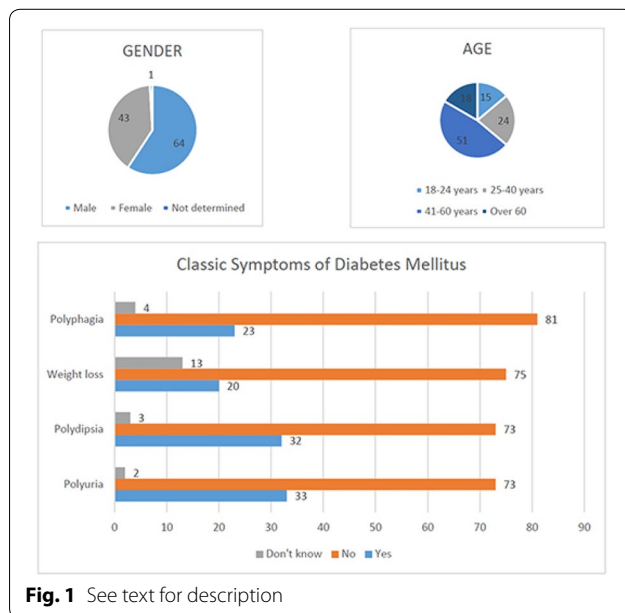


Fig. 1 See text for description

### A326 Prevalence of diabetes mellitus in individuals undergoing hemodialysis treatment at a dialysis clinic in Curitiba, PR

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**Introduction:** The chronic kidney disease (CKD) has become a public health problem. A considerable increase of 34% in the number of individuals with the disease has been observed in recent years, this fact is associated with the increase of comorbidities such as diabetes mellitus (DM) responsible to causes diabetic nephropathy, which is reported as the main cause of CKD. Worldwide it is estimated that DM is present in 50% of the population with CKD. In Brazil, the estimative is lower, being 27%.

**Objective:** To know the prevalence of DM in the population of chronic kidney patients undergoing hemodialysis treatment at a dialysis clinic in Curitiba, PR.

**Methods:** This is a descriptive observational study with patients with CKD undergoing hemodialysis treatment at a dialysis clinic in Curitiba, PR. The sample was identified through the age and gender of the patients and comorbidities were obtained through the subjects' medical records. The survey of the data occurred on the month of July 2017.

**Results:** There were evaluated 153 patients undergoing hemodialysis, with 46% (n = 71) of female and 54% (n = 82) males, mean age

57  $\pm$  14 years. Diabetes mellitus was identified as a single comorbidity in 12% (n = 7) of patients and associated with other comorbidities such as systemic arterial hypertension, congestive heart failure and dyslipidemias in 86% (n = 49) of the patients. Regarding gender, prevalence of 54% (n = 30) and 46% (n = 26) of DM as comorbidity associated with CKD was found in men and women, respectively.

**Conclusion:** Diabetes mellitus was present in the hemodialysis population with a prevalence higher than the Brazilian one. Alternatives for promotion and prevention of health should be adopted to prevent the increase of the frequency of DM in the Brazilian population.

### A327 Prevalence of diabetes mellitus type 2 and prediabetes type 2 in patients who are candidates for bariatric surgery

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**Introduction:** In Brazil the prevalence of diabetes mellitus type 2 (DM2) is 11.6 million cases, being that 3.2 million do not diagnosed and approximately 25% of patients with pre-DM2 will develop DM2 in 3–5 years. Obesity is the main risk factor for both diseases.

**Objective:** To assess the prevalence of DM2 and pre-DM2 and the type of treatment carried out, in the first assessment of obese patients candidates for bariatric surgery.

**Method:** A cross-sectional analysis of data of 243 obese patients with indication of bariatric surgery of the Endocrinology Outpatient Clinic of the Hospital Santa Marcelina, the survey occurred between January/2014 and November/2016. We evaluated the information regarding the DM2, dyslipidemia, hypertension and smoking provided by patients, as well as fasting blood glucose and HbA1C of the first consultation. We consider with pre-DM2 patients with fasting glycemia  $\geq$  100 mg/dL and/or glycosylated hemoglobin  $\geq$  5.7%.

**Results:** After the analysis of 243 medical records, it was observed that 38% of patients reported the diagnosis of DM2 and 32% denied be DM2 patients, but they were bearers of pre-DM2 and knew not of comorbidity. In relation to the patients with DM2, 86.8% were female. The average  $\pm$  standard deviation, minimum value and maximum value were: age (44.8  $\pm$  11.0; 18–72 years), BMI (46.55  $\pm$  7.0; 3<sup>o</sup>71.48 kg/m<sup>2</sup>), 58.4% possessed HbA1c < 7%. In relation to the treatment of DM2: 79% wore metformin, 20.4% used metformin and NPH insulin, and 23.6% wore only NPH insulin. Regarding the coexistence of diseases: 61.7% reported SAH, 31.3% related dyslipidemia. In relation to the consumption of substances: 8.7% reported smoking.

**Conclusion:** The prevalence of disorders of carbohydrate metabolism is high in obese patients candidates for bariatric surgery. There is an important association of comorbidities such as hypertension and dyslipidemia to DM2, which potentiates the cardiovascular risk in these patients. Because pre-DM2 be an asymptomatic disease, although already associated with macro and microvascular changes, it is fundamental to the active search with attainment of blood glucose and HbA1C throughout the obese patient.

### A328 Prevalence of diabetic neuropathy in a reference unit in the lower amazon region

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**Introduction:** Among the consequences of diabetes mellitus (DM), diabetic neuropathy is the most common complication presented by diabetic patients. Peripheral diabetic neuropathy significantly

increases patients' morbidity and mortality, and current evidences claim that better metabolic control relates to lower prevalence of this complication.

**Objectives:** To determine the prevalence of diabetic neuropathy and to identify the quality of glycemic control among diabetic patients assisted at the Endocrinology clinic of a reference unit in Santarém-Pará.

**Methods:** The research was carried out at the Endocrinology clinic at a reference unit in Santarém, Pará; data were collected by the researchers through a standardized form, and patients were evaluated according to the Neuropathy Symptom Score (NSS) and Neuropathic Disability Score (NDS).

**Results:** Twenty-two patients were evaluated during the study; 64% were over 45 years of age and 36% were below that age group; 64% of the sample comprised women and 36% consisted of men; the prevalence of peripheral diabetic neuropathy in the population studied was 41%; among patients with diabetic neuropathy, 77.8% had the diagnosis of diabetes mellitus for more than 5 years; 66.7% of patients with diabetic neuropathy had poor quality of their glycemic control, with blood glucose levels higher than the current optimal target, whereas 44.3% presented irregular glycemic control, with blood glucose levels checked less than 3 times a week.

**Conclusion:** Data collected through this research made possible to know the local sample of the patients treated in the referred Endocrinology clinic, highlighting that most of them do not have diabetic neuropathy. Thus, preventive measures, such as continuing education to the patients and active search for early signs and symptoms of diabetic neuropathy, must be reinforced in the service, to improve their quality of life, and to avoid the evolution of complications from diabetes mellitus.

### A329

#### Prevalence of gestational diabetes mellitus on mothers of malformed newborns in the region of Londrina

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**Introduction:** Gestational Diabetes mellitus (GDM) is considered the main metabolic problem during pregnancy and puerperal period, and may represent the development of diabetes mellitus type 2. It integrates one of the main risk factors for maternal and fetal morbidity and mortality.

**Objectives:** Verify the prevalence of GDM in pregnancy of malformed newborns and identify the risk factors.

**Materials and methods:** Multicenter study involving three sites, Neonatal Intensive Care Unit of the Hospital Universitário de Londrina, Clinic of Children's Specialties/UEL and Institute Londrinense of Education for Exceptional Children, with data collected from January 2013 to April 2017. A group of 227 mothers with malformed newborns was identified. By means of a questionnaire and analysis of medical records, pregnant women who presented DMG were selected, it was collected information on possible risk factors for this metabolic disorder and the main characteristics and malformations of the newborns.

**Results:** Among the sample assessed, it was found 29 cases of Gestational Diabetes mellitus (12.77%). The following possible risk factors were analysed: advanced maternal age (41.38%  $\geq$  35 years); hypertensive disorders of pregnancy (20.68%); multiparity (58.62%) and previous occurrence of abortion (27.58%). Considering that the GDM contributes to changes in embryonic and fetal development, it was analyzed the main characteristics of neonates malformations, being that: 34.48% were premature; 27.58% were small for gestational age, mainly due to congenital malformations presented, and only 13.79% were big for gestational age, characteristic of the GDM. Among the congenital malformations were observed a greater number of neurological changes (44.82%), followed by cardiac malformations (10.34%).

**Conclusion:** Early identification of risk factors associated with GDM is important for a better diagnosis of the disease and to minimize fetal involvement by maternal hyperglycemia.

### A330

#### Prevalence of glucose intolerance and diabetes mellitus in patients hospitalized at the central hospital of the Irmandade Santa Casa de Misericórdia of São Paulo, Brazil

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**Introduction:** Type 2 Diabetes Mellitus (T2DM) is an important global health problem, and 50% of patients are unaware of this pathology. People with undiagnosed and uncontrolled T2DM and glucose intolerance (GI) are at high risk for cardiovascular disease and have an increase on the length of hospital stay due to various diseases and long-term morbidity and mortality. Many individuals only seek medical care in emergency situations, which requires hospital admission, so this may represent as an opportunity to identify patients without prior diagnosis or those with uncontrolled T2DM.

**Objectives:** To evaluate the prevalence of T2DM, glucose intolerance and stress hyperglycemia in individuals hospitalized at the hospital Irmandade Santa Casa de Misericórdia of São Paulo (ISCMSP) during the first 72 h of admission.

**Methodology:** This is a cross-sectional study of 89 inpatients admitted to Santa Casa de São Paulo hospital from March to July 2017. Patients answered a questionnaire that included information on age, schooling, comorbidities, symptoms of T2DM, medications, risk factors for T2DM and anthropometric measures. Exclusion criteria were: anemia, chronic renal disease stages IV and V, pregnant women and age under 18 years. Capillary glycemia test, glycated hemoglobin (HbA1c) and serum glycemia were performed.

**Results:** 27% of 89 patients were T2DM (95% CI from 5.3 to 48.7), and 41.7% of these presented HbA1c  $>$  7%. From those 65 patients who answered had no diabetes, 15.4% were glucose intolerance (A1c 5.7-5.4%) and 3% were diabetic (A1c  $>$  6.5%). Stress hyperglycemia occurred in 3.0% of those 65 that referred no diabetes and 41.7% of those with previous diabetes presented capillary glycemia  $>$  180 mg/dl within the first 72 h in hospital.

**Conclusion:** The prevalence of our inpatients with diabetes is similar to other centers, while undiagnosed diabetes patients prevalence is smaller. A1c measurement and capillary glucose test at hospital admission were useful to identify patients with unknown diabetes and patients at risk of stress hyperglycemia. Since the patients who presented stress hyperglycemia were the same with undiagnosed diabetes, maybe capillary glucose test could be used in the future as an easy and low cost screening test for diabetes and patients at risk for stress hyperglycemia. At this moment we are increasing our sample to perform this kind of analysis.

### A331

#### Prevalence of hyperglycemia at the admission in the emergency service of a tertiary hospital

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**Introduction:** Hyperglycemia is associated with increased morbidity and mortality in hospitalized patients. However, scarce information is available in the literature about the prevalence of hyperglycemia and diabetes mellitus at admission in the hospital emergency service.

**Objectives:** The aims of this study were to evaluate the prevalence of hospital hyperglycemia, defined as glycemia  $\geq$  140 mg/dl, and

diabetes mellitus at the admission in the emergency service of a tertiary hospital.

**Methods:** We performed a retrospective analysis of the medical records of May/2017. Patient's glycaemia were monitored using the point of care testing (POCT) Abbott Precision XYP glucometer. The local Research Ethics Committee approved the study.

**Results:** In May/2017, 878 patients were evaluated in the emergency service, with a mean age of  $61.8 \pm 20.7$  years and 55.4% were women. Previous diagnosis of diabetes mellitus was reported by 17.65% ( $n = 155$ ) of the patients. In May/2017, 700 POCT were performed in the hospital emergency service and hyperglycemia  $\geq 140$  mg/dl was observed in 30.14% ( $n = 211$ ) of the cases.

**Conclusions:** We observed a high prevalence of hospital hyperglycemia and a relatively high frequency of patients with diabetes mellitus admitted in the hospital emergency service. Hospital hyperglycemia was observed in patients with and without previous diagnosis of diabetes. The evaluation of glycaemia in the admission of patients in the emergency service using POCT represented a fast, simple and effective strategy in the detection of hyperglycemia. Thus, glycemic measurements at hospital admission would be important for early detection and adequate management of hyperglycemia, increasing patient safety and quality of care.

### A332

#### Prevalence of hypovitaminosis d in type-2 diabetic patients candidate to bariatric surgery

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**Background:** Hypovitaminosis D is present among 62% of type-2 diabetic (DM-2) patients; also, obesity is an independent risk factor to improve the prevalence of this vitamin deficiency. Previous studies have shown that hypovitaminosis D is associated to worse glycemic controls; however, the exact mechanism to justify this is still unknown.

**Objective:** Analyze the prevalence of hypovitaminosis D in obese patients with and without DM-2 candidates to bariatric surgery.

**Methods:** This research was approved by Hospital Santa Marcelina's Ethics Board (n. 06581/17), and was a transversal study based on the review of 96 patient files from Hospital Santa Marcelina's Endocrinology service, who had their last medical appointments between January/2011 and November/2016. These individuals were then split in two groups: G1 (with DM-2) and G2 (without the disease). The mean level and standard-deviation of age, HbA1c, fasting glucose, BMI, serum calcium, serum phosphorus, serum magnesium and PTH were then calculated; hypovitaminosis D was considered when 25(OH)-Vitamin D levels were  $< 30$  ng/mL. Posteriorly, the mean values of both groups were compared through Student's T-Test (significance when  $p < 0,05$ ).

**Results:** The prevalence of hypovitaminosis D was 96.15% in G1 and 76.34% in G2. The mean results and standard-deviation of the other analyzed parameters in G1 were: age ( $40.8 \pm 1.94$  years), HbA1c ( $5.3\% \pm 0.03$ ), fasting glucose ( $90.23$  mg/dL  $\pm 1.02$ ), BMI ( $46.06$  kg/m<sup>2</sup>  $\pm 1.25$ ), serum calcium ( $8.92$  mg/dL  $\pm 0.30$ ), serum phosphorus ( $3.49$  mg/dL  $\pm 0.16$ ), serum magnesium ( $2.125$  mg/dL  $\pm 0.06$ ), PTH ( $64.38$  pg/mL  $\pm 8.13$ ) and 25(OH)-vitamin D ( $21.63$  ng/mL  $\pm 1.11$ ). In G2, these parameters were: age ( $49.4 \pm 1.06$  years), HbA1C ( $8.2\% \pm 0.77$ ), fasting glucose ( $142.8$  mg/dL  $\pm 5.7$ ), BMI ( $45.42$  kg/m<sup>2</sup>  $\pm 0.70$ ), serum calcium ( $10.34$  mg/dL  $\pm 1.10$ ), serum phosphorus

( $3.32$  mg/dL  $\pm 0.10$ ), serum magnesium ( $1.963$  mg/dL  $\pm 0.041$ ), PTH ( $56.83$  pg/mL  $\pm 5.23$ ) and 25(OH)-vitamin D ( $22.94$  ng/mL  $\pm 0.72$ ). There were no significant differences between BMI, serum calcium, serum phosphorus, PTH and 25(OH)-Vitamin D in both groups; however, G2 presented lower serum magnesium and higher levels of age, HbA1c and fasting glucose.

**Conclusion:** There is a high prevalence of hypovitaminosis D in obese patients with or without DM-2; however, the presence of this comorbidity didn't affect the prevalence of this vitamin deficiency in both groups. The determinative factor to this deficiency appears to be the presence of obesity

Informed consent to publish has been obtained from all 96 patients.

### A333

#### Prevalence of insulin resistance, glucose intolerance and diabetes mellitus among hiv-positive individuals receiving antiretroviral therapy (ART)

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**Introduction:** The prevalence of insulin resistance, glucose intolerance and diabetes mellitus among HIV-positive individuals has been growing significantly after the introduction of antiretroviral therapy (ART). The clinical presentation of insulin resistance and type 2 diabetes has been reported in 8–10% of cases, while hyperglycemia with diabetes mellitus previously diagnosed or not, has occurred in 3–17% patients receiving antiretroviral therapy (TARV).

**Objectives:** To determine the prevalence of insulin resistance (IR), glucose intolerance and type 2 diabetes (T2D) in a sample of HIV-infected patients receiving TARV, followed up in the outpatients' clinic of the Institution.

**Materials/methods:** This is a retrospective cross-sectional study conducted from February 2016 to March 2017, through the analysis of clinical and physical data, as well as laboratory studies. The body mass index (BMI) was calculated by using the Quetelet index, by dividing the weight (kg) by the height squared (m<sup>2</sup>).

**Results:** We evaluated 66 consecutive patients (77.3% male), with a mean age ranging from  $43 \pm 9$  years and average period receiving TARV was  $37 \pm 28$  months (Table 1). Diabetic patients presented higher levels of insulin resistance than non-diabetic patients (HOMA-IR 3.95 vs. 3.44), but there was no statistical significance for this data ( $p = 0.56$ ). Advanced age (OR 1.03, 95% CI 1.01–1.08) and average antiretroviral treatment time (OR 1.02 95% CI 1–1.03) were positively correlated with T2D.

**Conclusion:** After the advent of HAART era, HIV-infection has been considered a chronic disease and it's merging with other diseases more common and frequent in the 3rd age as life expectancy increases in these patients. Among HIV-infected adults, overweight and obesity were found to be associated with DM. Accordingly, additional studies to explain the mechanism behind the association of many risk factors like diet, age, family history, sedentarism are necessary to clarify the precise role that HIV-infection and TARV in order to play this metabolic disorder. As the results obtained, screening tests for diabetes may be appropriate be in the routine care of HIV-positive patients (Fig. 1).

Table 1. The profile of patients studied.	
Study sample	N = 66 patients
Men	51 (77.3%)
Women	15 (22.7%)
Mean age	43±9 years
Average period receiving TARV	37±28 months

Assessment of the nutritional status based on BMI classified 9 (14%) as eutrophic, 45 (68%) as overweight and 12 (18%) were obese (Graphic 1).

Graphic 1. The distribution of patients according to BMI



Fig. 1 See text for description

**Acknowledgments:** We would like to offer our deepest gratitude to the study participants. No funding was obtained from pharmaceutical companies to carry out this study. All authors were involved in the data collection and analysis.

**Disclosure:** The authors declare no conflict of interest.

### A334

#### Prevalence of intestinal constipation and associated factors in older adults with type 2 diabetes

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The increase in the population of older adults has led to a greater demand for senior healthcare institutions, such as senior care centers at federal universities. Ageing is accompanied by physiological changes, such as the loss of tone of the gastrointestinal tract (GIT), leading to an increased risk for intestinal constipation. Indeed, this condition is common in the older population and may stem from low fiber intake, low fluid intake, the use of medications, previous surgeries and a sedentary lifestyle.

**Objective:** Analyze intestinal constipation, body mass index (BMI) and water intake in older adults with type 2 diabetes.

**Methods:** A retrospective study (period: 2011–2017) was conducted with 231 older adults registered with the nutrition/diabetes outpatient clinic of the Senior Care Center of the Federal University of Pernambuco in the city of Recife, Brazil. All participants answered a questionnaire addressing water intake, functioning of the GIT, lifestyle and demographic characteristics. BMI was calculated as weight/height<sup>2</sup> (LIPSCHITZ, 1994).

**Results:** One hundred ninety older adults (83%) were female and 95% resided in urban areas. Among the 56 participants (24.6%) who reported having constipation, the female sex (82%) and overweight individuals (54%) predominated. With regard to hypoglycemic agents, 35 (61%) of the constipated patients took metformin (1–3×/day) and 77% used other medications (antihypertensive drugs, lipidlowering agents, T4). The most frequently reported symptoms were the sensation of incomplete evacuation and the sensation of anorectal obstruction or blockage. Low water intake (< 1.5 l/day) was found in 51% of the individuals with constipation and only 16% performed physical activity ≥ 150 min/week on alternating days.

**Conclusions:** The present data suggest a low prevalence rate of constipation in the group of older adults with diabetes analyzed. This condition was more frequent among women, overweight individuals, individuals with low water intake and those with a sedentary lifestyle. There is a need for further studies involving this portion of the population as well as the development of prevention protocols and

nutritional therapy for the treatment of constipation in this vulnerable group.

### A335

#### Prevalence of macro and microvascular complications in 444 patients with type 2 diabetes mellitus starting a second therapeutic line in Brazil: discover study

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**Introduction:** In the last decade, the therapeutic arsenal for the treatment of type 2 Diabetes Mellitus (T2DM) has gained new options that can benefit the most diverse profiles of patients. However, the delay in diagnosis and initiation of adequate therapy are still frequent causes that contribute to the high mortality rates due to T2DM complications. The DISCOVER Study is a global and prospective registry (NCT02322762), conducted in 37 countries, including 14,178 patients with T2DM initiating a second line of antidiabetic therapy.

**Objective:** The present study aimed to describe the main macro and microvascular complications related to T2DM observed in Brazilian population.

**Methods:** From May 2015 to June 2016, a total of 444 individuals mainly referred by primary services (81.8%) were nationwide included through 22 research sites.

**Results:** Brazilian patients showed a mean age of 58.6 ± 11.5 years, caucasian majority (67.3%) and female (53.2%), diagnosed with T2DM for a mean of 6.6 years, through routine exams (76.6% of cases). Clinical and laboratory measures showed medians of 7.9% (7.3–9.2) for HbA1c, 160 mg/dL (134–200) for fasting glycemia, 10 mg/g (2.5–25) for albumin/creatinine, 30 kg/m<sup>2</sup> (27–33) for body mass index, and 102 cm (95–109) for waist circumference. Macrovascular complications reported by 15.3% of the individuals, being coronary artery disease the main exponent (8.8% of the cases), also associated with previous percutaneous coronary intervention (6.5%) and surgical revascularizations (1.4%), acute myocardial infarction (5.4%), angina pectoris (4.5%), CCS 2 = 45%), and chronic heart failure (4.3%, NYHA II = 57.9%). Stroke was reported as the second of these complications (2.5%), predominantly ischemic (90.9%). On the other hand, the microvascular complications related to T2DM were confirmed by 83.1% of the patients, including hypertension (63.7%), dyslipidemia (55.9%), peripheral neuropathy (6.8%) and chronic kidney disease (6.5%). Among the associated comorbidities, thyroid dysfunctions were reported by 18.9% and depression by 16.7%.

**Conclusions:** Thus, in our population, the observed delay for the therapeutic optimization in patients with T2DM seems strongly correlated with the high prevalence of macro and microvascular complications evidenced.

### A336

#### Prevalence of metabolic syndrome in the city of São Paulo, Brazil, an observational study

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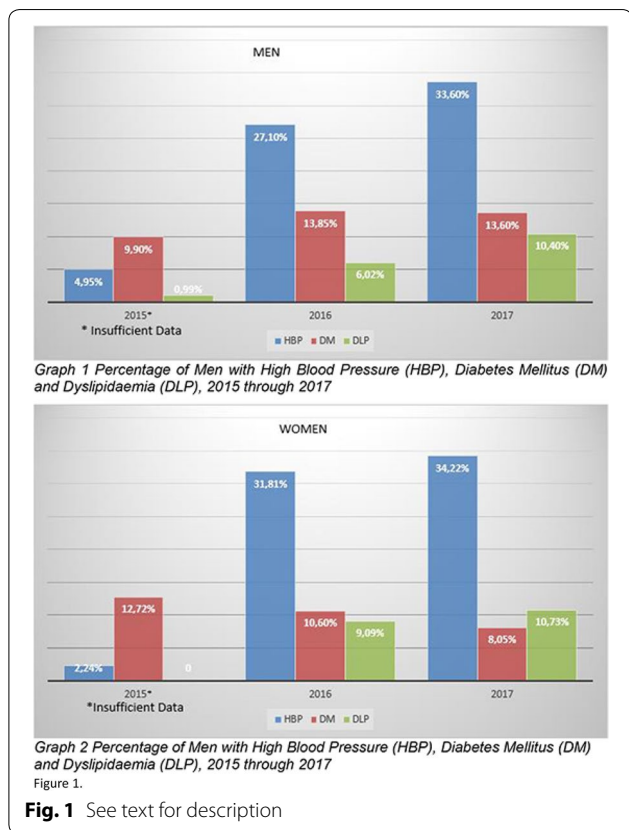
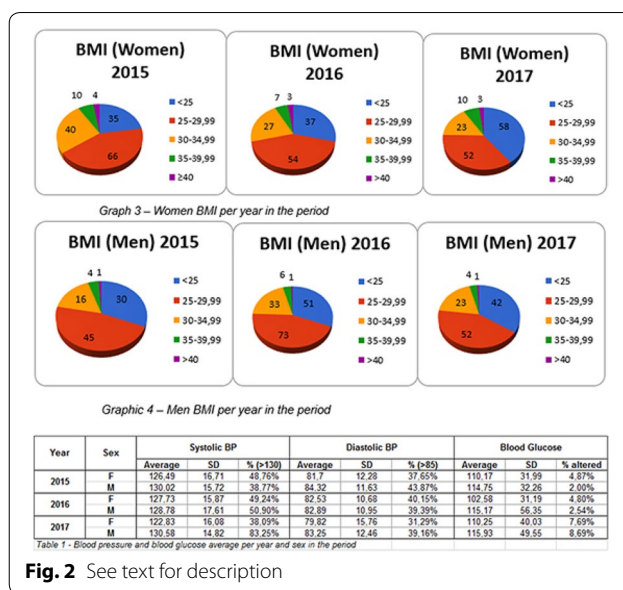
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**Introduction:** Metabolic syndrome (MS) implies in several metabolic dysfunction, being an important risk factor for cardiovascular events. Its prevalence has been growing around the world; studies in developing countries points a varying prevalence between 12.3 and 42.7%,

depending on the utilized criteria. Being a syndrome that is related to chronic diseases and high mortality taxes, it is important to know MS prevalence for effective prevention and therapeutic approach. Our target is to analyze the prevalence of MS in the local population in a period of 3 years.

**Methods:** The data were collected between the years 2015 and 2017 in health events held in places of great circulation of people in São Paulo city, Brazil. In such events, medical students measured people's arterial blood pressure (BP), body mass index (BMI), waist circumference (WC) and capillary blood glucose (BG), and collected information about drugs and comorbidities. These people came by free will, and after the data was collected, were oriented about weight adequacy, regular physical activities practices, self-medication, and screening for non-communicable diseases (NCD). A MD supervised all activities. The data was compared with the IDF diagnosis criteria: central obesity (WC ≥ 94 cm for men and ≥ 80 cm for women or BMI > 30) and two or more of the following: specific treatment for dyslipidemia (DLP); for high blood pressure (HBP); or for diabetes mellitus (DM).

**Results/discussion:** In 3 years, we obtained 838 entries (CI = 95%). The average prevalence of MS in these 3 years was 12.26% for women and 8.93% for men (10.59% for both genders). Detailed results can be observed in Table 1 and in Graphs 1–4. The results indicate a satisfactory representation of São Paulo's population. The average WC and BMI above recommended points toward a deficiency in the basic healthcare system. The variation of the data in regards the prevalence of HBP, DM and DLP indicates that the healthcare professionals gave variable importance to NCD rising concerns about medical education and professional preparation. There is a possibility that the patients did not know how to inform their NCD, and once the responsible one for the patients' instruction is the MD, the former concern cannot be dismissed. Even with the variation of the collected data, MS prevalence was high and, therefore, the subject must be approached more frequently, as new strategies to control and screen this condition must be developed (Figs. 1, 2).



**A337**  
**Prevalence of microvascular complications in type 2 diabetics of a University Hospital**

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The article goals are describe the prevalence of microvascular complications and the main associated risk factors in type 2 diabetics. It was a revision of patients medical records attended in 2016. Main variables analyzed: presence of microvascular complications, disease time, body mass index, glycated hemoglobin levels. The qui-square and t-student test were used in the statistical analysis. In results, 81% with more than 50 years, 58% with altered glycated hemoglobin rate and 57% with more than 10 years of disease. 23% had retinopathy, 45% nephropathy, 18% neuropathy and 59% had none of these complications. There was an association between altered glycated hemoglobin and the development of nephropathy in 55.2%, as well as the presence of dyslipidemia and the development of nephropathy. There was a significant association between the time of disease of patients and the development of any of the microvascular complications. In the conclusions, we saw microvascular complications are the major cause of morbidity in DM2 patients. In our service, we found a higher prevalence of nephropathy, and confirmation that patients with adequate hyperglycemia control and adequate follow-up presented a lower risk of developing these complications (Figs. 1, 2).

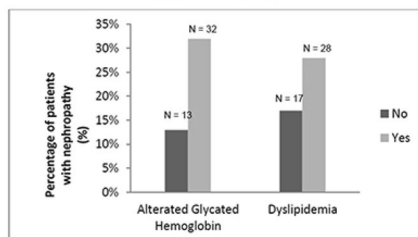
Table 1 - Distribution of the patients evaluated in this study according to gender, age, smoking / alcoholism, retinopathy, nephropathy, neuropathy, any of microvascular complications, systemic arterial hypertension (SAH), dyslipidemia, stroke, glycated hemoglobin, time of illness.

Variable	% (n)
<b>Gender</b>	
Male	36.0 (36)
Female	64.0 (64)
<b>Age</b>	
Up to 40	4.0 (4)
41 to 50	15.0 (15)
51 to 60	24.0 (24)
61 to 70	37.0 (37)
More than 70	20.0 (20)
<b>Smoking / Alcoholism</b>	31.0 (31)
<b>Retinopathy</b>	23.0 (23)
<b>Nephropathy</b>	45.0 (45)
<b>Neuropathy</b>	18.0 (18)
<b>Any of microvascular complications</b>	59.0 (59)
<b>SAH</b>	83.0 (83)
<b>Dyslipidemia</b>	50.0 (50)

Fig. 1 See text for description

Stroke	6.0 (6)
Glycated hemoglobin (%)	7.58±0.18
Normal	42.0 (42)
Light change	47.0 (47)
Serious change	11.0 (11)
Blood glucose (mg/dL)	170.89±7.76
Time of illness (years)	12.71±0.87
Less than 10	43.0 (43)
10 or more	57.0 (57)

Figure 1 - Graph showing the percentage of patients with nephropathy, in altered and normal glycated hemoglobin patients: and without and with dyslipidemia. (p = 0.016, p = 0.027).



Ethics Approval  
The study was approved by Comitê de Ética da Equipe Plataforma Brasil, number CAAE 6455571720000021.

Fig. 2 See text for description

**A338**

**Prevalence of type 2 diabetes among Brazilian adolescents: findings from the erica survey**

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**Introduction:** Type 2 diabetes (T2DM) in adolescents represents a clinical challenge related to lifestyle changes and obesity. Although still underdiagnosed, recent studies suggest a significant annual increase in the incidence of T2DM in youth from different ethnic groups. **Objective:** To estimate the prevalence of prediabetes and T2DM and to investigate associated factors among Brazilian adolescents aged 12–17 years.

**Methods:** ERICA is a national school-based survey involving youth from cities with more than 100,000 inhabitants in Brazil. Variables were assessed by questionnaire, anthropometric measurements and blood samples. Blood samples were collected in schools and then analyzed in a single laboratory. Fasting plasma glucose, HbA1c and lipids were evaluated. Prediabetes was defined by glucose levels 100–125 mg/dL or HbA1c 5.7–6.4%. T2DM was defined by self-report (previous diagnosis), glucose  $\geq$  126 mg/dL or HbA1c  $\geq$  6.5% (previously undiagnosed diabetes). Prevalence and 95% confidence intervals (CI) were calculated and multinomial logistic regression was used to estimate the odds ratio (OR) of having prediabetes or T2DM; 33 adolescents with previous diagnosis of type 1 diabetes were excluded from analysis.

**Results:** A total of 37,854 youth were included in this study; prevalence of prediabetes and T2DM were 22.0% (95% CI 20.6–23.4), accounting for 1.46 million adolescents, and 3.2% (95% CI 2.9–3.6), accounting for 213,830 adolescents in the population group of the same ages, respectively. The prevalence of prediabetes by fasting glucose criterion only was 1.8%; prediabetes by HbA1c criterion only, 17.5%; prediabetes by a combination of glucose + HbA1c criteria, 0.9%; previously diagnosed T2DM, 2.9%; and previously undiagnosed T2DM, 0.3%. In the multivariate adjusted model, male sex (OR 1.38, 95% CI 1.03–1.83), obesity (OR 1.59, 95% CI 1.20–2.11) and total cholesterol  $\geq$  150 mg/dL (OR 1.42, 95% CI 1.03–1.97) were associated with T2DM, while older age 16–17 years (OR 0.68, 95% CI 0.47–0.98), having regular breakfast (OR 0.68, 95% CI 0.55–0.83) and studying at rural area schools (OR 0.51, 95% CI 0.36–0.74) were associated with a decreased odds for T2DM.

**Conclusions:** The prevalence of prediabetes and T2DM is high among adolescents, which highlights that T2DM has become a public health challenge even among youth in Brazil. Priority interventions could be focused in boys, with obesity and who live in urban areas.

**Support:** FINEP, CNPq, FIPE-HCPA.

**A339**

**Prevalence of type 2 diabetes and overweight in patients with follicular thyroid cancer of an ambulatory of endocrinology**

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**Background:** During the follow-up of patients with Differentiated Thyroid Cancer (DTC) in our service it was noticed the presence of many cases of overweight and obesity that may be related to the development of Metabolic Syndrome (MS). This is associated to Type 2 Diabetes (DM2), increased cardiovascular risk and arterial hypertension, in addition to the development of other tumors related to overweight.

**Objective:** The present study collected data about the prevalence of obesity, overweight and DM2 in our outpatient series.

**Methods:** The medical charts of 104 patients undergoing follow-up in the CDT outpatient clinic were evaluated, with 92 records used for analysis. Sex, age, Body Mass Index (BMI) and presence of DM2 were observed.

**Results:** Of the 92 subjects, 75 (82%) were female. The results were [mean  $\pm$  SD (median)] age: 55  $\pm$  12 (56.5) years; BMI: 30  $\pm$  6 (29) kg/m<sup>2</sup>; 22 had DM2 (24%); 22 (24%) eutrophic; 39 (42%) obese; 31 (34%) overweight. The diagnosis of DM2 correlated with age (p < 0.05) and BMI compatible with obesity and overweight (p < 0.05).

**Conclusion:** Although the findings are consistent with common knowledge, increasing weight and age raise the frequency of diabetes diagnosis, the high prevalence of diabetes (24%) and overweight (76%) was astonishing. It is extremely important that weight loss and maintenance strategies should be implemented in this medical service, considering the high prevalence of obesity and diabetes in our series. This approach can postpone diabetes diagnosis, improve its control and prevent the appearance of malignant neoplasms related to overweight that compromise the good prognosis of these patients.

**A340****Prevalence of vitamin d deficiency in a group of diabetic patients and associated factors—partial results**

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Similarly to Diabetes Mellitus (DM), hypovitaminosis D has become an epidemic in Brazil, characterized as insufficiency when serum levels are lower than 30 ng/mL. The relationship between insulin secretion and calcium ions modulation in the cytosol justifies the likely association between poor glycemic control and vitamin D deficiency. The presence of 1,25(OH) D favors proinsulin cleavage and subsequent insulin exocytosis, helping the maintenance of glycemic indexes in suitable levels. This study aimed to determine the prevalence of vitamin D deficiency and insufficiency in patients previously diagnosed with DM. This is a case-control study conducted in 69 patients seen at a diabetes outpatient clinic between 2016 and 2018. Those who presented cardiovascular diseases, hemophilia, anemia, gastrointestinal diseases, cancer, thyroid and renal disorders or took multivitamins in the past 6 months were excluded. We used a datasheet containing identification, social-demographic, and clinical epidemiological data, laboratory tests: 25 hydroxy vitamin D, PTH, calcium, phosphorus, blood glucose, Hemoglobin A1c (HbA1c), and screening test for diabetic neuropathy. Collected data were stored and analyzed using SPSS 14.0 software, through Chi square test using a 5% significance level. We found 11.7% of vitamin D deficiency and 40% of vitamin D insufficiency. 90% (n = 54) of patients had T2DM and 10% (n = 6) had T1DM, however, there has not been found a significance level between DM type and hypovitaminosis D (p = 0.389). Regarding glycemic control, we found only 24.2% of ideal blood glucose control, and there has not been found an association with vitamin D deficiency (p = 0.084). We observed that vitamin D deficiency was more prevalent in women than men (56.7% of patients), however, there has not been found a significance level for the association (p = 0.067). We have not found an association with climacteric—57.7% (p = 0.575), systemic arterial hypertension (SAH)—73.3% (p = 1.00), smoking—21.7% (p = 0.754), alcohol consumption—25% (p = 0.756), and peripheral neuropathy—76.3% (0.654). We observed that 66.7% of patients with vitamin D insufficiency presented obesity (p = 0.05). Therefore, we observed high prevalence of vitamin D insufficiency, SAH, climacteric and peripheral neuropathy in patients with DM, and also a relationship between vitamin D deficiency/insufficiency and obesity.

**A341****Prevention and strategies for childhood obesity based on food and nutritional contexts**

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The warning of the salt intake (WORLD HEALTH AND HEALTH ACTION) is a solution for the prevention of human damage, and it is necessary to maintain adequate weight and control fat as advocated by action. It is important that these nutritional care be adopted from childhood and adolescence.

**Objective:** To alert and evaluate the educational level of children with regard to renal impairment, identifying the risk factors as important.

**Method:** A cross-sectional quantitative study based on a thematic campaign in a children's school in Marília-SP, Brazil. A total of 350 children were approached by means of directed anamnesis. They were informed about the context of kidney diseases, and general guidelines on changes in lifestyle. The research had 300 participants that quantified on the dietary profile, self care, creatinine, family history of cardiovascular disease, urine examination and importance of the initiative,

being as answer options affirmation (quantified), negation or annulment (test q2).

**Results:** In the sample, 97% had a habit of eating fast food, 26% ate more than 3 L of water per day, 39% had a habit of eating salad, 90% practiced exercise, 89% do not know what creatinine is, 44% have already had urine test I. 88% have a history of hypertension, diabetes in the family and 34% of kidney disease. 79% of respondents believe that they take care of their health. 98% of children considered an approach as important.

**Conclusions:** Educational and preventive activities related to renal diseases with children are feasible and of great epidemiological significance, because they are feeding with high sodium intake and a greater part unknown of the malfunctions of this conduct. Interventions indicate the adoption of a multidimensional model to incorporate different levels of action, using and integrating resources.

**A342****Prevention of type 2 diabetes mellitus health professionals: how are the risk factors?**

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**Introduction:** The prevalence of obesity is increasing worldwide and the number of cases of type 2 diabetes mellitus (DM2). Health professionals, in general, are exposed to a working environment with high levels of stress, with little time for themselves, and make a few hours of sleep a day, an important risk factor for the development of DM2.

**Objective:** To evaluate the prevalence of risk factors for type 2 diabetes in the professional health of the Hospital Santa Casa de Misericórdia de São Paulo and medical students of the Faculty of Medical Sciences of Santa Casa de São Paulo.

**Methods:** A total of 186 people for body mass index (BMI), as well as a questionnaire for evaluation of sleep, physical activity, smoking, said diagnosis of hypertension (HBP), dyslipidemia (DLP) and DM2. Statistical analysis was used t test for parametric data, and Mann-Whitney test for nonparametric data with the SPSS program version 13.0, p < 0.05 was considered significant.

**Results:** The average age was 32.5 ± 9.2 years, 67% of the female sex. Physical inactivity was evidenced in 47.3% while smoking was seen in 8% of the participants. The average time of sleep was 6.45 h and 53.8% sleep less than 7 h per day. The diagnosis referred to in DM2 was 4.35%, hypertension in 11.5% and DLP in 8.5%. According to BMI, 24.7% of the participants were diagnosed with 29% with obesity and overweight.

**Conclusion:** Although the prevalence of type 2 diabetes that is low compared to Brazilian data, the prevalence of risk factors for type 2 diabetes was high. We note that more than half of the evaluated participants is overweight, and 24.7% already have obesity, an important risk factor for type 2 diabetes. The average sleep time was less than 7 h per day and 53.8% sleep less than recommended, adding another risk factor for type 2 diabetes. The prevalence of smoking was lower than the Brazilian data, possibly a positive result of anti-smoking campaigns. Our results can be used as justification for implementing health promotion programs for health professionals who may be sicker than the patients themselves.

**A343****Profile of diabetic patients attended at the ambulatory of endocrinology in a city of extreme south of Brazil**

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**Introduction:** Worldwide, the number of people with Diabetes is around 422 million. Type 2 Diabetes Mellitus (T2DM) represents a spectrum of heterogeneous patients (over 90% of diabetic population), occurring mainly in adults, however, at present, is commonly found in children and adolescents. Type 1 Diabetes Mellitus (T1DM) represents less than 5% of diabetic people, with major incidence in pre-school children and adolescents. Other types of DM are rare. Individually, DM is an important risk factor for Cardiovascular Disease (CVD), however, the association with Systemic Hypertension (SH). Lipid Disorders (LD), Obesity (OB) and Primary Hypothyroidism (PHT) increase the cardiovascular morbimortality risk.

**Objectives:** To verify the prevalence of DM and associated diseases in patients attended at the ambulatory of endocrinology.

**Methods:** Retrospective study, with review of patient's files, attended at the Ambulatory of Endocrinology, in a 3 month period, from May to July 2017. Associated diseases (AD) are defined as SH, LD, OB and PHT.

**Results:** The analysis of 939 files has shown 693 patients with DM (73% of the total). From the total number of patients with DM, 82.5% were T2DM (age 20–91 years) and 70.1% were female. Association with SH was 74.3%, LD: 41.2%, OB: 25.7% and PHT: 21.1%. From the total patients with DM, T1DM occurred in 7.6%, Latent Autoimmune Diabetes in Adults (LADA): 1.9%, Pre-DM: 7.5%. The frequency of AD amongst T1DM, LADA and Pre-DM were respectively: SH: 9.4, 7.7 and 59.6%; LD: 13.2, 15.4 and 44.2%; OB 5.7, 7.7 and 40.4%; PHT: 7.5, 38.5 and 51.9%.

**Discussion and conclusions:** DM was the most prevalent disease at the Ambulatory of Endocrinology. T2DM patients displayed high association with SH (74.3%) and LD (41.21%), data consistent with WHO Global Reports on Diabetes, 2016. In the Pre-DM group, in addition to the strong association with SH and LD, it was observed a higher percentage of OB (40.4%) and PHT (51.9%). In Brazil, there are few population-based surveys to detect the national prevalence of DM, highlighting the work of Malerbi and Franco, 1992, on the prevalence of DM in nine Brazilian capitals. Our data on LADA, in spite of the small sample, were similar to statistics results of others, worldwide (Isomaar, 1999). SH, LD and OB occurred, in a similar way, in T1DM and LADA, but was less prevalent than in T2DM. Association with PHT has predominated in LADA patients. Our results confirm the relevance of DM as a public health issue, allowing the identification of a range of AD for possible intervention, thus, contributing for national construction of health public policies (Fig. 1).

hospitalizations. In the pediatric age group, CAD is present both in the original presentation of the DM1 and in situations of poor adherence to treatment such as: omission of insulin, food transgression and irregular follow-up.

**Objective:** The main objective of this study is to evaluate the causes of admissions of pediatric patients with DM1 in order to improve the multidisciplinary approach.

**Methods:** Retrospective review of medical records collected through the unit's digital platform. Filtered under 18 with DM1 hospitalized from December 2011 to May 2017, totaling 38 patients.

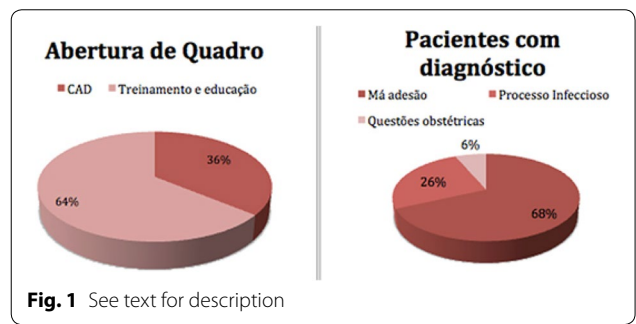
**Results:** There were 72 hospitalizations, 47 (65%) female, with a mean age of 11 years, of which 46 (63%) were older than 10 years. Twenty-five (34%) patients were hospitalized at the time of opening DM1, of which 9 (36%) were with CAD. The other 16 (64%) were for training and education in diabetes. In 9 (36%), infectious processes were identified and in another 2 (8%) the hospitalization occurred after the psychotraumatic episode. In the remaining 47 hospitalizations, 34 (47%) were recurrences, which 19 (55%) were in CAD. Thirteen were patients with the diagnosis of DM1 already, of which 3 in CAD. In these hospitalizations, 32 (68%) occurred due to poor adherence to treatment, including insulin omission, food transgression, absenteeism and treatment withdrawal. In 12 (26%) hospitalizations, the infectious process was present and there were obstetric issues in adolescents in 3 (6%).

**Conclusions:** With this survey, we identified one of the aggravating factors to the therapeutic difficulty: adolescence. Particular attention should be paid to the adolescent patient and we must emphasize the importance of intense family participation and supervision at this stage. The high prevalence of CAD openings leads us to evaluate primary pediatric follow-up as ineffective in identifying the signs and symptoms that predict CAD. This team should be attentive and trained to avoid the incidence of this acute complication. Bad adherence is still the greatest generator of acute complications of DM1 and with this, we must focus our team in the approach in an ambulatory level of preventive ways as well as therapeutics (Fig. 1).

**Tabela 1. Prevalência de doenças associadas na população diabética, 2017. (N= 693)**

DM (tipo)	N	Idade	Mediana (Idade)	Sexo F N	Sexo M N	HAS N	DLP N	OB N	HTP N
DM2	572	20-91	68,5	401	171	425	236	147	121
DM1	53	7-61	42	24	29	5	7	3	4
LADA	13	39-71	42	7	6	1	2	1	5
Pre-DM	52	14-73	53,5	45	7	31	23	21	27
MOD Y	3	18-29	23,5	3	0	1	0	0	0
Total (DM)	693	7-91	46,5	480	213	463	268	172	157

**Fig. 1** See text for description



**A344**

**Profile of internection of pediatric patients with diabetes mellitus type 1 in a reference service in Rio de Janeiro**

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**Correspondence:** Beatriz da Camara Fernandes *Journal of Diabetology & Metabolic Syndrome* 2018, 10(Suppl 1):A344

**Background:** Diabetes Mellitus type 1 (DM1) is a disease that affects more than 542,000 children worldwide, with Brazil being the third largest prevalence. Diabetic Ketoacidosis (CAD), on the other hand, is the most common and acute complication, responsible for recurrent

**A345**

**Profile of overweight individuals metabolically healthy and metabolically unhealthy, by different criteria**

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**Correspondence:** Maíra Schuchter Ferreira *Journal of Diabetology & Metabolic Syndrome* 2018, 10(Suppl 1):A345

**Introduction:** Obesity is an independent risk factor for type II diabetes and metabolic syndrome (MS). Some obese individuals appear to have lower metabolic risk, being known as metabolically healthy obese (MHO). Criteria for identifying such groups are not yet standardized [1, 2].

**Objective:** To characterize overweight adults regarding their metabolic profile using different criteria.

**Methods:** The study was approved by Federal University of Juiz de Fora Ethics Board (no 12345). A cross-sectional study was carried



out to evaluate overweight adults of both genders. In order to characterize the MHOb and metabolically unhealthy obese (MUOb), 3 criteria were used: Homeostasis Model Assessment Index (HOMA) (MHOb:  $\leq 3,10$ ; MUOb:  $> 3,10$ ); (MHOb:  $\leq 2$  components; MUOb:  $\geq 3$  components); Patterns of National Cholesterol Education Program's Adult Treatment Panel III (NCEP/ATPIII) for SM (MHOb: up to 2 components; combination of the HOMA + ATPIII criteria). The lifestyle profile, anthropometric, biochemical and food consumption were compared between MHOb and MUOb groups for each criterion.

**Results:** It was evaluated a total of 63 individuals with a middle age of  $40.1 \pm 12.1$  years, of which 69.8% were female. As for body weight, 36.5% ( $n = 23$ ) were overweight, 31.7% ( $n = 20$ ) obesity grade I, 17.5% ( $n = 11$ ) obesity grade II and 14.3% ( $n = 9$ ) obesity grade III. It was observed that few were smokers (6.3%,  $n = 4$ ) and had daily use of alcoholic beverages (12.7%;  $n = 8$ ), and most (54%) did not practice physical activity. The frequency of MHOb was 73% ( $n = 46$ ) by the HOMA criterion, 49.2% ( $n = 31$ ) by the ATPIII, and 79.4% ( $n = 50$ ) using the HOMA + ATPIII. It was evidenced that the MHOb when compared to the MUOb, practice physical activity for a longer time and have lower values of BWI, glycemia, insulinemia and triglyceridemia, when using the HOMA criterion. Already according to the ATPIII, besides BMI and lower triglyceridemia, the age, waist circumference (WC) and dietary fiber intake were also lower in MHOb. Considering both criteria, were evidenced lower values of BMI, WC, glycemia, insulinemia, triglycerides and serum total cholesterol, as well as higher total lipid intake in the diet in MHOb.

**Conclusion:** The identification of MHOb individuals may vary according to the criterion. In general, considering one or more of the criteria, MHOb exhibit lower BMI and WC, and have fewer biochemical changes. However, these individuals also need nutritional monitoring in order to avoid that these parameters change over time.

#### A346

##### Profile of patients hospitalized by diabetes mellitus in the municipality of Belo Horizonte

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A346**

Diabetes Mellitus (DM) is an important cause of morbidity and mortality, due to the burden of suffering, disability, loss of productivity and premature death that it causes, being one of the main public health problems in Brazil and one of the main chronic diseases affecting the population, especially the elderly. Being a disease of expressive and impactful epidemiology. On average, 23.9% of individuals with diabetes have been hospitalized at least once. Being a group of metabolic diseases characterized by hyperglycemia and associated with complications, dysfunctions and insufficiency of several organs. The study presented hospitalizations and the amounts spent by the municipality of Belo Horizonte from January 2008 to December 2016, to the care of DM patients. The work developed is characterized as a longitudinal study, type of descriptive, explanatory and quantitative research with a qualitative research approach to the DATASUS database of MS, conducted in the city of Belo Horizonte. In addition, the research intends to point out the role of the nursing team in the care of patients with the disease and the importance of assistance's quality. Diabetes Mellitus represents a considerable economic burden for the individual and for society, especially when not well controlled. DM hospitalizations in the city of Belo Horizonte were estimated at 16,093 patients, representing 11.48% of hospitalizations, and 5.85%

of deaths in the state of Minas Gerais due to diabetes, with a total of 299 deaths. With an average stay of 9.1 days. The cost of diabetes amounted to R\$ 21,793,800.13, being spent R\$ 2,421,533.33 per year with the disease. The study points to some recommendations, such as better monitoring of these patients by primary care, and considering that educational programs can halve the number of hospitalizations, and that one of the most emphasized characteristics of nurses during their training concerns their role as educators, due to that, their importance in the patient's education stands out. In addition, investing in the updating of professionals since the severity of the disease course is due to badly conducted actions. It is necessary to advance to the reflection around the subject so that one can realize more and more a better understanding in relation to the diabetic person and the great difficulty to maintain a good control of the glycemic levels.

#### A347

##### Profile of the smoker and ex-smoker patient in relation to the value of the casual glycemia and quantification of the smoke load in diabetics and non-diabetics in the city of Lagarto/SE

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A347**

##### Abstract:

**Background:** Active smoking is the leading single cause of preventable disease and death in the world and may play a role in the pathogenesis of type 2 Diabetes Mellitus. This study aims to calculate the smoking load in diabetics and non-diabetics individuals related to the value of measured blood glucose. This research was approved by the Committee of Ethics in Research CEP/UFS, according to Norms and Guidelines for Research Involving Human Beings—Res CNS 196/96, II.

**Methods:** Observational study, using a questionnaire directed to identify risk factors for type 2 DM and the measurement of random capillary glycemia. The samples were taken at the fair-free of the city of Lagarto/SE, individuals over the age of 18 years. The smoking load was calculated by dividing the amount number of cigarettes consumed daily by twenty and multiplying by the number of years of smoking.

**Results:** Regarding glycemic values, 96 (88%) were below 200 mg/dL, 10 (9%) were above this value and 2 (1%) were not measured. The sample ranged from 78 to 354 mg/dL, with average of 131.29 mg/dL. Among the 108 interviewees, 18 (16%) were active smokers and 18 (16%) were former smokers, and 72 (66%) denied having smoked. When we consider only current smokers, 13 (72%) are males, have mean age of 45.8 years, average glycemia of 125.35 mg/dl and smoking load ranging between 0.05 and 45 years-pack, with average of 12.84 years-pack. The ex-smokers, had similar gender division (50%), present a average age of 51.1 years, average glycemia of 136.27 mg/dl and smoking load ranging from 0.05 to 15 years-pack, with a mean of 81.45 years-pack. When comparing the findings in diabetics and non-diabetics, we found a prevalence of smoking of 50% in diabetics and 35% in non-diabetics. The average age of diabetics and smokers was 58.25 years, the average mean glycemia was 192.75 mg/dl and the mean smoking load was 7.87 years-pack. Among non-diabetics, the mean age was 47.2 years, the average glycemia was 119.15 mg/dl and the smoking load was 11.39 years-pack.

**Conclusion:** Active smoking was 36% with a prevalence of 50% among diabetics. We found higher values of capillary glucose and smoking load in diabetic smokers, compared to smokers who did not have diabetes (Fig. 1).

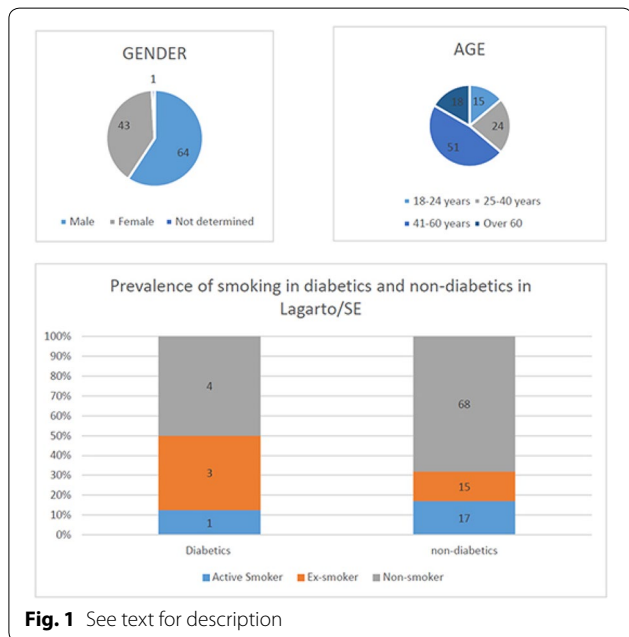


Fig. 1 See text for description

**A348**  
**Proliferative diabetic retinopathy correlates with the presence of microalbuminuria in a sample of type 2 diabetic patients**

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A348**

**Introduction:** The presence of microalbuminuria, triggered by altered vascular permeability, is a clear example of how diabetes affects the renal glomerulus very early. The passage of molecules involved in the inflammatory and atherogenic process supports the observation that microalbuminuria is associated with extrarenal vascular events, such as cardiac and retinal.

**Objectives:** To determine the correlation between the presence of albuminuria and proliferative diabetic retinopathy (RD) in a sample of patients with type 2 diabetes mellitus (DM2).

**Materials and methods:** A cross-sectional study was carried out between June/15 and November/16, and the presence of RD was determined by mapping the retina, classified as: RD absent, nonproliferative, preproliferative and proliferative. The presence of diabetic nephropathy was defined by the excretion of albumin in 24-h urine, classified as normal (< 20 µg/min), micro (20–199 µg/min) and macroalbuminuria (> 200 µg/min).

**Results:** We studied 146 patients, mean age 62.5 years and mean duration of diabetes 12.3 ± 6.6 years. Regarding the presence of RD, it was observed: 48.6% without RD, 21.7% non-proliferative RD, 16.7% pre-proliferative RD and 13% RD proliferative. Among the patients with proliferative ROP, it was found, through the statistical analysis, that they were mostly males (66.7 vs. 45.8%, p < 0.01), older (63.9% ± 6 vs. 58.4 ± 7 years, p < 0.01), with a longer time of diabetes (16.4 ± 4.3 vs. 11.8 ± 3.9, p < 0.01), with worse (P < 0.005) and higher levels of LDL (132 ± 12.7 vs. 88 ± 14, p < 0.01), and glycemic control (HbA1c 11.4 ± 2.3% vs. 9.3 ± 3.7%, p < 0.005), as well as higher levels of albuminuria [163 (11–1645) vs. 11 (5–258) µg/min]. In multiple logistic

regression analysis, proliferative RD was associated with the presence of microalbuminuria [RR = 12.7 (1.4–27), p < 0.05], macroalbuminuria [RR = 6.4 (2.5–18); p < 0.05] and age [RR = 0.88 (0.81–0.95), p < 0.01]. When glycemia and lipid levels were excluded from the regression model, only microalbuminuria remained associated with proliferative RD [RR = 7.6 (1.1–17.5), p = 0.04], while macroalbuminuria was associated with the time of duration of DM2 (r = 0.64, p = 0.003) and uncontrolled hypertension (r = 0.61, p < 0.01).

**Conclusion:** The results obtained in this study reiterate the main risk factors associated with RD and indicate the need for a rigorous and systematic approach to RD in those in which microalbuminuria is present. **ACKNOWLEDGMENTS:** No funding was obtained from pharmaceutical companies to carry out this study. All authors were involved in the data collection and analysis (Fig. 1).

**Disclosure:** The authors declare no conflict of interest.

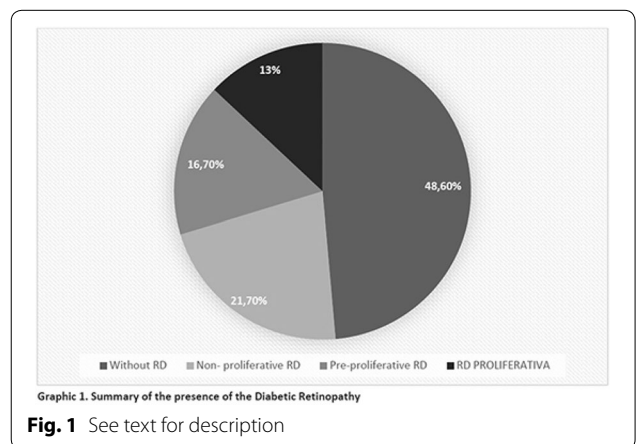


Fig. 1 See text for description

**A349**  
**Proportion and factors associated with diabetic neuropathy in patients attended in a unit in north of Brazil**

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A349**

**Introduction:** Diabetes mellitus (DM) is a prevalent chronic disease, if not monitored properly it can cause numerous complications. Diabetic peripheral neuropathy is the most common, but it is often or not diagnosed early nor is diagnosed. The DM can cause deformity in the feet and predisposes to ulcers, which can cause diabetic foot with high risk for amputation. DM is the cause of 70% of limb amputations, which could be prevented with the early diagnosis of diabetic peripheral neuropathy. It is suggested to evaluate the degree of neuropathy in diabetics by means of scores, to homogenize the diagnosis, to quantify the prevalence and to promote preventive measures.

**Objective:** To identify factors related to the development of ulcers in lower limbs and the proportion of diabetic neuropathy (ND) through a score in users attended at a Basic Health Unit (BHU) in Northern Brazil.

**Methods:** It was carried out an interview and data collection of diabetic patients attended at a UBS, for punctuation and qualification in the "Score of Neuropathic Symptoms", validated in the Portuguese language for evaluation of Diabetic Peripheral Neuropathy.

**Results:** The age group was  $56.3 \pm 11.3$  years; 44.4% were female and 55.5% were male; 88.8% living in urban areas and 11.1% in rural areas (Table 1). The study was approved by the Ethics and Research Committee (Comitê de Ética e Pesquisa) (CEP) from UNIFAP, with Postal Code/CEP number: 45141315.9.0000.0003 Table 1—Profile of the research participants Table 2—Factors associated with the development of ulcers in lower limbs Diabetic peripheral neuropathy was found in almost all patients, and in 11.1%, there were no symptoms for ND, 22.2% had mild ND, 55.5% had moderate ND and 11.1% had severe ND (Table 3). Table 3—Result of “Neuropathic symptom score”

**Conclusion:** After evaluation of the data, it is verified that DM and associated SAH increases and/or predispose patients to the risk of developing ulcers in the lower limbs, making it difficult to heal due to lack of oxygenation in the limb, but metabolic control may present acute changes that interfere in the evaluation of ND. Thus, it is indicated the improvement of glycemic levels before a definitive diagnosis (Fig. 1).

SOCIOECONOMIC CHARACTERISTICS	
Age group	56,3 ± 11,3 years
Sex	Female: 44,4% / Male: 55,5%
Residence	urban area: 88,8% / rural area: 11,1%
Factors related to the development of lower limb ulcers: 100% have the diagnosis for DM, 66.6% have Systemic Arterial Hypertension (SAH) and 33.3% sedentariness; of the 33.3% have associated DM + SAH + sedentariness, 44.4% have DM + SAH and 22.2% have only DM (Table 2).	
Table 2 - Factors associated with the development of ulcers in lower limbs	
ASSOCIATED COMORBITIES	%
DM	100%
SAH	66,6%
Sedentariness	33,3%
Only DM	22,2%
DM + SAH	22,2%
DM + SAH + Sedentariness	33,3%
Diabetic peripheral neuropathy was found in almost all patients, and in 11.1%, there were no symptoms for ND, 22.2% had mild ND, 55.5% had moderate ND and 11.1% had severe ND (Table 3).	
Table 3 - Result of "Neuropathic symptom score"	
"SCORE OF NEUROPATHIC SYMPTOMS"	%
They did not present symptoms for ND	11,1%
Mild ND	22,2%
moderate ND	55,5%
severe ND	11,1%

**Fig. 1** See text for description

### A350

#### Questionnaires of self-care and knowledge about diabetes as an evaluation tool of patients treated in primary health care unit in the city of Americana

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A350**

**Introduction:** In collective health, education and communication are increasingly required domains at different levels of practice, with special relevance in primary health care, the importance of health promotion and disease prevention. There is a growing effort to value and recognize the individual's experience and their conceptions around diabetes to better approximate and understand the richness and

subtleties of the issues involved in the self-care and self-control of the diabetic patient.

**Objective:** To discuss the results obtained in the application of the Questionnaires: Diabetes Self-care Activities (QAD), Diabetes Knowledge Scale (DKN-A) and Diabetes Attitudes (ATT-19) in Primary Health Care unit of the city of Americana.

**Methods:** This was a cross-sectional study, in which 27 diabetic patients (18 women and 9 men) from a Primary Health Care Unit of the city of Americana (SP) answered the QAD and DKN-A and ATT-19 questionnaires, respectively, self-care, knowledge about diabetes and satisfaction with the disease. The data were evaluated through descriptive analysis.

**Results:** In the QAD, 40% of the patients responded that they adhere to the diet at least 5 days of the week; 40% have physical activity at least 3x/week; 66% take their prescribed medications regularly and 51% examine their feet daily. In the questionnaire about knowledge about diabetes, 74% had scores lower than 8, which means poor knowledge about the disease. ATT-19 revealed that 92% of patients are unhappy living with the disease.

**Conclusion:** Being a carrier of a chronic disease, for most people, generates dissatisfaction and profoundly modifies the life of each one of them. In addition, despite advances in the drug treatment of Diabetes Mellitus, there is still great misinformation about the disease and its complications, especially in the low-income population and self-care practices are still unsatisfactory. Therefore, self-care practices should be encouraged because they are an essential part of diabetes care and allow the person with diabetes to take control of their illness and manage their daily lives.

**Ethics approval:** The study was approved by Faculdade de Ciências Médicas e da Saúde FCMS-PUC/SP's Ethics Board, approval number 67110917.7.0000.5373.

**Consent to publish:** Informed consent to publish has been obtained from these patients.

### A351

#### Questionnaires on diabetes mellitus validated to Brazilian Portuguese: a systematic review

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**Introduction:** Questionnaires and scales may be simple and useful tools to evaluate different aspects related to diabetes and its complications.

**Objective:** To identify and describe questionnaires on diabetes cross-culturally adapted and validated to Brazilian Portuguese.

**Methods:** Two researchers conducted independent searches at five different electronic databases: PubMed/MEDLINE, Embase, SciELO, LiLACS and Web of Science. Manual search in annals of national conferences was also conducted. We selected studies with methodology of cross-cultural adaptation and validation for patients with any diabetes type at any age in Brazil. After the full-text articles reading, the data related to psychometric characteristics identified in each validation study [Cronbach's alpha (Ca)] were extracted. A third researcher solved discrepancies between the two researchers.

**Results:** In the initial electronic databases search, 2159 articles were identified, of which 128 were excluded based on duplicates; 2031 articles were then analyzed by title/abstract, of which 41 were selected for full-text reading. Twenty-three studies, and two additional abstracts identified through manual search, were included in this systematic review, finalizing a sample of 25 studies containing a total of 27 instruments. The kappa statistic used to test interrater reliability was 0.84. The included instruments addressed topics related to adherence to treatment [n = 6, Ca = 0.71–0.79 for type 1 diabetes (T1D) and Ca = 0.63–0.84 for type 2 diabetes (T2D)], quality of life (n = 6, Ca = 0.70–0.94 for T1D and Ca = 0.70–0.94 for T2D), diabetes

knowledge (n = 3, Ca = 0.75–0.91 for T2D and Ca = 0.81 for health providers), hypoglycemia (n = 3, Ca = 0.73–0.84 for T1D), self-efficacy (n = 3, αC = unavailable for T1D and Ca = 0.63–0.78 for T2D), satisfaction with pharmaceutical services (n = 1, Ca unavailable, T2D), emotional stress (n = 1, Ca unavailable, T2D), hope (n = 1, Ca = 0.83 for T2D), diabetes attitude (n = 1, Ca = 0.91 for T2D), perception of disease severity (n = 1, Ca = 0.66 for T1D and T2D) and risk of developing diabetes (n = 1, Ca unavailable, T2D).

**Conclusion:** This study assembles the questionnaires for patients with diabetes validated to Brazilian Portuguese, which may facilitate the selection of the most appropriate instrument for each interest domain in future research and clinical setting.

**Support:** FIPE-HCPA, UFRGS.

**A352**

**Rapid regression of eruptive xanthomas and improvement of lipid levels in patient with diabetic dyslipidemia**

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54 year old patient, male, previously hipertensive, asymptomatic, sought out an outpatient Dermatology clinic in March 2017 with a complaint of skin lesions for 5 months. At the dermatological clinical examination, papular, yellowish erythematous lesions were found in the trunk and extensor region of the upper and lower limbs without pruritus or pain (Fig. 1), with diagnostic hypotesis of eruptive xanthomas. Laboratory tests were requested, and a result of triglycerides (TG) of more than 5000 mg/dl was obtained; then the patient was referred to Endocrinology, when type 2 diabetes mellitus (DM2) was diagnosed and were initiated fenofibrate 200 mg, rosuvastatin 10 mg and metformin 500 mg twice daily, as well as guidelines dietary habits were made. Only 16 days after drug and dietary introduction, there was an impressive reduction in TG levels to 622 mg/dl, with HDL-C of 21 mg/dl. Clinical and laboratory follow-up showed normalization of cholesterol, triglyceride, and glucose levels (Table 1) in only 2 months, as well as disappearance of all skin lesions. One of the complications of DM2 is dyslipidemia, with a more common lipid profile of hypertriglyceridemia and reduction of HDL-C, which could be observed in this patient. The ACCORD (Action to Control Cardiovascular Risk in Diabetes) study, which tested the hypothesis of additional cardiovascular benefit from the use of fenofibrate in combination with simvastatin, showed that there was a tendency to benefit in the subgroup of patients with diabetic dyslipidemia, in whom the primary outcomes were reduced by about 30% in the fenofibrate group compared to placebo [1]. The greater need to decrease TG levels in these patients is, however, due to the reduction of the risk of pancreatitis, and especially in patients with TG above 500 mg/dl, the Brazilian Society of Diabetes (SBD) recommends the association of fbrate-statins for this purpose [2]. This case shows a favorable evolution in a short interval of treatment, with results that, if maintained, will reflect in reduction of cardiovascular risk, as well as the toxic effects of dyslipidemia on the pancreatic beta cells of this patient [3]. Outpatient follow-up is

important for monitoring the development of DM2 complications, as well as preventing the progression of those already existing (Fig. 1).

**Table 1:** laboratory follow-up

Laboratory examination	2017/04/04	2017/04/20	2017/06/14
Total cholesterol	*	299,1 mg/dl	93,1 mg/dl
Triglycerides	>5000 mg/dl	622 mg/dl	174 mg/dl
HDL-cholesterol	*	21 mg/dl	29 mg/dl
LDL-cholesterol	*	-	29,3 mg/dl
Non-HDL cholesterol	*	278,1 mg/dl	64,1 mg/dl
Fasting plasma glucose	-	138,9 mg/dl	101,2 mg/dl

\*Examinations canceled due to severe hipertriglyceridemia.

**Figure 1:** Papular yellowish lesions on upper and lower limbs, before treatment begins.



\*Informed consent to publish has been obtained from this patient.

**Fig. 1** See text for description

**A353**

**Rare case of tumor producer of IGF-II causing hypoglycemia in patient with meningeal hemangiopericytoma**

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**Case presentation:** EGS, female, 71 yo, housewife, was referred to urgent care in March 2014 with a history of episodes of mental confusion, time-space disorientation and anterograde amnesia in the last year, associated with hypoglycemia, being treated in the basic health system with glycoside solution. Six days before admission, there was worsening of the symptoms, which have become refractory. She reported frequent postprandial nausea and vomiting and weight loss of 17 kg in 1 year. She denied use of antidiabetics oral drugs or insulin. At admission, hypoglycemia was confirmed. In the background, she was followed up in oncology clinic for meningeal hemangiopericytoma diagnosed in 1992, already with bone, liver and pelvic metastases, under treatment with palliative chemotherapy, morphine, dipyrone and ondansetron. She denied history of diabetes mellitus, but she had 2 siblings with diabetes mellitus. Laboratory tests are described in Table 1. Treatment with fractional diet and prednisone 20 mg per day, increased up to 40 mg per day, with improvement in hypoglycemia in outpatient follow-up. In November of 2015 presented with heart failure, necessitating hospitalization with renal complications and death.

**Discussion:** Hypoglycemia is a common clinical event in people with diabetes mellitus, but very uncommon on non-diabetic. After rigorous anamnesis, hepatic, renal and adrenal insufficiencies and the use of drugs potentially causing hypoglycemia should be excluded. In this patient, the initial exams excluded organ dysfunctions and the critical sample tests confirmed hypoinsulinemic hypoglycemia. Because of the oncologic disease, a non-pancreatic tumor with IGF-II acting as the cause of hypoglycemia was suspected. The dosage of this hormone in the same initial critical sample revealed a very high value (Table 2). IGF-II causes insulin-induced hypoglycemia, decreasing hepatic glucose production and increasing its uptake in the skeletal muscle and also inhibiting secretion of counter regulatory hormones such as glucagon and GH, making the individual even more vulnerable. Final comment: Para neoplastic syndrome is one of the rarer causes and graves of hypoglycemia. In cases of hypoinsulinemic hypoglycemia, suspicion of the action of IGF-II may develop, especially in patients with cancer disease. Informed consent to publish had been obtained from the patient (Fig. 1).

**Table 1.** Laboratory tests results requested during etiological investigation of hypoglycemia in elderly female patient

	result	Normal range
Glicemia sérica (mg/dl)	38	
Insulin (mU/L)	< 2,0	2,1-22
Pro-insulin (pmol/L)	< 7,5	Até18,8
C-Peptide (ng/ml)	0,24	1,1-4,4
IGF-II (ng/ml)	1074	288-736
IGF-I (ng/ml)	< 25	64-188
GH (ng/ml)	0,3	

**Table 2.** Comparison of expected results in cases of non-pancreatic tumor producing IGF and values found during patient investigation

	Insulin (mU/L)	Pro-insulin (pmol/L)	C-peptide (ng/mL)	IGF-II (ng/mL)	IGF-I (ng/mL)	Ratio IGFII/I
Expected results	< 3	< 5	< 0,6	> 275	<100	> 10:1
Patient	< 2,0	< 7,5	0,24	1074	< 25	42,96

**Fig. 1** See text for description

**A354**

**Real world efficacy and safety of insulin degludec in Brazilian children and adolescents with type 1 diabetes**

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**Background:** Management of type 1 diabetes (T1D) is challenging, especially in children and adolescents. However, good glycaemic

control can prevent long term complications. Insulin degludec (IDeg) is a basal insulin with improved PK/PD profile compared to others basal insulins, a long half-life of ~ 25 h and a flat and stable blood glucose lowering effect. IDeg also allows flexible dose administration. Insulin degludec is approved for use in in children from 1 year old in Brazil.

**Aims:** The diabetes team at endocrinology office performed a clinical follow up of T1D patients < 18 years switching from IDet, IGLar U100, NPH or continuous subcutaneous insulin infusion (CSII) to IDeg to evaluate its clinical performance, using medical interview and available measures.

**Methods:** Retrospective, open-label, single-arm, observational, clinical follow-up of T1D patients < 18 years who switched to insulin degludec according to the following indications: currently administrating basal insulin twice daily, not acceptable HbA1c, repeated hypoglycaemic events and/or unstable glucose or difficult with fixed time administration, in conjunct with professional judgment and patient/parents' wishes. Information about HbA1c, insulin dose, weight and frequency of hypoglycaemia (self-reported by patients/parents) were collected in every consultant.

**Results:** In March 2017, data were available on nine T1D patients (5 males), with median age of 12.67 (± 3.61) years. Median duration of diabetes was 4.94 (± 3.23) years. Mean time to follow up was 6 months. One patient was using insulin glargine U100, six insulin detemir, one NPH and one CSII (glulisine). All patients were using basal insulin twice daily. Main reasons for switch were nocturnal hypoglycaemia (4/9) and unstable glucose (4/9). Median HbA1c was 8.17% (± 0.80) before switch and 7.52% (± 0.70) at 6 months after switch. Median basal insulin dose was 30.23 U (± 13.11)/0.61 U/kg (± 0.16) before switch and 26 U (± 12.26)/0.51 U/kg (± 0.20). Body weight was 47.77 kg (± 14.35) at baseline and 49.63 (± 13.28) kg. Nocturnal hypoglycaemia reduced, according to patients and parents reports during the consultant. No others adverse events were reported. Limitations: this is a non-randomized, observational follow-up study. Hypoglycaemia was not accessed by questionnaire, only by reports. However, to our knowledge, it is the first real world data in Brazilian children and adolescents using IDeg.

**Conclusion:** IDeg was effective and safe in the studied population.

**A355**

**Reduced hypoglycemia and comparable efficacy with insulin glargine 300 U/ml (GLA-300) vs. insulin glargine 100 U/ml (GLA-100) in subjects with T2D achieving different levels of prebreakfast smpg**

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This post hoc analysis of a patient population previously treated with basal insulin (EDITION 2), investigated the clinical outcomes according to pre-breakfast SMPG level achievement (protocol defined [SMPG < 100 mg/dL] or ADA recommendation [< 130 mg/dL]). 403 Gla-300-treated and 405 Gla-100-treated subjects were analyzed; mean age 57 and 58 years, 46 and 45% male, baseline A1c 8.3 and 8.2%, FPG 147 and 141 mg/dL, respectively. Achievement of pre-breakfast SMPG, A1c change, proportion of subjects reaching A1c < 7.0%, and hypoglycemia rates were assessed at 6 months. Comparable proportions of Gla-300 and Gla-100-treated subjects reached both SMPG levels, with greater A1c reduction in those reaching SMPG levels in both treatment groups (Table). Across all hypoglycemia definitions, event rates were generally lower in Gla-300-treated subjects reaching SMPG < 130 mg/dL and those not reaching SMPG < 100 or < 130 mg/dL; event rates for any nocturnal hypoglycemia were significantly lower in Gla-300-treated subjects regardless of SMPG level achievement (Table). There were no differences in severe hypoglycemia rates. Irrespective of pre-breakfast SMPG level achievement, comparable efficacy and less hypoglycemia were observed with Gla-300 versus Gla-100 in this T2D

**Table 1.** Glycemic Control and Hypoglycemia in Subjects Reaching and Not Reaching Pre-breakfast SMPG Levels.

	Gla-300 (n = 403)	Gla-100 (n = 405)	P value
<b>Pre-breakfast SMPG &lt; 100 mg/dL</b>			
Number of subjects, n (%)	113 (28)	138 (34)	0.07
A1c change from baseline, %	-1.0 (0.10)	-0.9 (0.08)	0.39 <sup>a</sup>
A1c < 7.0%, n (%)	48 (42.5)	54 (39.1)	0.70 <sup>b</sup>
Overall hypoglycemia <sup>c</sup> , events/patient-year	20.1	22.0	0.02 <sup>d</sup>
Any nocturnal hypoglycemia <sup>e</sup> , events/patient-year	2.7	4.6	< 0.05 <sup>d</sup>
Documented symptomatic hypoglycemia <sup>f</sup> , events/patient-year	9.5	8.4	0.03 <sup>d</sup>
Documented symptomatic nocturnal hypoglycemia <sup>g</sup> , events/patient-year	1.9	2.4	0.09
<b>Pre-breakfast SMPG ≥ 100 mg/dL</b>			
Number of subjects, n (%)	290 (72)	267 (66)	0.07
A1c change from baseline, %	-0.6 (0.06)	-0.5 (0.05)	0.46 <sup>a</sup>
A1c < 7.0%, n (%)	70 (24.1)	65 (24.3)	1.00 <sup>b</sup>
Overall hypoglycemia, events/patient-year	12.0	17.4	< 0.05 <sup>d</sup>
Any nocturnal hypoglycemia <sup>e</sup> , events/patient-year	1.7	3.6	< 0.05 <sup>d</sup>
Documented symptomatic hypoglycemia <sup>f</sup> , events/patient-year	5.7	8.0	< 0.05 <sup>d</sup>
Documented symptomatic nocturnal hypoglycemia <sup>g</sup> , events/patient-year	1.0	2.3	< 0.05 <sup>d</sup>
<b>Pre-breakfast SMPG &lt; 130 mg/dL</b>			
Number of subjects, n (%)	297 (74)	320 (79)	0.08
A1c change from baseline, %	-0.9 (0.06)	-0.8 (0.05)	0.18 <sup>a</sup>
A1c < 7.0%, n (%)	108 (36.4)	107 (33.4)	0.55 <sup>b</sup>
Overall hypoglycemia, events/patient-year	15.4	19.9	< 0.05 <sup>d</sup>
Any nocturnal hypoglycemia <sup>e</sup> , events/patient-year	2.2	4.1	< 0.05 <sup>d</sup>
Documented symptomatic hypoglycemia <sup>f</sup> , events/patient-year	7.0	8.1	< 0.05 <sup>d</sup>
Documented symptomatic nocturnal hypoglycemia <sup>g</sup> , events/patient-year	1.4	2.2	< 0.05 <sup>d</sup>
<b>Pre-breakfast SMPG ≥ 130 mg/dL</b>			
Number of subjects, n (%)	106 (26)	85 (21)	0.08
A1c change from baseline, %	-0.3 (0.12)	-0.3 (0.10)	0.90 <sup>a</sup>
A1c < 7.0%, n (%)	10 (9.4)	12 (4.1)	0.50 <sup>b</sup>
Overall hypoglycemia, events/patient-year	11.3	15.3	< 0.05 <sup>d</sup>
Any nocturnal hypoglycemia <sup>e</sup> , events/patient-year	1.2	3.5	< 0.05 <sup>d</sup>
Documented symptomatic hypoglycemia <sup>f</sup> , events/patient-year	5.9	8.3	< 0.05 <sup>d</sup>
Documented symptomatic nocturnal hypoglycemia <sup>g</sup> , events/patient-year	0.9	2.6	< 0.05 <sup>d</sup>

Data represent mean (standard error) unless specified otherwise. Efficacy data based on mITT population, hypoglycemia data based on safety population. P values from <sup>a</sup>one-way ANOVA, <sup>b</sup>Fisher exact test, <sup>c</sup>Poisson modelling. <sup>d</sup>Overall hypoglycemia was any hypoglycemia event recorded; <sup>e</sup>Hypoglycemia occurring between 00:00 and 05:59; <sup>f</sup> Documented symptomatic hypoglycemia ≤70 mg/dL at any time of day; <sup>g</sup> Documented symptomatic hypoglycemia ≤70 mg/dL occurring between 00:00 and 05:59.

**Fig. 1** See text for description

population. Study code: NCT01499095. This is an ENCORE abstract previously presented at ADA2016. Funding and editorial support provided by Sanofi (Fig. 1).

**A356**

**Reduction of intestinal GIP gene expression after roux-en-y gastric bypass (RYGB) is not associated type 2 with diabetes mellitus improvement (T2DM)**

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**Background:** GIP is an incretin hormone produced by k cells of the duodenum under the presence of glucose and fat in the intestinal lumen and its main function is to stimulate the release of postprandial insulin. In humans, plasma GIP concentrations increase after food intake.

**Objectives:** To correlate the intestinal expression of the GIP gene and its plasma levels with markers of glycemic homeostasis in obese patients with or without complete remission of T2DM after 3 months of RYGB.

**Methods:** Intestinal biopsies were acquired through double balloon enteroscopy in 20 obese women with T2DM before and 3 months after RYGB, and submitted to transcriptomic analysis by microarray technique and RT-qPCR. GIP and markers of glycemic homeostasis were measured in blood, collected in the fasted state and after a standard liquid diet feeding test. After 1 year of RYGB, patients were classified as responsive (R) and nonresponsive (NR) to total remission of T2DM.

Statistical analysis was performed by: non-parametric tests, area under the curve (AUC) was calculated by trapezoidal rule, correlation analyzes were done by Spearman correlation and association between R and NR groups by Mann-Whitney exact test.

**Results:** After 3 months of RYGB, the fasting plasma concentrations of glucose, insulin, glucagon, HbA1c and peptide C were reduced (p < 0.05). Of the 20 patients studied, 12 were classified as R. The gene that transcribes GIP significantly altered its expression in two of the three intestinal segments evaluated (Table 1). In agreement with the reduction of the GIP gene expression, their plasma concentrations decreased (p < 0.05) after 3 months of RYGB in all the evaluated periods of the feeding test (Fig. 1). The postoperative plasma AUC of GIP decreased (111452.86 vs. 82,406.77, p = 0.004) in relation to the pre-operative period; however, the analysis between groups showed that the decrease in GIP was similar between R and NR (p > 0.05). No significant correlations were found between plasma concentrations of reduced GIP and markers of glycemic homeostasis.

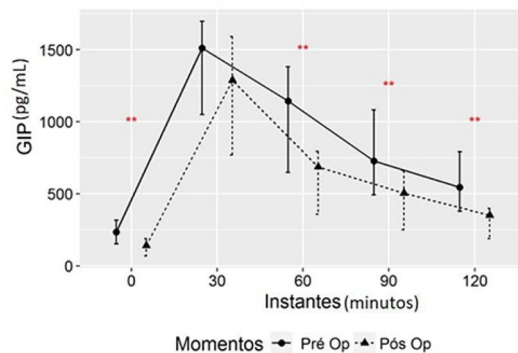
**Conclusion:** Our data suggest that the reduction of GIP gene expression and the reduction of its plasma concentration has no correlation with the response to improvement of T2DM after RYGB (Fig. 1).

**Table 1.** Global (microarray) and target (RT-qPCR) expression of genes that transcribe hormones involved in glycemic homeostasis in intestinal tissues

Gene	Transcript	Analysis	Duodenum	Jejunum	Ileum
GIP	GIP	Global	-0,2501	-0,2318	-0,2212
		Target	<b>-0,6366</b>	<b>-1,3889</b>	<b>-0,5469</b>

Legend: Bold = (p < 0.05); (pre vs. postoperative).

**Figure 1.** Plasma levels of GIP in response to the pre and post 3 months feeding test of DGYR.



Legend: \*\*significant difference compared to the preoperative value (p 0.05)

**Fig. 1** See text for description

**A357**

**Rehabilitation technology for dm care: development and validation of a software that personalizes the progress of exercises for foot and ankle**

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**Introduction:** ADA recommends the development of technology-based interventions that allies the promotion and prevention of the

DM and its complications. Since such tools may be more effective than usual care because they promote motivation and adherence to treatment, a specific tool could be beneficial for persons with diabetic polyneuropathy. This condition requires a continuous care and changes in lifestyle in order to maintain the health of the feet and avoid late comorbidities. Specific exercises for feet and ankles are effective in promoting the function and balance and can be facilitated by a software developed for this purpose.

**Aim:** Elaborate and develop a software for persons with DM that personalizes the progression of an exercise routine, designed to improve mobility and strength of foot and ankle.

**Methods:** A Diabetic Foot Guidance Software (SOPED) was created in its web and software versions in the HTML, Javascript and PHP languages, that can be used in desktop and/or mobile (Android or IOS). The selection and progression of the exercises are based on gamification principles to stimulate the adherence and motivation.

**Results:** The software has three characteristics: (a) recommendations for foot care and information about diabetes; (b) self-evaluation of the feet according to the main occurrences of diabetes (calluses, cracks, deformities, tissue lesions), in which a corresponding marker can be positioned on 5 standard foot images (lateral, medial, posterior, plantar and dorsal incidences); and c) exercises for feet and ankles: muscle strengthening, gain of range of motion and improvement of functionality. Each exercise is defined as an average of 8 levels of progressive difficulty, which differs in the number of sets and repetitions, body positions and materials used. The individual progression is based on an algorithm that adjusts the volume of the training from the evaluation of effort perceived by the patient through a visual scale. You can keep, progress, or return at the exercise level. Patients are explicitly informed of risk situations that may indicate infection, ulceration and injury, and are advised to seek medical attention.

**Conclusion:** SOPED can be recommended by health professionals to facilitate self-monitoring and self-care. It helps the patient to be independent in treatment, and has the main benefit of progressing according to the possibilities of the patient himself, which is a situation closer to a supervised therapy.

### A358

#### Related aspects to insulinotherapy in a care line in diabetes mellitus in Fortaleza-Ceará

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**Introduction:** Insulin therapy for the treatment of diabetes mellitus (DM) demands a series of attributes for its correct execution.

**Objectives:** To evaluate the related aspects to the insulinotherapy practice.

**Methods:** Descriptive, quantitative study, conducted from march to July 2017 in a Diabetes Care Line (DCL) in Fortaleza-Ceará. Data were collected from nursing protocols related to insulinotherapy and its related aspects, according to the recommendations of the Diabetes Brazilian Society. The study was approved by the Institution's Ethics and Research Committee Nº. 1.956.803 e CAAE: 64549817.0.0000.5045.

**Results:** Among the 66 patients followed up, 92.4% (61) had DM type 2, 4.5% (3) DM type 1 and 3.1% (2) maturity onset diabetes of the young (MODY). Among patients who used insulin, 42.4% (28) performed self-administration, while 57.6% (38) depended on third parties for administration. The adequacy of packaging was observed in 51.5% (34), transport in 50% (33) and compliance use with the expiration date after the opening bottle (34). Hand hygiene was performed in 56.1% (37) and insulin bottles asepsis with 70% alcohol in 39.4% (26). Appropriately homogenization of NPH insulin bottles was performed in 45.4% (30) and the order of aspiration of insulins in 42.4% (28). Correct dose graduation was performed in 50% (33) and angulation according to needle size in 39.4% (26). Needle withdrawal time was respected in 43.9% (29). From the ones that used insulin pens, the needle's flow was correctly checked in Application sites were adequate in 47.0% (31), 40.9% (27) were rotating and 56.1% (37) reused syringes/needles. Lipohypertrophy was found in 4.5% (3). The disposal waste was correct in

**Conclusion:** Although the patients were followed up at a DM specialized referral service in Ceará, important errors were evidenced in related aspects to insulinotherapy. Such misconceptions compromise glycemic control and contribute to the unsatisfactory disease progression. Thus, it is necessary to intensify the systematic patient's follow-up with nursing team to improve these practices (Figs. 1, 2)

	n	%
<b>INSULINS TYPES</b>		
Human	57	86,4
Analogues	9	13,6
<b>WHO MAKES THE APPLICATION?</b>		
Patient	28	42,4
Relatives	38	57,6
<b>CORRECT PACKAGING</b>		
3rd refrigerator shelf	34	51,5
Do not know to inform	9	13,6
Refrigerator door	4	6,1
Freezer	2	3,0
Room temperature	1	1,5
<b>CORRECT TRANSPORT</b>		
Styrofoam	33	50,0
Do not know to inform	12	18,2
Room temperature	5	7,6
<b>VALIDITY AFTER OPENED BOTTLE</b>		
Yes	34	51,5
Do not know to inform	10	15,2
No	6	9,1
<b>HAND CLEANING</b>		
Yes	37	56,1
Do not know to inform	11	16,7
No	2	3,0
<b>BOTTLES CLEANING</b>		
Yes	26	39,4
Do not know to inform	11	16,7
No	13	19,7

**Fig. 1** See text for description

<b>NPH HOMOGENIZATION</b>		
Yes	30	45,4
Do not know to inform	12	18,2
Not applicable - use of analogues	3	4,5
<b>ASPIRATION ORDER OF HUMAN INSULINS</b>		
Yes	28	42,4
No	3	4,5
<b>GRADUATION DOSE</b>		
Yes	33	50,0
Do not know to inform	14	21,2
No	3	4,5
<b>ADEQUATE NEEDLE ANGULATION ON SIZE</b>		
Yes	26	39,4
Do not know to inform	15	22,7
No	9	13,6
<b>NEEDLE REMOVAL TIME</b>		
Yes	29	43,9
Do not know to inform	12	18,2
No	9	13,6
<b>FLOW CHECK (IF PEN)</b>		
Not applicable - use of bottles	47	71,2
Yes	3	4,5
<b>PROPER APPLICATION'S SITES</b>		
Yes	31	47,0
No	19	28,8
<b>ROTATING SITES REALIZATION</b>		
Yes	27	40,9
No	23	34,9
<b>NEEDLES / SYRINGES REUSE</b>		
Yes	37	56,1
No	13	19,7
<b>CORRECT DISPOSAL WASTE</b>		
Yes	27	40,9
Do not know to inform	13	19,7
No	10	15,1

Fig. 2 See text for description

**A359**

**Relation of levels of capillary blood glucose on the decrease of recovery blood pressure of type 2 diabetic patients submitted to the ergometric test**

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**Introduction:** In patients with T2DM, the prevalence for cardiovascular disease is increased two to four times when compared to the

general population. It may be related by the constant exposure to hyperglycemic states resulting from poor glycemic control, causing damage to target tissues and organs, such as the myocardium.

**Objective:** To verify the relation of the capillary blood glucose levels on the decrease of the recovery arterial pressure in type 2 diabetic patients, submitted to the ergometric test.

**Methods:** Experimental study with a sample composed of 67 individuals of both sexes, who were divided into four groups: Diabetic Group with Capillary blood glucose < 100 mg/dL (GD < 100) n = 12, Group of Diabetics with Capillary blood glucose 100 (GD > 200) n = 19 and Control Group (GC) n = 12, constituted by non-diabetic patients.

**Results:** Diabetics presented a percentage of 76.1% for hypertension and disease diagnosis time 10.0 ± 2 years. The GD group > 200 mmHg showed an attenuated decrease in systolic and diastolic blood pressure in relation to the other groups.

**Conclusion:** The results showed for this sample that high glycemic levels may be related to BP attenuation during all stages of the exercise test. Thus an effective recovery phase should be performed at the time of effort to minimize any type of clinical intercurrent provided by post-effort hemodynamic slowing

**A360**

**Relations between asymmetrical dimethylarginine levels and both cardiovascular risk factors and outcomes and type 2 diabetes development in hypertensive patients**

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**Background:** Asymmetric dimethylarginine (ADMA), which is the main endogenous inhibitor of nitric oxide synthase, plays a critical role in the process of endothelial dysfunction. We evaluated the association between high plasma ADMA levels in hypertensive patients and the presence of cardiovascular risk factors, the development of type 2 diabetes mellitus (DM) and the development of cardiovascular outcomes, including death.

**Methods and results:** We evaluated 191 hypertensive subjects who were stratified into 2 groups according to the median value of basal ADMA: those with high levels of plasma ADMA (> 0.55 µmol/L) and low levels of plasma ADMA (≤ 0.55 µmol/L) who were prospectively evaluated over 5.8 years. High ADMA levels were seen in subjects with higher weight, body mass index (BMI), waist circumference, triglycerides, uric acid, and high-sensitivity C-reactive protein (hs-CRP), and lower levels of HDL-cholesterol and in type 2 diabetic patients. There was an association between high plasma ADMA levels and the occurrence of cardiovascular death. In a subgroup of hypertensive subjects free from metabolic syndrome (MS) and DM at baseline, there was an association between high ADMA levels and the development of type 2 DM.

**Conclusions:** Our study confirms the association of high plasma ADMA levels and the presence of cardiovascular risk factors in hypertensive subjects. It also suggests the association of high plasma ADMA levels and the occurrence of cardiovascular death in hypertensive subjects and the development of type 2 DM in a subgroup of hypertensive subjects who are free from MS and DM at baseline (Figs. 1, 2, 3, 4, 5).



Table 1. Baseline characteristics according to plasma ADMA levels.

	Low plasma ADMA	High plasma ADMA	p-value
	n=100	n=91	
Age (years)	61.0 ± 9.5	60.2 ± 8.4	0.559
Male – n (%)	30 (30.0)	23 (25.3)	0.286
Weight (Kg)	71.3 ± 15.1	77.9 ± 15.7	<b>0.004</b>
BMI (kg/m <sup>2</sup> )	28.6 ± 5.2	31.5 ± 6.1	<b>0.001</b>
Waist circumference (cm)	94.2 ± 12.3	100.5 ± 12.7	<b>0.001</b>
Obesity – n (%)	33 (33.0)	50 (54.9)	<b>0.002</b>
SBP (mmHg)	138.7 ± 17.8	136.6 ± 17.9	0.427
DBP (mmHg)	85.3 ± 8.8	85.1 ± 12.9	0.884
Total Cholesterol (mg/dl)	202.9 ± 40.7	196.2 ± 41.9	0.269
HDL-col (mg/dl)	57.3 ± 15.7	51.8 ± 14.6	<b>0.012</b>
LDL-col (mg/dl)	119.6 ± 34.9	109.6 ± 35.9	0.056
Triglycerides (mg/dl)	129.8 ± 61.9	178.7 ± 97.8	<b>&lt;0.001</b>
Dyslipidemia – n (%)	13 (13.1)	22 (23.9)	<b>0.041</b>
Fasting glucose (mg/dl)	100.6 ± 37.5	108.7 ± 37.4	0.139
Cardiovascular disease – n (%)	10 (10)	12 (13.2)	0.322
Metabolic syndrome – n (%)	28 (28)	61 (67)	<b>&lt;0.001</b>
Type 2 Diabetes Mellitus – n (%)	27 (27.0)	42 (46.2)	<b>0.005</b>
Smoke – n (%)	7 (7.0)	12 (13.2)	0.118
Family history of CVD – n (%)	19 (19.0)	14 (15.4)	0.321
Uric acid (mg/dl)	5.4 ± 1.5	5.8 ± 1.4	<b>0.041</b>
Creatinine (mg/dl)	0.9 ± 0.2	0.9 ± 0.2	0.419
eGFR – ml/min/1.73 <sup>2</sup>	75.7 ± 15.8	71.9 ± 15.4	0.097
eGFR < 60 ml/min/1.73 <sup>2</sup> – n (%)	11 (11.2)	19 (20.9)	0.053
Albuminuria – mg/g	14.5 ± 47.9	22.8 ± 67.8	0.346
Albuminuria > 26 mg/g – n (%)	7 (7.4)	12 (14.0)	0.115
Albuminuria > 300 mg/g – n (%)	1 (1.1)	1 (1.2)	0.726
CRP – mg/dl	0.2 ± 0.3	0.9 ± 0.8	<b>&lt;0.001</b>
Framingham Risk Score (%)	8.6 ± 7.3	7.9 ± 6.1	0.652

BMI = body mass index, SBP = systolic blood pressure, DBP = diastolic blood pressure, eGFR = estimated glomerular filtration rate, CRP = C reactive protein, ADMA = asymmetric dimethylarginine. Data are expressed in mean ± standard deviation. p-value for Student t test of independent samples or X<sup>2</sup> test.

Fig. 1 See text for description

Table 2. Mean baseline plasma ADMA levels according to the demographic and laboratory characteristics of the subjects.

	ADMA	p-value
Women (n=138)	0.57 ± 0.10	0.976
Men (n=53)	0.57 ± 0.09	
Obese (n=83)	0.59 ± 0.09	<b>0.010</b>
Non obese (n=108)	0.55 ± 0.09	
With dyslipidemia (n=35)	0.60 ± 0.08	<b>0.020</b>
Without dyslipidemia (n=156)	0.56 ± 0.10	
Smoking (n=19)	0.57 ± 0.05	0.980
Non-smoking (n=172)	0.57 ± 0.10	
With MS (n=89)	0.60 ± 0.09	<b>&lt;0.001</b>
Without MS (n=102)	0.53 ± 0.09	
With cardiovascular disease (n=22)	0.59 ± 0.10	0.365
Without cardiovascular disease (n=169)	0.56 ± 0.09	
With DM2 (n=69)	0.59 ± 0.09	<b>0.004</b>
Without DM2 (n=122)	0.55 ± 0.10	
eGFR ≥ 60 ml/min (n=159)	0.55 ± 0.09	<b>0.006</b>
eGFR < 60 ml/min (n=30)	0.62 ± 0.10	
Albuminuria <26 mg/g creatinine (n=162)	0.56 ± 0.09	0.052
Albuminuria >26 mg/g creatinine (n=19)	0.62 ± 0.12	
Albuminuria <300 mg/g creatinine (n=179)	0.56 ± 0.09	-
Albuminuria >300 mg/g creatinine (n=2)	0.55 ± 0.00	

MS = metabolic syndrome, DM2 = type 2 diabetes mellitus, eGFR = estimated glomerular filtration rate. p-value descriptive for Student's t test for independent samples.

Fig. 2 See text for description

Table 3. Baseline characteristics according to plasma ADMA levels in subjects free from MS and DM.

	Free from MS and DM n=80	MS and/or DM in baseline n=111	p-value
Age (years)	61.0 ± 9.7	60.3 ± 8.4	0.568
Male - n (%)	22 (27.5)	31 (27.9)	0.541
Weight (Kg)	69.2 ± 15.0	78.2 ± 15.2	<0.001
BMI (kg/m <sup>2</sup> )	28.0 ± 5.0	31.4 ± 5.9	<0.001
Waist circumference (cm)	92.0 ± 11.6	100.8 ± 12.5	<0.001
Obesity - n (%)	21 (26.3)	62 (55.9)	<0.001
SBP (mmHg)	138.3 ± 18.5	137.2 ± 17.4	0.670
DBP (mmHg)	86.2 ± 12.1	84.3 ± 9.8	0.254
Total cholesterol (mg/dl)	204.6 ± 34.6	196.1 ± 45.2	0.142
HDL-col (mg/dl)	61.2 ± 15.3	49.9 ± 13.6	0.012
LDL-col (mg/dl)	118.9 ± 31.2	111.9 ± 38.4	<0.001
Triglycerides (mg/dl)	122.5 ± 56.5	175.1 ± 94.1	<0.001
Dyslipidemia - n (%)	4 (5.0)	31 (27.9)	<0.001
Fasting glucose (mg/dl)	88.4 ± 10.4	115.9 ± 45.1	<0.001
Cardiovascular disease - n (%)	6 (7.5)	16 (14.4)	0.105
Smoke - n (%)	3 (3.8)	16 (14.4)	0.012
Family history of CVD - n (%)	11 (13.8)	22 (19.8)	0.184
Uric acid (mg/dl)	5.4 ± 1.4	5.8 ± 1.4	0.077
Creatinine (mg/dl)	1.0 ± 0.2	0.9 ± 0.2	0.047
eGFR - ml/min/1.73 <sup>2</sup>	71.1 ± 14.4	75.8 ± 16.3	0.035
Albuminuria - mg/g	9.9 ± 21.0	24.5 ± 73.6	0.056
CRP - mg/dl	0.4 ± 0.6	0.7 ± 0.7	0.033
Framingham Risk Score (%)	7.6 ± 6.7	8.8 ± 7.3	0.239
Baseline ADMA	0.52 ± 0.09	0.59 ± 0.09	<0.001

BMI = body mass index, SBP = systolic blood pressure, DBP = diastolic blood pressure, eGFR = estimated glomerular filtration rate, CRP = C reactive protein, ADMA = asymmetric dimethylarginine. Data are expressed in mean ± standard deviation. p-value for Student's t test for independent samples or the X<sup>2</sup> test.

Fig. 3 See text for description

Table 4. Association of high ADMA and the development of DM after adjustment.

	Odds Ratio	CI 95%	p-value
Age	1.01	0.94 - 1.08	0.737
Gender (male)	0.40	0.07 - 2.21	0.295
BMI	1.04	0.92 - 1.18	0.476
Statin use	0.99	0.25 - 3.84	0.988
High plasma ADMA level	4.51	1.10 - 18.40	0.035

BMI = body mass index, ADMA = asymmetric dimethylarginine. P-value for binary logistic regression analysis.

Figure captions

Fig. 1 Mean plasma ADMA level according to the number of MS factors

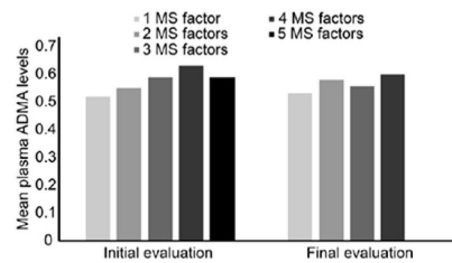


Fig. 2 Cardiovascular death according to baseline plasma ADMA level

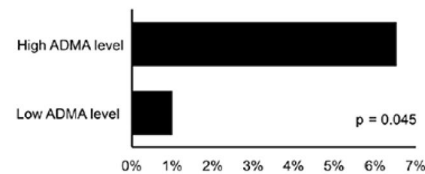


Fig. 4 See text for description

Fig. 3 Development of type 2 DM in subjects free from MS and DM at baseline

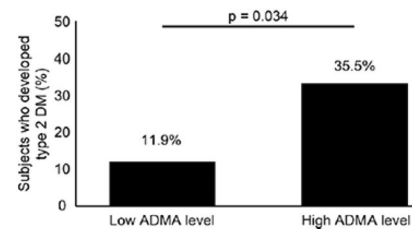


Fig. 5 See text for description

**A361****Relationship between food consumption and glycemic control of adolescents with type 1 diabetes**

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**Introduction:** Type 1 diabetes (T1D) is characterized by autoimmune beta cells destruction, which can lead to insulin deficiency. Diabetics of type 1 shall follow a plan based on the use of insulin, shall have a healthy diet and shall do regular physical activities. Through healthy eating it is possible to achieve a balance between food consumption, metabolic needs and energy expenditure, promoting a better glycemic control.

**Objective:** To verify the relationship between diet and glycemic control of adolescents with T1D.

**Method:** A descriptive cross-sectional study was performed with 30 individuals with T1D, aged between 10 and 16 years. The study evaluated anthropometric parameters (weight, height and z-score BMI/I), food consumption—which was obtained through a 3 day food diary and information from the last glycated hemoglobin were collected. Means and standard deviation of the descriptive analyzes were made. Pearson's correlation was used to verify the correlation between all evaluated variables.

**Results:** According to the BMI-I z-score, 77% of the population was eutrophic, 20% was overweight and 3% was obese. Only 27% of the adolescents consumed adequate quantity of carbohydrate, and 50% consumed quantities above recommended level. Regarding protein, 60% of the adolescents had adequate consumption. The consumption of total lipids was below recommended level in 53% of the analyzes and adequate in 40% of the analyzes. From the total of samples, 53% had high energy consumption and only 14% presented adequate energy consumption. Only 10% of the adolescents showed adequate intake for the three macronutrients. The mean value of glycated hemoglobin was  $9.49 \pm 1.44$  and a positive correlation was observed between fat consumption and HbA1c ( $r = 0.638$ ,  $p = 0.001$ ). No significant correlations were found for other variables.

**Conclusion:** The present study showed an inadequate food consumption by adolescents with T1D, considering the consumption of the three macronutrients together, and energy consumption was higher than expected. There was a positive correlation between fat consumption and HbA1c. These findings suggest that strategies should be created to promote healthy eating and continuous follow-up, favoring the link between health professionals and patients, thus increasing adherence to prescribed treatments.

**Ethics approval:** The study was approved by Ethics Committee on Human Research of the Hospital de Clínicas of the Federal University of Paraná, CAAE 44193214-7.0000.0096.

**A362****Relationship between glycemic control and glycemia obtained from meter and logbook**

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**Introduction:** Type 1 diabetes (T1D) is a chronic disease which treatment includes intensive insulin therapy and non-pharmacological therapies, both important tools to reach adequate glycemic control for delay diabetes-related chronic complications.

**Objective:** To determine the relationship between glycemic control and the agreement between glycemia obtained from meter and logbook.

**Methods:** This was a cross-sectional study, conducted between May 2017 and June 2017 at a University diabetes Center. Data were obtained from 159 patients, aged  $27.0 \pm 15.1$  years (52.2% males, 52.8% Caucasians) with a diabetes duration of  $12.5 \pm 9.7$  years and a follow-up duration of  $12.4 \pm 9.6$  years. Information concerning some tasks of diabetes management besides the receipt of supplies such as NPH and regular insulins, syringes, needles, glucometers and strips for blood glucose monitoring received from Sistema Único de Saúde (SUS) were obtained from a questionnaire during a clinic visit.

**Results:** From the pooled sample, 129 (81.1%) of the patients were from Rio de Janeiro city and 30 (19.4%) from other ones cities close to Rio de Janeiro. The HbA1c level was  $9.4 \pm 2.4\%$ ; 27 patients (16.6%) had HbA1c levels in good glycemic control and 51 (31.3%) had HbA1c levels greater than 10.0%. Adults patients had lower HbA1c ( $8.8 \pm 2.0\%$ ) than children ( $10.2 \pm 2.8\%$ ) and adolescents ( $10.7 \pm 2.6\%$ ),  $p < 0.001$ . A tendency for higher HbA1c levels in non-White was noted, respectively  $9.8 \pm 2.5$  vs  $9.1 \pm 2.5\%$  ( $p = 0.07$ ). Overall, in 77 patients (48.4%) ambulatory monitoring glycemia could not be evaluated because the meter was not available to check the results. Patients who carry their meters with inconsistent glycemia logbook to the clinical visit ( $n = 17$ ) had higher HbA1c levels when compared to those who carry the meters with consistent data in glycemia logbook ( $n = 65$ ) ( $9.9 \pm 2.9\% \times 9.2 \pm 2.2\%$ ),  $p > 0.05$ . Multivariate analysis with glycemic control as dependent variable showed that among all the demographic and clinical independent variables, only duration of diabetes was significant [Odds ratio, 0.94; Confidence Interval of 0.910–0.987,  $p < 0.05$ ].

**Conclusions:** In our study the majority of patients attending a tertiary diabetes care center did not reach good glycemic control. Although without statistical significance, probably because our sample size, the agreement between glycemia obtained from meter and logbook might have a influence upon glycemic control.

**A363****Relationship of the glycemic levels of type 2 diabetic patients with the response of blood pressure during the ergometric test**

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**Introduction:** Exercise test (ET) is indicated for asymptomatic diabetic patients, especially those with other risk factors such as systemic arterial hypertension (SAH).

**Objective:** To evaluate the relationship between glycemic levels of type 2 diabetic patients and blood pressure response during the ergometric test.

**Method:** Characterized as quasi experimental. Sixty individuals of both sexes were assigned to the study: Group of Normoglycemics (NG)  $n = 12$  that characterizes the control group, Diabetic Group with Capillary Glycemia values  $< 100$  mg/dL (GD  $< 100$ )  $n = 12$ , Diabetic Group with Capillary Glycemia values of 100-200 mg/dL (GD 100-200)  $n = 24$ , and the Group of Diabetics with Capillary Glycemia values  $> 200$  mg/dL (GD  $> 200$ )  $n = 19$ . The ergometric test (ET) was performed in the morning, in an environment with a temperature controlled between 18 and 22 °C and relative humidity of approximately 60%. The ET treadmill with slope option was used in the ET and all electrocardiographic records were obtained by the 12-lead system and recorded by the ErgoPC<sup>®</sup> program version 13.0. All subjects were submitted to ET using the modified Bruce protocol and were adequately fed (90–120 min apart until ET) and under routine use of their medications. Blood pressure was measured before and during the exercise test (ET). A test was performed to analyze the normality of the data, where Kruskal-Wallis test was chosen for non-parametric normality, adopting the level of significance of  $p \leq 0.05$ .

**Results:** The 67 subjects presented a mean of  $64.1 \pm 1.9$  years, of which 76.1% presented a diagnosis of systemic arterial hypertension, were in a functional class I classification in relation to METs reached.

Table 1 shows the initial characteristics of the subjects divided for each intervention group.

**Conclusion:** The main finding of the present study demonstrated that high capillary glucose levels appear to be directly related to the exacerbated rise of BP during all stages of the exercise test (Fig. 1).

**Tabela 1. Características iniciais dos grupos de intervenção**

GRUPOS DE INTERVENÇÃO

Variáveis	GC	GD <100	GD 100-200	GD > 200
n	12	12	24	19
Idade	65,4 ± 6,0	61,5 ± 6,2	63,2 ± 7,6	66,5 ± 7,8
GC pré	85,9 ± 8,1	87,5 ± 10,3	139,5 ± 31,5	283,8 ± 58,9
VO2	24,9 ± 7,5	30,0 ± 11,3	28,6 ± 7,5	18,5 ± 9,0
MET	7,1 ± 2,1	8,5 ± 3,2	8,1 ± 2,1	5,4 ± 2,5
PAS pré	129,1 ± 11,8	132,5 ± 14,2	131,2 ± 13,0	168,7 ± 13,7
PAD pré	80,0 ± 7,0	76,2 ± 6,1	78,7 ± 8,8	88,4 ± 7,4
Diagnóstico DM		10,0 ± 2,9	10,5 ± 3,6	10,1 ± 3,0
Hipertensão	9 (75%)	8 (66,6%)	17 (70,8%)	17 (89,4%)

\*GC: Glicemia Capilar; PAS: Pressão Arterial Sistólica; PAD: Pressão Arterial Diastólica.  
\*Valores da idade expressos em média ± desvio-padrão.

**Fig. 1** See text for description

### A364

#### Reproductive life of women with type 1 diabetes mellitus with and without hypothyroidism by Hashimoto's and idiopathic thyroiditis

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**Background:** About 30% of women with type 1 diabetes mellitus (T1DM) develop autoimmune thyroiditis, the most common subtype being Hashimoto's thyroiditis (HT). It is known that women with T1DM have reduced fertility in relation to the general population. However, literature reports regarding the reproductive life and gynecological characteristics of women with T1DM are scarce and there is none comparing patients with type 1 diabetes with and without hypothyroidism.

**Methods:** To determine gynecological and obstetric characteristics, infertility history in T1DM women and to compare subgroups with and without hypothyroidism, we evaluated 110 T1DM women, aged 18–50 years, of which 31 had hypothyroidism and of these 67.7% had HT. Infertility was defined as the absence of pregnancy in sexually active women having regular unprotected intercourse with a male partner for an exposure period of at least 12 months. The diagnosis of hypothyroidism was made through decreased serum free thyroxine and elevated thyroid stimulating hormone levels. Autoimmune hypothyroidism was defined when levels of anti-peroxidase or anti-thyroglobulin antibodies were elevated. All women signed the free and informed consent form and answered a questionnaire about gynecological and obstetric history. Their medical records were also reviewed. The University Research Ethics Committee approved the study (number 49956915.3.0000.5404). The Chi square test and Fisher's exact test were used to analyze categorical variables and numerical variables were analyzed with the Mann-Whitney test. The level of significance was 5%.

**Results:** Women with hypothyroidism presented a longer time since diagnosis of T1DM ( $p = 0.02$ ), higher body mass index ( $p = 0.03$ ), required higher insulin dose ( $p = 0.01$ ), and had more frequent family history of hypothyroidism ( $p = 0.02$ ). Regarding the gynecological and obstetric characteristics, there was no significant difference between the groups without and with hypothyroidism for age of menarche, age of onset of sexual life, presence of irregular menstrual cycles or diagnosis of polycystic ovary syndrome. Mean of pregnancies were 1.3 and 1.4, live children were 0.9 and 1.0, respectively. Frequency of fetal losses were 27.8% and 19.4% ( $p = 0.36$ ), preterm deliveries 30.4 and

48.4%, ( $p = 0.07$ ), infertility 20.2 and 35.5% ( $p = 0.09$ ), in the groups without and with hypothyroidism respectively.

**Conclusions:** Hypothyroidism was associated with longer duration of T1DM, higher insulin doses and more frequent family history of thyroid dysfunction. Due to the low prevalence of T1DM and even less of T1DM with associated hypothyroidism, the number of women studied was a limiting factor for comparison between groups regarding gynecological and obstetric characteristics. Nonetheless, we observed a trend towards higher rates of infertility and premature births in women with T1DM and hypothyroidism (Fig. 1).

**Table 1. Characteristics of T1DM<sup>1</sup> women with and without hypothyroidism**

Variable (SD)	Without HYP <sup>2</sup>	With HYP	P-value
Age (years), mean (SD)	32.1 (7.9)	35.1 (7.8)	0.07
Time of T1DM (years), mean (SD)	17.0(9.4)	20.9(7.6)	0.02
Daily dose of Insulin <sup>3</sup> , mean (SD)	0.77(0.27)	0.94(0.34)	0.01
BMI <sup>4</sup> , mean (SD)	25.2(4.6)	27.9(5.8)	0.03
HT Family history, n (%)	29 (36.7)	19 (61.3)	0.02

<sup>1</sup>T1DM = Type 1 diabetes mellitus. <sup>2</sup>HYP = Hypothyroidism. <sup>3</sup>BMI = Body Mass Index. <sup>4</sup>Units Kg.

**Table 2. Gynecological and obstetric characteristics in T1DM<sup>1</sup> women without and with hypothyroidism**

Variable (SD)	Without HYP <sup>2</sup>	With HYP	P-value
Age of menarche (years), mean (SD)	13.0 (1.8)	12.7 (2.0)	0.25
Age of onset of sexual life (years), mean (SD)	18.2(3.4)	18.4(4.1)	0.82
IMC <sup>3</sup> , n (%)	39 (49.4)	20 (64.5)	0.15
PCOS <sup>4</sup> , n (%)	13 (16.5)	3 (9.7)	0.55
Pregnancies, mean (SD)	1.3 (1.4)	1.4 (1.6)	0.70
Live children, mean (SD)	0.9 (1.1)	1.0 (0.8)	0.35
Fetal losses, n (%)	22 (27.8)	6 (19.4)	0.36
Preterm deliveries, n (%)	24 (30.4)	15 (48.4)	0.07
Infertility <sup>5</sup> , n (%)	16 (20.2)	11 (35.5)	0.09

<sup>1</sup>T1DM = Type 1 diabetes mellitus. <sup>2</sup>HYP = Hypothyroidism. <sup>3</sup>IMC = Presence of irregular menstrual cycles. <sup>4</sup>PCOS = Polycystic Ovary Syndrome characterized by 2 of the 3 criteria: oligo-ovulation or anovulation, hyper-androgenism (either clinical or bio-chemical), and the presence of polycystic ovaries. <sup>5</sup>Infertility was defined as the absence of pregnancy in sexually active women having regular unprotected intercourse with a male partner for an exposure period of at least 12 months.

**Fig. 1** See text for description

### A365

#### Resistant training improves fasting glucose and resistance insulin in elderly women

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**Introduction:** The loss of muscle mass, as well as the increase in body fat, are factors that are associated with the aging process, in addition to being related to impaired levels of fasting glycemia and insulin resistance. On the other hand, studies with resistance training have suggested that this type of exercise may be an effective strategy for changes in body composition, including in elderly individuals. However, it is still uncertain whether RT has an impact on fasting glycemia and insulin resistance in older women.

**Objective:** To analyze the effect of 12 weeks of RT on fasting glycemia and insulin resistance in elderly women.

**Methods:** Forty-three elderly women were randomly divided into: training group (TG, n = 21), who underwent a RT program for 12 weeks (8 exercises, 3 × 10–15 maximal repetitions, 1–2 intervals min between exercises and weekly frequency of 3 times); and control group (CG, n = 22), who remained without exercise for the same period. Blood samples after 12 h of fasting and with a minimum interval of 72 h after the last training session were performed for determination of fasting glucose and insulin. The homeostasis evaluation model (HOMAIR) was also calculated. Evaluations were performed before and after the intervention. This research was carried out in accordance with the Declaration of Helsinki and was approved by the local University Ethics Committee (048/2012). Two-way analysis of variance (ANOVA) for repeated measurements was used, followed by Bonferroni post hoc, with statistical significance of 5%.

**Results:** At the baseline, the groups did not show differences between the analyzed variables (TG, n = 21, 72.0 ± 6.3 years, BMI = 26.8 ± 4.7 kg/m<sup>2</sup> vs. CG, n = 22; 69.3 ± 4.7 years, BMI = 26.7 ± 3.9 kg/m<sup>2</sup>, P > 0.05). However, after 12 weeks of

intervention only the TG showed improvements in the insulin resistance measured by the HOMA-IR index (TG: pre =  $2.7 \pm 1.0$ , post  $2.0 \pm 0.9$  \* vs. CG: pre ( $P < 0.001$ ), as well as in fasting glucose (TG: pre =  $108.2 \pm 8.2$ , post =  $86.1 \pm 9$ ,  $3 *^5$  vs. CG: pre =  $100.8 \pm 8.7$ , post =  $101.2 \pm 8.2$ ,  $P < 0.001$ ).

**Conclusion:** Twelve weeks of RT improved insulin resistance and fasting glucose in elderly women, suggesting that TR can be indicated not only for the improvement of physical fitness parameters but also for the prevention and treatment of cardiovascular risk factors.

### A366

#### Responder analysis of subjects achieving hba1c $\geq$ 1% and weight loss > 5% across

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**Background:** Semaglutide, a GLP-1 analog in development for once-weekly subcutaneous treatment of T2D, demonstrated superior HbA1c and body weight reductions vs. comparators across the SUSTAIN 1-5 phase 3a clinical trials. We now report a post hoc analysis of these trials evaluating the proportion of subjects who achieved a composite endpoint of both  $\geq$  1% HbA1c reduction and  $\geq$  5% weight loss.

**Methods:** SUSTAIN 1-5 evaluated the efficacy and safety of once-weekly semaglutide (0.5 and 1.0 mg) vs. comparators (placebo, sitagliptin, insulin glargine, exenatide extended release, or placebo + basal insulin) in subjects with T2D.

**Results and discussion:** The proportion of subjects achieving both  $\geq$  1% HbA1c reduction and  $\geq$  5% weight loss was greater with semaglutide 0.5 mg (25-35%) and 1.0 mg (38-56%) vs. comparators (2-13%;  $p < 0.0001$  for all comparisons). The proportion of subjects achieving this combined endpoint was also greater with semaglutide 1.0 mg vs. 0.5 mg ( $p < 0.0001$  for SUSTAIN 2, 4 and 5;  $p = 0.17$  for SUSTAIN 1), suggesting a dose-dependent effect. In all five trials, severe or BG-confirmed symptomatic hypoglycemia events were fewer or similar with semaglutide vs. comparators. Semaglutide was well tolerated, with a safety profile similar to that of other GLP-1 receptor agonists.

**Conclusion:** With semaglutide, significantly more subjects achieved the clinically meaningful composite endpoint of  $\geq$  1% HbA1c reduction and  $\geq$  5% weight loss.

### A367

#### Responses of different intensities of strength training on blood pressure and blood glucose on a type 2 hypertensive diabetic: a case study

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**Case presentation:** It is estimated that 70% of patients with Type 2 Diabetes Mellitus (DM2) have Systemic Arterial Hypertension (SAH), and the nonmedication treatment of the two pathologies includes diet and physical exercise. It has been shown that physical exercise acts in the improvement of insulin sensitivity, systolic blood pressure (SBP) and diastolic blood pressure (DBP), in a chronic and acute way. Therefore, this study investigated the effects of the strength training on blood pressure and blood glucose of a type 2 diabetic patient with hypertension. This research was characterized as an evaluative case study. The subject was submitted to two sessions of strength training on different intensities, moderated (60% of 10RM) and high intensity (90% of 10RM). The blood pressure and blood glucose were measured before the sessions and up to 60 min after the sessions.

**Discussion:** According to the analyzed data, after the high-intensity strength training session the SBP and DBP showed reductions during the 60 min evaluation and blood glucose presented reduction after 60 min of the intervention.

**Final remarks:** This case study concludes that a single high intensity resistance training session caused hypotension of up to 60 min after exercise on the blood pressure of a type 2 diabetic patient who has hypertension. As well as, it was also able to produce reductions in blood glucose, 60 min after an intervention. Informed consent to publish had been obtained from the patient.

### A368

#### Retrospective evaluation of pregnant with diagnosis of diabetes mellitus gestacional accompanied in a reference clinic

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**Background:** Changes in glycemia are metabolic abnormalities more common in pregnancy, and inadequate treatment of diabetes mellitus (DM) leads to greater morbidity and mortality for both mother and fetus.

**Objective:** To know the reality of the patients attended at the service, as well as the perinatal outcomes, allowing to establish new routines of pregnancy follow-up, aiming to reduce complications and costs.

**Methods:** A retrospective observational study of the medical records of pregnant women diagnosed with diabetes in gestation (GDM) followed at the outpatient clinic of Endocrinology and Obesity in the Gestation of HC-FMRP-USP, in the year 2015.

**Results:** 142 patients had a diagnosis of GDM; 11% were hypertensive and 49.3% were obese pregestation; 45.8% had a family history of DM and 52.1% had previous GDM. Variables on average  $\pm$  standard deviation: age 33.2 years  $\pm$  9.1, pre-pregnancy BMI 31.5 kg/m<sup>2</sup>  $\pm$  7.6, BMI at the end of gestation 35.6 kg/m<sup>2</sup>  $\pm$  7.3, weight gain of 11.8 kg  $\pm$  12.7 some women had less weight at the end of the gestation than before getting pregnant; 43% used insulin, with a total pre-delivery dose of 42.1 UI/d (31.5 UI NPH/10.6 UI regular), with 0.46 UI/kg/d. About gestational complications: 13.4% preterm labor, 20.4% polyhydramnios, 10.6% premature chorioamnionitis, 4.9% pre-eclampsia, and no eclampsia. About delivery: 51.3% of cesarean deliveries, mean gestational age was 38.2  $\pm$  1.7 week (SD + 1.7), prepartumcapillary glycaemia of 92.5 mg% and postpartum 111.6 mg%. About newborns, 87.3% had cephalic presentation; mean Apgar score 8.1 and 9.3 at the 1st and 5th min, respectively; 53.3% male; average birth weight of 3320 g (1250-5170 g); 6% SGA, 73.3% AIG and 20% GIG. The women performed 75 g OGTT postpartum in Basic Health Unit.

**Conclusions:** Epidemiological studies, such as Hyperglycemia and Adverse Pregnancy Outcomes (HAPO), showed that the risks of maternal/fetal adverse effects and unfavorable neonatal outcomes increased as a function of maternal glycemia between 24 and 28 weeks. Previous conception obesity, GDM history, family history of DM, and more advanced maternal age seem to have been the major risk factors associated with the development of GDM. According to the ADA, women with a history of GDM present a considerable increase in the risk of developing DM. The large number of cesarean deliveries can be explained by the high percentages of SAH, obesity, older age and GIG fetuses of pregnant women (Fig. 1).

Tabela 1. Condições clínicas associadas ao aparecimento de Diabetes Gestacional na população estudada

Condição Clínica	
Obesidade	49,3%
DMG prévio	52%
HF para DM	45,8%
Idade materna	33,2 anos

DMG – Diabetes Gestacional  
HF – História Familiar

**Fig. 1** See text for description

**A369****Risk classification of diabetic foot and association between sociodemographic and clinical characteristics of the aged**

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Risk classification of developing diabetic foot associated with identification of the sociodemographic and clinical profile of aged individuals provide health professionals with subsidies for proper clinical handling, focused on strategies of health education, metabolic control, and prevention of complications. We aimed to identify the risk association of development of diabetic foot with sociodemographic and clinical characteristics of aged individuals with diabetes mellitus. This is a cross-sectional study developed in the Primary Health Care Service of a city from Ceará, Brazil, including a sample of 254 aged individuals that had been randomly chosen through a proportional stratified sampling. We collected data from August 2016 to January 2017 through a form that contains sociodemographic (sex, age, income, occupation, educational level, family arrangement) and clinical (diabetes diagnosis time, drug treatment, smoking habit, alcoholism, physical activity practice, comorbidities and complications) variables. Then, we collected data from the evaluation and tracking form of neuropathic pain, loss of protective sensitivity (LPS) and peripheral artery disease (PAD) for basic care from the Brazilian Society of Diabetes for assessing the feet and classifying the risk (level 0—no risk; level 1—LPS and/or deformities; level 2—PAD with associated or non-associated LPS; level 3—amputations, previous ulcers). We obtained sociodemographic and clinical data by means of interviews, whereas risk classification data were obtained using physical examination following the techniques recommended by Brazilian and foreign guidelines with the instruments: 10 g Semmes-Weinstein monofilament, 128 Hz diapasão, and 8 MHz portable manual doppler sonar. We analyzed data using R Statistical Software and adopted a statistical significance ( $p < 0.05$ ) for the bivariate association. We found statistical significance between the risk and the variables age, family income, diabetes time, drug treatment, smoking habit, osteo-locomotor comorbidity, and cerebrovascular complications. In conclusion, sociodemographic and clinical characteristics might significantly influence the risk of diabetic foot and, therefore, health professionals should implement feet evaluation, risk classification and systematic follow-up of aged individuals with diabetes in the primary health care service.

**A370****Risk factors associated with lipodystrophy**

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**Introduction:** Lipodystrophies are the most frequent complications found at the sites of insulin application, dividing into: lipoatrophy and lipohypertrophy. Lipodystrophies can alter the absorption time of insulin or its action, leading to hyperglycemia, unexplained hypoglycemia, increased glycemic variability and the need to increase daily insulin doses, interfering with the optimal metabolic control of diabetes.

**Purpose:** To identify the possible factors associated with the occurrence of lipodystrophies at the insulin application sites.

**Method:** A multicenter observational study carried out in 06 reference centers for diabetes care in the Unified Health System, located in São Paulo, Brasília, Rio de Janeiro, Curitiba, Jundiaí and Porto Alegre. The patients answered a specific questionnaire about self-administered insulin practices, including questions regarding the complications and their possible factors of risk.

**Results:** The sample consisted of 140 patients who had been insulinized for more than 6 months, of both sexes, from 6 to 75 years of age

and were self-administered insulin, with type 1 and 2 diabetes. Most adult and young patients (65%) had used insulin for more than 5 years. 71,7% of adult patients applied 2–3 daily doses of insulin, 50% used 21–61 syringes/needles or more per month, proving the practice of reusing syringes. The rotation technique was considered adequate in only 28.3% of adults. Lipodystrophy was found in 20% of adults and only 10% of adults had correct insulin selfinjection technique. 65% of the youths applied 4 daily doses of insulin and 55% used up to 10 syringes/needles per month, proving the practice of reusing syringes also among young people. The rotation technique was considered inadequate in 30% of young people and 10% of them did not perform it. Lipodystrophy was found in 50% of the young and 40% of the youngsters presented a partially correct technique.

**Conclusion:** The possible risk factors for the development of lipodystrophies were: the time of insulin use, the reuse of needles/syringes, the lack of rotation or inadequate rotation and the incorrect technique of applying insulin, demonstrating the need for urgent educational strategies, emphasizing the importance of preventing complications at the insulin application sites and their impact on metabolic control.

**Ethics approval:** The study was approved by UNIFESP's Ethics Board, approval number 1698/11. Informed consent was obtained from all patients this study.

**A371****Risk factors for diabetes mellitus after liver transplantation**

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**Abstract:** There are few data related specifically to the identification of risk factors for post transplant Diabetes Mellitus (PTDM) in liver recipients.

**Objectives:** To verify the risk factors for PTDM in patients submitted to liver transplantation in the population of a tertiary reference service.

**Methods:** Revision of medical records of patients submitted to liver transplantation from 1990 to 2016, all older than 18 years. A total of 152 patients were included. Data for sex, age, BMI, pre and post transplantation DM, transplantation reason, presence of hepatocellular carcinoma (HCC), HbA1c, hypertension, dyslipidemia, use of immunosuppressants (tacrolimus, mycophenolate, prednisone, everolimus, cyclosporine, azathioprine or sirolimus), hepatitis B, hepatitis C (HepC), and history of transplant rejection were analyzed. Comparisons were done with Chi square tests and analysis of independent risk factors with multivariate logistic regression.

**Results:** Of all patients analyzed, 76.5% were men. The median age was 59 years, transplant time 6 years, BMI 27.53 kg/m<sup>2</sup> and diagnosis of DMPT 2 years after the transplant. Among the 152 patients, 43.2% had diagnosis of DM, 27% of which PTDM. As for comorbidities, 48.3% presented hypertension, 32.2% hypercholesterolemia and 31.5% hypertriglyceridemia. The major cause of transplantation was hepatitis C virus (55%), followed by alcohol (32.9%). Additionally, 40.3% were diagnosed with HCC before liver transplantation. The most commonly used drugs after liver transplantation were Tacrolimus (78.4%), Mycophenolate (62.8%), Everolimus (24.5%) and prednisone (PDN) (23.8%). The clinical characteristics of the sample of patients studied are summarized in Tables 1.1 and 1.2. There was a predominance of males in patients with PTDM compared to those without PTDM (87.5% vs 72.2%,  $p = 0.05$ ), higher frequency of HepC (72.5% vs 42.1%,  $p = 0.001$ ) and of tacrolimus use (92.5% vs 72.9%,  $p = 0.01$ ). The maximum dose of tacrolimus was higher in patients with PTDM ( $p < 0.001$ ). The results are summarized in Table 2. The independent risk factors for PTDM were HepC (OR = 3.8, 95% CI 1.3–10.9,  $p = 0.013$ ), presence of HCC (OR = 3.7, 95% CI 1.2–11.5,  $p = 0.025$ ), the use of Tacrolimus (OR = 6.3, 95% CI 1.2–32.5,  $p = 0.029$ ) and PDN (OR = 7.2, 95% CI 2.4–21.8,  $p < 0.001$ ).

**Conclusion:** Among all immunosuppressants, Tacrolimus and PDN had a greater influence on the risk of PTDM. HepC and presence of HCC before liver transplantation are also risk factors for PTDM, which may warrant further vigilance of these patients. If possible, PDN and tacrolimus should be avoided in patients at risk for PTDM (Fig. 1).

Variable	Frequency
Male Sex	76.50%
Without DM	56.80%
DM Pre transplantation	16.20%
DM after transplantation	27%
Cause of Transplantation	
Hepatitis C	55%
Hepatitis B	3.40%
Cryptogenic	8.70%
Alcohol and others	32.90%
HCC	40.30%
HCC Alcohol	17.40%
Alcoholism	34.20%
Smoking	30%
Hypertension	48.30%
Hypercholesterolemia	32.20%
Hypertriglyceridemia	31.50%
Hepatitis B	5.40%
Hepatitis C	50.70%
Rejection	14.60%

Variable	Median
Current Age	59
Transplant Period	6
DM Period	5
Time after transplantation for DM.	2
BMI	27.5
Last HbA1c	6.5

	Without DM or Pre transplantation	PTDM	p
MALE SEX	72.20%	87.50%	0.05
HCC	41.70%	35.00%	0.571
HCC ALCOHOL	15.70%	22.50%	0.34
FHDM	54.50%	66.70%	0.68
ALCOHOLISM	31.50%	43.20%	0.231
SMOKING	38.10%	25.00%	0.363
HYPERTENSION	52.80%	37.50%	0.138
HYPERCHOLESTEROLEMIA	36.10%	22.50%	0.166
HYPERTRIGLYCERIDEMIA	36.10%	20.00%	0.074
HEPB	5.60%	5.00%	1
HEPC	42.10%	72.50%	0.001
REJECTION	13.90%	17.10%	0.593

HCC- hepatocellular carcinoma; HCC ALCOHOL- Carcinoma by alcohol; FHDM- Family History of Diabetes Mellitus; HEPB- Hepatitis B; HEPC- Hepatitis C

**Fig. 1** See text for description

### A372

#### Risk factors related to mortality during and after hospital discharge in adult patients with diabetic ketoacidosis in a university hospital

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**Introduction:** Diabetic ketoacidosis (DKA) remains the main form of diagnosis of type 1 diabetes mellitus (TDM1) in Brazil. DKA is also a frequent cause of hospitalization during the course of TDM1, and not rarely, of TDM2. Previous studies show that DKA can impact the survival of these patients. In our country we often find patients with multiple hospitalizations for DKA.

**Objective:** To identify risk factors for mortality during and after hospital discharge in patients with DKA in a Brazilian university hospital.

**Methods:** We conducted a retrospective study evaluating DKA hospitalizations in the period between 2012 and 2016. Patients were identified by the International Classification of Diseases (CID-10). Data from electronic records were analyzed and ADA-2017 and SBD-2017 criteria for DKA diagnosis and classification were used. In the case of more than one hospitalization, the last episode of DKA was considered for analysis. The survival status was collected by telephone contact. The results are presented as  $x \pm dp$  and percentiles. Parametric and non-parametric statistical tests (SPSS-24) were used and  $p < 0.05$  was considered significant.

**Results:** 207 patients [68.6% DM1; 26.6% DM2 and 4.6% other types], age:  $36.7 \pm 18.7$  years at the time of admission and diagnosis time of DM 6 years. There were 305 hospitalizations with an average duration

of 5.6 days. Number of hospitalizations per patient were 1 in 80.2% (166/207), 2 in 12.6% (26/207) and 3 or more in 7.2% (15/207). The severity of DKA was: 9.7% (20/207) mild, 30% (62/207) moderate and 60.4% (125/207) severe. Mortality during hospitalization was 2.41% (5/207). Post-discharge mortality within this 5 year period was 11.8% (17/143), among the 69% (143/207) of patients that were found by telephone contact. The survival in the DM1 group was 94% and in the DM2, 69.7%. Three variables had a significant association with mortality: the patient's age at diagnosis of DKA, durations of diabetes and number of hospitalizations, with an OR of 1.058 (1.006–1.113;  $p = 0.03$ ), 1.121 (1.033–1.218;  $p = 0.007$ ) and 1.425 (1.105–1.807,  $p = 0.006$ ). The impact of the number of hospitalizations on mortality was 40% at 16 months in the group with more than 1 episode of DKA. **Conclusion:** Patient's age at diagnosis of DKA, duration of illness and number of hospitalizations for DKA were risk factors for mortality in adults with DM.

### A373

#### Role of hypothalamic hif-1 complex in the development of obesity and metabolic dysfunction

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**Background:** Hypothalamic dysregulation of the energy homeostasis is critical for the obesity development. Hypoxia-inducible factor-1 (HIF-1) is a transcription factor that plays a role in the regulation of glucose and energy homeostasis. Previously, it was reported that HIF-1 can regulate energy homeostasis in the hypothalamus.

**Aim:** Our main purpose was to analyze whether a high-fat diet (HFD) changes the expression of HIF-1 in the hypothalamus. We also down-regulated HIF-1 in the arcuate nucleus (ARC) to evaluate body composition changes and metabolic alterations.

**Materials and Methods:** C57BL/6 mice (CEUA 4125-1), 8-week old, were fed on chow or HFD, and the expression of HIF-1 proteins was measured by RT-qPCR and western blot; their distribution was evaluated by immunofluorescence. HIF-1 $\beta$  in ARC was inhibited using shRNA lentiviral particles and the animals were grouped under chow or HFD for 14 days. Body mass and food intake were evaluated throughout the experiments.

**Results:** HIF-1 proteins were mainly localized in the ARC, were colocalized with microglia and glial cell markers, and also with POMC neurons. The mRNA expression of HIF-1 proteins significantly decreased after 3 and 7 days of HFD; however, the protein levels of HIF-1 $\alpha$  were significantly higher after 7, 14 and 28 days of HFD consumption, with a decreased in the VHL protein (E3ligase), indicating an increase in HIF-1 $\alpha$  stabilization. Under HFD, the downregulation of HIF-1 $\beta$  promoted an increase in body mass compared with control animals, without changes in food intake; however, these animals decreased their basal metabolic rate. The inflammatory markers in hypothalamus were higher in animals with inhibition of HIF-1 $\beta$ . The downregulation of HIF-1 $\beta$  in mice fed on HFD induced a decrease in the brown adipose tissue temperature and a decrease in the UCP-1 protein expression. Regarding metabolic parameters, the downregulation of HIF-1 $\beta$  induced intolerance to glucose and lipid accumulation in the liver, together with changes in the expression of enzymes involved in the regulation of glucose and lipid metabolism in the liver.

**Conclusion:** Concluding, HIF-1 proteins were elevated under HFD resulting from an increase in HIF-1 $\alpha$  stabilization. The dysregulation of hypothalamic HIF-1 complex associated with the consumption of HFD can contribute to the increase in body mass as a result of an impairment of energy expenditure (decrease in metabolic rate and in thermogenesis), likely associated with development of metabolic disorders. Supported by FAPESP, 2015/10078-2

**A374****Sarcopenia and the not presence of diabetes as a predictor of mortality after hospital discharge in elderly patients**Mileni Vanti Beretta<sup>1</sup>, Juliane Feldman<sup>2</sup>, Camila Nery<sup>2</sup>, Ticiana da Costa Rodrigues<sup>3</sup><sup>1</sup>PPG Endocrinologia-UFRGS, Rio Grande do Sul, Brazil; <sup>2</sup>UFRGS, Faculdade de Nutrição, Rio Grande do Sul, Brazil; <sup>3</sup>PPG Endocrinologia, UFRGS-Serviço de Endocrinologia, Hospital de Clínicas de Porto Alegre, Rio Grande do Sul, Brazil**Correspondence:** Mileni Vanti Beretta*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A374**

**Introduction:** Sarcopenia has been discussed as a possible predictor of mortality in the elderly, but there are few studies evaluating the relationship between mortality and sarcopenia in the population of patients with type 2 Diabetes Mellitus (T2DM), especially after hospital discharge.

**Objective:** To verify the mortality predictors within 1 year after hospital discharge in elderly patients with and without T2DM.

**Methodology:** A prospective study that included hospitalized patients at the Hospital de Clínicas de Porto Alegre (HCPA) between July 2015 and December 2016, over 60 years and with up to 48 h of hospitalization in a ward unit. The follow-up was done by phone and by consulting the medical records after 1, 3, 6, 9 and 12 months after discharge. To evaluate sarcopenia, a 3-m gait test was performed, such as Time Up and Go, muscle strength was measured by hand-grip using an analog dynamometer, and muscle mass was measured across the largest calf circumference region. Patients with reduced gait (< 0.8 m/s), with low muscle strength by the dynamometer (< 20 kgf for women and < 30 kgf for men) and lesser calf circumference (< 32 cm) were considered sarcopenic. This project was approved by the HCPA Ethics Committee under number 150,068.

**Results:** 610 patients were included, mean age  $71.31 \pm 6.45$  of which 51% were women, 82% were Caucasian. The group was stratified according to the presence of diabetes, 306 (51%) patients had T2DM. There were no differences between the groups regarding gender, schooling, smoking, alcohol consumption and physical activity. Patients with T2DM had lower muscle strength ( $19.62 \pm 7.53$  vs.  $21.19 \pm 7.31$   $p = 0.009$ ), were slower in the walking test ( $0.54$  m/s ( $0.46-0.66$ ) vs.  $0.60$  ( $0.48-0.75$ )  $p < 0.001$ ) than those without T2DM, 58.4% being classified as sarcopenics. The mortality rate among T2DM was 45.3%. In the multivariate analysis after adjustment for age, sex, physical activity and presence of DM2, only the presence of sarcopenia maintained an association with post-high mortality (OR = 1.64, 95% CI 1.037–2.62  $p = 0.034$ ).

**Conclusion:** Patients with T2DM had more sarcopenia than individuals without T2DM. But the presence of sarcopenia was the predictor of all-cause mortality in elderly after 1 year of hospital discharge, regardless of the presence of T2DM.

**A375****Screening of risk in diabetes foot campaigns of the national association of attention in diabetes - anad- são paulo – brasil**Thais Arrigotti<sup>1</sup>, João Antonio da Silva Junior<sup>1</sup>, Fadlo Fraige Filho<sup>2</sup>, Maria Gabriela Secco Cavicchioli<sup>1</sup>, Anderson da Silva Rosa<sup>1</sup>, Monica Antar Gamba<sup>1</sup><sup>1</sup>UNIFESP, São Paulo, Brazil; <sup>2</sup>ANAD, São Paulo, Brazil**Correspondence:** Thais Arrigotti*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A375**

**Background:** This research arises to Federal University in São Paulo, in the graduated extension program: Cuidar-te, during the campaign of the National Association of Attention in Diabetes (ANAD).

**Objective:** To evaluate the proportion of previously diagnosed and undiagnosed DM patients with signs of neuropathy and vasculopathy, deformities and ulcerations, and to describe sociodemographic variables, habits, clinical history and self-care/health education.

**Methods:** Epidemiological study of the cross-sectional population-based type carried out by means of collecting data from records of foot assessment in people without and with a previous diagnosis of DM, carried out during the period from 2013 to 2015, in which dependent variables were: the presence of signs of neuropathy and vasculopathy, deformities and ulcerations in the feet; and independent variables were sociodemographic variables, habits, clinical history and self-care/diabetes education.

**Results:** Descriptive analysis performed using 1339 individuals, of whom 115 were unaware of the diagnosis. Female predominance observed (51%), elderly (39%), and belonged to the non-economically active population group (32%), mostly non-smokers and non-alcoholics. The predominant classification of DM was type 2 (72%), with duration of disease of 11 years; hypertension was the most prevalent comorbidity (55%). Regarding the treatment, were the association of diet (51) and oral antidiabetics (61%). The presence of peripheral neuropathy, the degree of risk detected was 1 (27%) and referred as tingling in the feet (35%), 59% reported that they did not receive advice regarding foot care, questioning the quality of foot care.

**Conclusion:** These investigation reports an interface with extension program and a diabetes association aimed at preventing complications due to DM. The results of this research confirm international findings that support the importance of prevention of foot complications and that population campaigns have the potential to detect risks and vulnerabilities due to diabetes. It also highlights the shortfall in the educational process offered to people with diabetes.

**A376****Secondary diabetes due to acromegaly: influence of age and gh/ igf-1 axis**

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**Introduction:** Acromegaly is caused by hypersecretion of growth hormone (GH) from a secreting pituitary adenoma, whose action is mediated by insulinlike growth factor (IGF-1). The insidious progression of the disease leads to complications such as diabetes, which increases the risk for cardiovascular disease. Unlike type 2 diabetics, the pathophysiology of diabetes secondary to acromegaly is unrelated to obesity.

**Objective:** Analyze the clinical and biochemical data of diabetic and non-diabetic acromegalic patients at the time of acromegaly diagnosis.

**Methods:** Medical records of 32 acromegalic patients were divided in two groups according to the presence or absence of diabetes at the diagnosis of acromegaly. Clinical and biochemical variables were collected, IGF-1 was expressed as the observed value divided by the upper limit of normal (IGF-1 x ULN) and by the mean between upper and inferior limit of normal (IGF-1 x mean) for age and gender. The study was approved by Londrina State University's Ethics Board, approval number 059/2014 and informed consent were obtained from the patients.

**Results:** From 32 patients, 46% were diabetic at the diagnosis of acromegaly and older than non-diabetic patients ( $p = 0.04$ , Table 1). A weak and a moderate positive correlation was found between GH and IGF-1 ( $p = 0.08$ ) and IGF-1 (X ULN) and fasting glycemia, respectively ( $p = 0.04$ , Fig. 1). In diabetics, the estimated duration of acromegaly before diagnosis was longer than in non-diabetic patients ( $p = 0.04$ ).

**Conclusion:** Diabetic patients were older than non-diabetic patients at acromegaly diagnosis. The positive correlation between IGF-1 (X ULN) and glycemia levels demonstrated the influence of GH/IGF-1 axis on glucose metabolism in acromegaly. The presence of diabetes was related to the duration of acromegaly once that patients were exposed to chronically elevated IGF-1 levels (Fig. 1).



**Table 1** – Characterization of 32 diabetic and non-diabetic patients at diagnosis of acromegaly.

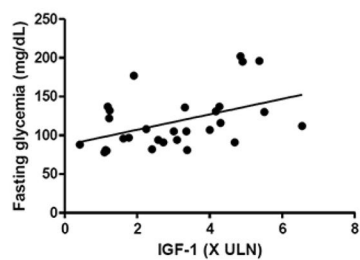
Variables	Diabetics (n = 15)		Non-diabetics (n = 17)		p value
	Mean	Median	Mean	Median	
Age (years)	51.6±18.8	49.0	39.0±14.9	38.0	0.04 <sup>a</sup>
Acromegaly (years)*	5.9±3.4	7.0	3.6±2.9	3.0	0.04 <sup>b</sup>
IGF-1 (ng/mL)	881.5±480.2	847.5	888.3±276.5	775.0	0.52
IGF-1 (X mean)	4.9±3.0	4.8	4.74±1.51	4.2	0.31
IGF-1 (X ULN)	3.3±2.0	3.3	3.2±1.0	2.7	0.29
Glycemia (mg/dL)	146.5±34.2	134.0	95.6±12.3	91.0	0.0008 <sup>c</sup>
GH (ng/mL)	22.9±35.2	10.6	22.7±34.2	8.1	0.77
Acral alterations (%)	92.8	-	81.8	-	0.56
Hypertension (%)	57.0	-	45.4	-	0.69
Arthropathy (%)	42.8	-	27.2	-	0.67

ULN: upper limit of normal

Mean: mean between upper and inferior limit of normal

\*Duration of symptoms of acromegaly until diagnosis

Data expressed as means standard deviation, median and percentage

<sup>a</sup> Significant difference – unpaired t test<sup>b</sup> Significant difference – Fisher's test<sup>c</sup> Significant difference – paired t test**Figure 1** – Positive correlation between fasting glycemia and IGF-1 divided by the upper limit of normal for age and gender at the diagnosis of acromegaly ( $r = 0.44$ ,  $p = 0.01$ ; Pearson's correlation test).**Fig. 1** See text for description**A377****Secondary hemichorea to the hypoglycemia in elderly patient without previous diagnosis of diabetes mellitus: case report**

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Chorea and ballism are rare neurological manifestations with diverse etiologies. This is a case report of a patient who has received a diabetes diagnosis after an episode of secondary hemichorea to the hypoglycemia. A rare manifestation in a common disease in a female patient without previous diagnosis of diabetes mellitus. The 79 years old patient, without previous antecedents, independent for the daily living activities, was taken to the emergency room by her daughter with the report of mental confusion that had begun 10 days before, associated to the presence of involuntary movements in the right side, which improved during sleep. The patient was admitted in regular general state, dehydrated, with capillary glycemia, immeasurable through the glucometer. She has received adequate hydration and glycemic control, but kept a neurological picture. Was performed an investigation with serological tests, cerebrospinal fluid examination, electroencephalogram, evaluation of thyroid and vitamin deficiency, all negative, but with magnetic resonance revealing hypersignal in T1, in bilateral putaminal topography, alteration attributed to the hyperglycemic state, and glycosylated hemoglobin 14.1%, being hemichorea attributed to the hyperglycemia. Secondary chorea to hyperglycemic state is a rare neurological manifestation, with description of cases in ketotic and nonketotic patients, generally associated to alterations in the region of basal ganglia visualized in brain's magnetic resonance. Doesn't possess well defined physiopathological mechanism, with theories involving the consumption of inhibitory

neurotransmitters with lack of control of the mechanism of thalamic inhibition, diabetic vasculopathy leading to the bad perfusion of the nucleus striatum, acute disfunction of basal ganglia secondary to the hyperglycemia. The prognostic is variable, with cases reported with gradual improvement after diabetes control and use of haloperidol and others with maintenance of the picture. The referred patient received insulin therapy and haloperidol to control the involuntary movements, having good results in the discharge, however, in ambulatory return the patient still needs haloperidol maintenance for symptomatic control, despite of the adequate diabetes control.

Informed consent to publish had been obtained from the patient.

**A378****Self-care of patients with diabetes mellitus**

Camila Leal Cardoso, Ana Carla de Macedo Mesquita, Marcia Cristina da Silva Magro, Tayse Tâmara da Paixão Duarte UnB, Brasília, Brazil

**Correspondence:** Camila Leal Cardoso*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A378**

**Introduction:** Diabetes Mellitus (DM) is a non-transmissible chronic disease, whose the treatment extends from self-care, as a preventive measure, the adherence to drug and non-drug therapy.

**Objective:** To identify factors related to adherence to self-care measures by diabetic patients.

**Method:** Quantitative, descriptive, exploratory cross-sectional study. A sample of 99 diabetics patients Type 2. To assess adherence to self-care was used the Self-Care Summary of Diabetes Self-Care Activities (SDSCA) which is validated in Brazil. Participants were only interviewed after signing the informed consent form. The results were expressed as absolute (n) and relative (%), mean and standard deviation. This research was approved by the research ethics committee of the Foundation of Education and Research in Health Sciences of the health secretariat—FEPECS/SES, CAAE 45288915.6.0000.5553.

**Results:** There was a predominance of elderly (58%), female (71%) and white (47%). Regarding the sociodemographic characteristics, the majority attended elementary school (62%) and lived accompanied (86%). Systemic arterial hypertension (79%) and dyslipidemia (46%) were the most prevalent comorbidities associated with diabetes. Regarding self-care, low adherence to healthy diet ( $3.7 \pm 0.3$  days) and physical activity ( $2.8 \pm 0.3$  days) were demonstrated. There was greater adherence when asked about daily foot care ( $6 \pm 0.2$  days) and use of prescribed medication therapy ( $6.4 \pm 0.2$  days).

**Conclusion:** Respondents presented greater adherence to drug treatment and foot care, and less adherence to healthy diet and physical activity.

**A379****Self-care skills of people with diabetes mellitus in the foot injury prevention**Luciana Catunda Gomes de Menezes<sup>1</sup>, Náya dos Santos Moura<sup>2</sup>, Yara Lanne Santiago Galdino<sup>3</sup>, Denizielle de Jesus Moreira Moura<sup>4</sup>, Eline Saraiva Silveira Araujo<sup>3</sup><sup>1</sup>Faculdade Metropolitana da Grande Fortaleza-Fametro, Fortaleza, Brazil; <sup>2</sup>Universidade Federal do Piauí, Piauí, Brazil; <sup>3</sup>Prefeitura Municipal de Fortaleza, Fortaleza, Brazil; <sup>4</sup>Faculdade da Grande Fortaleza-Fametro, Fortaleza, Brazil**Correspondence:** Luciana Catunda Gomes de Menezes*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A379**

**Introduction:** One of the complications of diabetes mellitus (DM) is diabetic foot, characterized by single or multiple lesions occurring on the feet of people with diabetes, often resulting triad consisting of neuropathy, peripheral artery disease (PAD) and infections. As known, the main measure in the treatment of these injuries is early detection through behaviors related to self-care skills to the feet of the patient and their families, and evaluation of risk factors by the multidisciplinary team.

**Objective:** To evaluate self-care skills of people with diabetes mellitus to prevent foot injuries. Crosssectional study of a quantitative

approach was developed in six units of Primary Health Care Fortress-Ceará-Brazil, at a convenience sample composed of 43 persons, a questionnaire of self-care skills with the diabetic foot and the examination of the foot runs on 4 months of follow-up was applied. The research was registered in Brazil under the Platform Presentation of Certificate number to Ethics Assessment (CAEE): 47663215.5.0000.5534.

**Results:** There was a desirable self-care ability, i.e., a good selfcare, determined by the habit of examining your feet; dry your feet and between toes; use some product to moisturize your feet; look into the shoes before using them; cut toenails in rounded shape. However, in footwear, foot injury presence, frequency of washing the feet, water temperature, and color of the fabric socks and treatment of lesions did not show good ability to self-care with their feet.

**Conclusion:** Descriptors: Diabetes mellitus; Diabetic foot; Nursing (Fig. 1).

**Tabela 1- Distribuição numérica e percentual do questionário de habilidades do autocuidado com os pés, segundo determinados aspectos de todos os participantes. Fortaleza-CE, maio/agosto/2016**

Habilidades para o autocuidado com os pés	n	%
<b>Exame dos seus pés</b>		
Sim	38	88,4
Às vezes	4	9,3
Não	1	2,3
<b>Lavagem dos pés durante o banho</b>		
Lava somente com água	6	14,0
Lava com água e sabão	37	86,0
Não lava	-	-
<b>Secagem dos pés</b>		
Sim	39	90,7
Às vezes	3	7,0
Não	1	2,3
<b>Usa algum produto para hidratar os pés</b>		
Sim	28	65,1
Às vezes	9	20,0
Não	6	14,0
<b>Costuma andar descalço</b>		
Sim	1	2,3
Às vezes	-	-
Não	42	97,2

**Fig. 1** See text for description

**A380 Semaglutide consistently reduces both fasting and postprandial glucose levels across sustain 1–5 clinical trials**

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**Correspondence:** Monica Palmanhani *Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A380**

**Background:** Improvements in fasting plasma glucose (FPG) and postprandial glucose (PPG) levels are major contributors to achieving HbA1c targets in subjects with type 2 diabetes (T2D). 1,2 Shortacting glucagon-like peptide-1 receptor agonists (GLP-1 RAs) generally demonstrate greater improvements in PPG following injection, while long-acting GLP-1 RAs show a greater effect on FPG and more modest effects on PPG. 3 Semaglutide is a GLP-1 analog in development for the oncedaily treatment of T2D. Semaglutide has demonstrated superior HbA1c reductions (1.2–1.5% with semaglutide 0.5 mg and 1.5–1.8% with semaglutide 1.0 mg), vs comparators, across the phase 3a SUSTAIN 1–5 clinical trials, when used as monotherapy, add-on to metformin, 1–2 oral anti-diabetic medications, or with basal insulin.

**Aim:** To assess the effect of once-weekly semaglutide subcutaneous on FPG and PPG across the SUSTAIN 1–5 trials.

**Methods:** In SUSTAIN 1–5, a total of 3918 subjects (HbA1c 7.0–10.0/10.5%) with T2D were randomized to semaglutide 0.5 mg, 1.0 mg, or placebo (SUSTAIN 1); sitagliptin (SUSTAIN 2); exenatide extended release [ER] (SUSTAIN 3, vs semaglutide 1.0 mg only); insulin glargine [IGlar] (SUSTAIN 4); or placebo as add-on to basal insulin (SUSTAIN 5); for 30 or 56 weeks. The effect of semaglutide 0.5 and 1.0 mg vs comparators on FPG, and PPG (mean and postprandial increments) from 7/8-point self-measured plasma glucose (SMPG) profile, was assessed (vs baseline) at the end of treatment.

**Results:** Semaglutide reduced mean FPG (mg/dL) from baseline. Reductions in FPG were significantly greater for semaglutide 1.0 mg vs comparators (estimated treatment difference [ETD] 1.0 mg – 26.87 vs Page 2 of 2 sitagliptin, – 15.12 vs exenatide ER, – 11.02 vs IGLar, and – 32.17 to – 33.87 vs placebo; all  $p \leq 0.0002$ ). Reductions were also significantly greater for semaglutide 0.5 mg vs sitagliptin and placebo (ETD0.5 mg – 17.53, and – 20.62 to – 35.28, respectively, all  $p \leq 0.0002$ ). Semaglutide reduced mean PPG (mg/dL) increments. The reductions in PPG increments were significantly greater for semaglutide 1.0 mg vs comparators (ETD1.0 mg – 6.87 vs sitagliptin, – 4.31 vs exenatide ER, – 11.71 vs IGLar, and – 13.38 to – 18.16 vs placebo; all  $p < 0.02$ ). Reductions were also significantly greater for semaglutide 0.5 mg vs IGLar and placebo when added to insulin (ETD0.5 mg – 7.09 and – 11.92, respectively; both  $p \leq 0.003$ ) but not vs placebo (monotherapy) and sitagliptin (ETD0.5 mg – 7.37 and – 3.26, respectively;  $p = 0.0807$  and  $p = 0.0926$ ). Mean SMPG levels were significantly reduced with semaglutide 0.5 and 1.0 mg vs all comparators ( $p < 0.0001$ ), with the exception of semaglutide 0.5 mg vs IGLar.

**Conclusions:** Semaglutide consistently reduced FPG and PPG across the SUSTAIN 1–5 clinical trials, suggesting that both components contribute to significantly better glycemic control versus comparators.

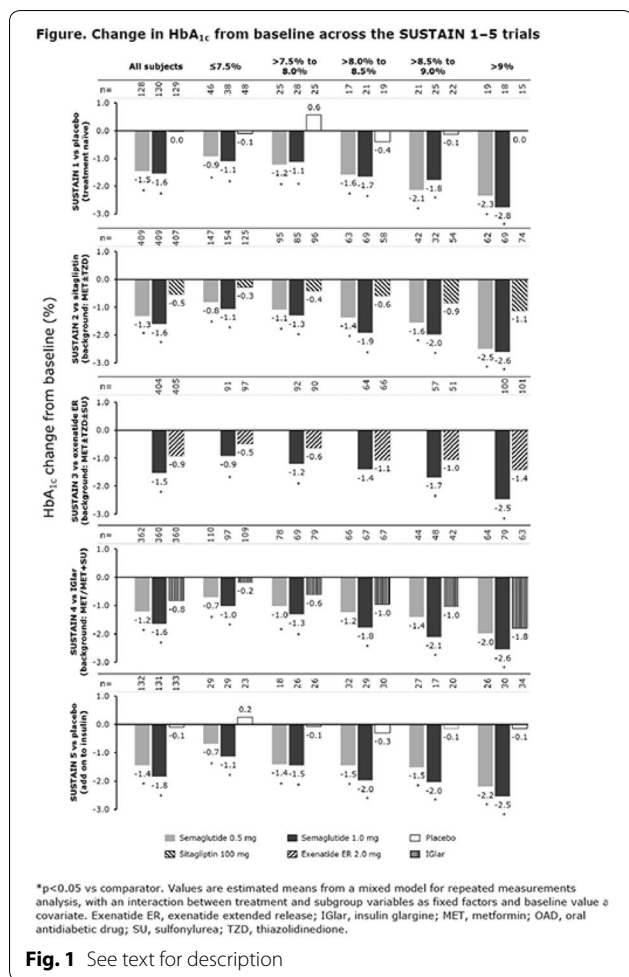
**A381 Semaglutide reduces hba1c across baseline HBA1C subgroups across sustain 1–5 clinical trials**

Stephen Bain<sup>1</sup>, Eiichi Araki<sup>2</sup>, Cyrus Desouza<sup>3</sup>, Satish Garg<sup>4</sup>, Ludger Rose<sup>5</sup>, George Tsoukas<sup>6</sup>, Eirik Quamme Bergan<sup>7</sup>, Julie Derving Karsbøl<sup>7</sup>, J Hans DeVries<sup>8</sup>

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**Correspondence:** Stephen Bain *Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A381**

Semaglutide, a GLP-1 analog in development for once-weekly subcutaneous treatment of T2D, demonstrated superior reductions in HbA1c and body weight across SUSTAIN 1–5 clinical trials. The efficacy of semaglutide 0.5 mg and 1.0 mg vs comparators (placebo, sitagliptin, exenatide ER, insulin glargine) by baseline HbA1c subgroup ( $\leq 7.5$ ,  $> 7.5$  to  $8.0$ ,  $> 8.0$  to  $8.5$ ,  $> 8.5$  to  $9.0$  and  $> 9\%$ ) was evaluated in a post hoc analysis of SUSTAIN 1–5. Semaglutide reduced mean HbA1c (%) from baseline in all subgroups vs all comparators. Mean HbA1c decreased by 0.7–2.5% with semaglutide 0.5 mg and 0.9–2.8% with semaglutide 1.0 mg, vs 1.8% to an increase of 0.6% with comparators (Figure). Across trials, reduction in HbA1c consistently increased with higher baseline HbA1c. In subjects with the highest baseline HbA1c ( $> 9\%$ ), an HbA1c target of  $< 7\%$  was achieved in 33–47% and 40–61% of subjects treated with semaglutide 0.5 and 1.0 mg, respectively, vs 3–21% with comparators; while 61–79 and 71–94% vs 7–60% achieved HbA1c level of  $< 8\%$ . Greater weight reduction with semaglutide vs comparators was observed across all baseline HbA1c subgroups. No new safety or tolerability issues were observed with semaglutide. Semaglutide consistently showed greater efficacy in lowering HbA1c vs comparators, regardless of baseline HbA1c. From a baseline HbA1c  $> 9\%$ , more than 40% of subjects achieved the HbA1c  $< 7\%$  target with semaglutide 1.0 mg (Sponsored by Novo Nordisk A/S) (Fig. 1).



**A382**  
**Sensitivity and specificity of laser speckle contrast imaging according to endo-pat index in type 1 diabetes**

Alessandra Saldanha Matheus Fernandes da Costa<sup>1</sup>, Maria de Fátima Bevilacqua da Matta<sup>1</sup>, Eliete Leão Silva Clemente<sup>2</sup>, Maria de Lourdes Guimarães Rodrigues<sup>3</sup>, Débora Cristina Torres Valença<sup>3</sup>, Marília Brito Gomes<sup>3</sup>

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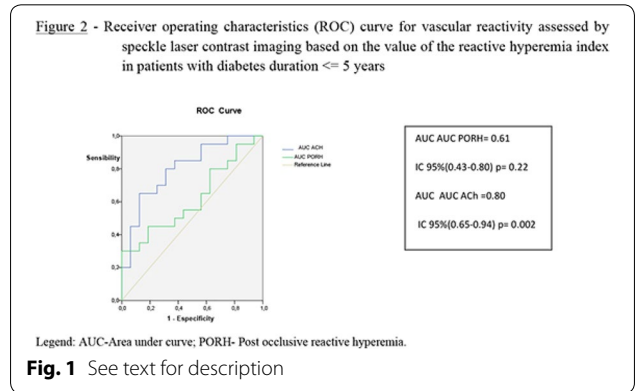
**Introduction:** Endothelial dysfunction (ED) in Type 1 Diabetes (T1D), is a common denominator in the pathophysiology of microvascular and macrovascular complications and is an early marker of cardiovascular risk (CVR).

**Objectives:** To determine the sensitivity and specificity of microcirculation (physiological and pharmacological) assessed through laser speckle contrast imaging (LSCI) based on cutoff value derived from the reactive hyperemia index (RHI) through Endo-PAT, which identifies the ones with ED in patients with T1D.

**Methods:** Patients with T1D, aged  $\geq 12$  years underwent a clinical-epidemiological questionnaire. Fasting blood samples were obtained (lipid profile, glycemic control and levels of C-reactive protein). Vascular reactivity was assessed in the forearm through the technique of LSCI at baseline, during post occlusive reactive hyperemia (PORH) and during iontophoresis of acetylcholine (ACh) and peripheral arterial tonometry was performed by supplying the RHI through Endo-PAT device.

**Results:** 189 patients were evaluated, 97 women (51.3%) with T1D, aged  $32 \pm 13$  years and with a disease duration of 16 (6–21) years and mean A1c of 9.2% ( $\pm 2.2$ ). Receiver Operating Characteristics curve (ROC) analysis according to RHI showed that the Area under curve (AUC) of ACh of 10,369 Laser Speckle Perfusion Unit (LSPU) presented sensitivity and specificity of 65 and 87.5%, respectively, ( $p = 0.002$ ) in those patients with T1D’s duration less than 5 years. Overall, no test of vascular reactivity was able to distinguish the ideal cutoff based on RHI.

**Conclusion:** In the present study, assessment of microcirculation through endothelium-dependent vasodilation to ACh using LSCI evidenced ED according to Endo-PAT’s score, only in those under 5 years of disease duration. Further prospective studies shall be conducted to evaluate its predictive cardiovascular value (Fig. 1)



**A383**  
**Serious sensitive neuropathy in type-1 diabetic patients without other chronic complications: case report**

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**Correspondence:** Júlia Vidal Caramori *Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A383**

**Case report:** JSM, 35 years old, married, with no history of alcoholism, with type-1 diabetes mellitus (DM) for 26 years, 3 years ago started feeling burning pain, paresthesia and hypoesthesia in her feet, which got worse at night and who has, for 4 months now, been presenting the same symptoms in her hands, starting at her distal phalanges and progressing to her hands greatly impact-ing her daily activities. During the physical examination, strength and tonus were preserved in up-per and lower limbs, tactile and painful hypoesthesia were present in her hands, and anesthesia in her feet with preserved reflexes. Tests were requested to evaluate glycemic control, the screening of lesions in target organs and investigation of peripheral neuropathy: glycemia while fasting: 262; HbA1c: 8.2; FAN: negative, TSH: 2.28, T4: 1.1; VIT B12: 454, VDRL: negative; urea: 30, creatinine: 0.6; microalbuminuria: 19.4; hemogram and electrophoresis of proteins without changes; ocular fundus without changes and electromyography with changes compatible with sensory poly-neuropathy predominantly in lower limbs. As a result, she was diagnosed with sensory polyneurop-athy and began treatment with Thioctacid and optimized insulin therapy for better glycemic control.

**Discussion:** The chronic DM complications are related to inadequate glycemic control, time of evo-lution, genetic predisposition and associated comorbidities, involving microvascular changes (reti-nopathy, nephropathy and neuropathies) and macrovascular changes. Diabetic neuropathy is charac-terized by progressive loss of myelin and axons, being the most frequent form of sensory polyneuropathy with or without autonomic manifestations. Sensitivity becomes more compromised in the distal segments of the limbs, usually assuming the form

of boots and gloves and affecting lower limbs more. In type-2 DM it can be detected during diagnosis, which in DM1, it normally appears 5 or more years after diagnosis.

**Final comments:** The neuropathic involvement of patients is usually precocious and of high prevalence, but most constitute diabetic triopathy—ophthalmopathy, nephropathy and neuropathy. It is an important public health problem, which causes morbidity and mortality and worsens quality of life due to incapacitation and decreased survival. In the case re-reported, the patient presented severe incapacitating sensory hand and foot polyneuropathy leading to early retirement without other microvascular complications shown by the complementary exams. Informed consent to publish had been obtained from the patient.

#### A384

##### Serum lipid profile in fulni-Ô indigenous people with diabetes and pre-diabetes—the project of atherosclerosis among indigenous populations (PAI)

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**Introduction:** Treating diabetes in indigenous populations is challenging due to difficulties to access adequate health care. Also, the prevalence of additional cardiovascular risk factors is unclear in this populations.

**Aim:** To assess the prevalence of dyslipidemia in Fulni-Ô Indigenous people with diabetes and pre-diabetes.

**Method:** PAI is a transversal study that included in the pilot phase 47 low urbanized Fulni-Ô indigenous people (Águas Belas, Pernambuco), males and females, aged between 30 and 70 years. Were excluded participants with history of cardiovascular diseases or that refused blood collection for laboratory analysis. Diabetes was established if HbA1c  $\geq$  6.5% or if in use of hypoglycemic drugs; pre-DM was established if HbA1c between 5.7 and 6.4%. Dyslipidemia criteria was: HDL < 40 mg/dL in males or < 50 mg/dL in females; LDL > 160 mg/dL; tryglicerides (TG) > 150 mg/dL; or total cholesterol (TC) > 200 mg/dL. Variables were described in their averages  $\pm$  standard deviation or proportions. The study was approved by the National Ethics Committee, approval number 1.488.268. Informed consent to publish has been obtained from these patients.

**Results:** Of the 47 indigenous people, 15 had diabetes and 24 pre-diabetes. Of those with diabetes, the average age was 58.5  $\pm$  11.5 years, 80% were female, 80% had low HDL, and 73.3% hypertriglyceridemia. LDL was calculated by the Friedwald formula in 4 participants, but none presented LDL > 160 mg/dL; all the others had TG > 400 mg/dL, not being possible to calculate. Moreover, 66.67% of the participants had TC > 200 mg/dL. When considering participants with pre-diabetes, the mean age was 36.5  $\pm$  4.5 years, 75% were female, 50% had low HDL, 8.34% had LDL > 160 mg/dL, 58.3% TC > 200 mg/days, and 54.16% had hypertriglyceridemia.

**Conclusion:** Fulni-Ô indigenous people with dysglycemia showed a high prevalence of dyslipidemia, particularly in females with diabetes.

#### A385

##### Severe diabetic ketoacidosis—initial manifestation of type 1 diabetes with hypernatremia and hyperglycemia unusually elevated—case report

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1)**:A385

**Introduction:** Type 1 Diabete Mellitus (T1DM) is caused by damage to pancreatic beta cells as a result of an autoimmune process in excess of 95% of the cases (type 1A), being idiopathic in less than 5% (type 1B). It incides in millions of people around the world, at any age, but the majority of the cases occurs in children, with the highest prevalence amongst pre-school children and around puberty. The principal acute complications are related to hypoglycemia and hyperglycemia, leading to diabetic ketoacidosis (DKA).

**Case report:** A 6 year old male was admitted into hospital with clinical complaints such as abdominal pain, nausea and vomiting, occurring in the last 48 h. He also presented oliguria and was taking Amoxicillin for pharyngitis in the last 24 h. Fever, dehydration, tachypnea, hyperpnea and obnubilation (Glasgow 11) were observed on physical examination. Laboratory findings: Glycemia: 1596 mg/dL, Na: 151 mEq/L, K: 4.9 mEq/L, creatinine: 3.67 mg/dL, urea: 178 mg/dL, pH: 7.09, pCO<sub>2</sub>: 16 mmHg, pO<sub>2</sub>: 163 mmHg and HCO<sub>3</sub>: 4.9 mEq/L. The patient was admitted to the Intensive Care Unit for treatment of Diabetic Ketoacidosis. After recovery and stabilization, new laboratory findings demonstrated C peptide: 0.66 ng/ml, Ab anti GAD 65: 1372 UI/mL and Ab anti IA2: 4000 UI/mL, which confirmed the diagnosis of Type 1 Diabete Mellitus. He was discharged from hospital taking Insulin NPH and Insulin Regular, subsequently substituted to Insulin Glargine and Insulin Lispro. In the last 18 months, the patient has shown good glicemic control and adhesion to treatment.

**Discussion:** DKA can be the initial manifestation of T1DM in up to 75% of the cases, being the most common pediatric emergency. The mortality rate in DKA depends on the precipitating events and/or complications of DKA treatment. In severe DKA (pH under 7.10), hypo, normo or hypernatremia can occur, as well as hyperglycemia ranging from 350 to 900 mg/dL. In this report, the patient presented a severe DKA (pH: 7.09 and HCO<sub>3</sub>: 4.9 mEq/L), hypernatremia (151 mEq/L) and hyperglycemia (1596 mg/dL), resembling levels of hyperglycemic hyperosmolar state, due to osmotic polyuria not compensated by polydipsia for at least the 48 h that preceded the admission to hospital. The patient's absence of adequate fluid ingestion was also consequent to dysphagia and odinophagia, attributed to a trivial bacterial pharyngitis. Informed consent to publish had been obtained from the patient.

#### A386

##### Shared medical appointments to introduce the carbohydrate counting therapy to children and adolescents with type 1 diabetes

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1)**:A386

**Introduction:** Carbohydrate counting therapy (CCT) is a nutritional approach that enables patients with type 1 diabetes (T1DM) to adjust their prandial insulin dose according to carbohydrate consumption. It aims to improve glycemic control and allow flexibility. Studies in adults have reported glycemic and lifestyle benefits when CCT is used. It is a challenge to bring this therapy to a greater number of patients, especially concerning the need for a specialized team to manage it. Shared medical appointments (SMAs) is defined as groups of patients meeting over time for comprehensive care for a defined chronic condition or health care state. It often uses educational or self-management enhancement strategies paired with medication and nutritional management in an effort to improve disease outcomes.

**Objective:** The objective of this study is to bring CCT to children and adolescents with T1DM through SMAs in a public health center for diabetes in Belo Horizonte, Minas Gerais, Brazil.

**Methods:** The patients attended four meetings lasting 60 min each for 4 months. The results were assessed by a self-applicable questionnaire administered 2 months after the end of the meetings.

**Results:** The group was composed of 18 participants. The mean age was 15.22  $\pm$  2.18 (10–18) years, most of the participants were male

(61.1%), and time of T1DM diagnosis was at  $5.61 \pm 2.82$  (1–11) years. Before the intervention, only 17% of the patients were practicing CCT, and afterward, 50% of them reported practicing CCT, all of whom wanted to maintain the therapy. In the group practicing CCT, 6 (67%) were practicing it for all meals and 3 (33%) for one daily meal. Of those 3 patients, 2 (67%) wanted to do it for all the meals. The benefits listed were mainly flexibility and improved control. In the group not practicing CCT, the reasons listed were the amount of time needed (34%), mathematics difficulties (22%), no desire to do it (22%), not understanding it (11%), and other (11%). The mean glycated hemoglobin on the baseline was  $9.95 \pm 1.69\%$  (8.1–12.9%), and after the SMA, it was  $9.8 \pm 2.06\%$  (7–14%). The glycemic control improved for the group that started practicing CCT, although it was not statistically significant. **Conclusion:** SMAs could be a useful tool to bring a greater number of patients to CCT, but further studies are necessary with a greater number of patients at different ages and longer to assess whether the SMAs can be useful to spread CCT to more patients (Fig. 1)

**Table 1:** Characteristics of participants and laboratory measures before and after intervention.

Variables	All patients n=18	Group 1 n=9	Group 2 n=3	Group 3 n=6
Age (years)	$15.22 \pm 2.18$ (10–18)	$15.22 \pm 2.28$ (12–18)	$16.67 \pm 0.58$ (16–17)	$14.57 \pm 2.23$ (10–17)
Sex				
Female	7 (38.9)	4 (44.4)	1 (33.3)	3 (42.8)
Male	11 (61.1)	5 (55.6)	2 (66.7)	4 (57.2)
Time of diagnosis (years)	$5.61 \pm 2.82$ (1–11)	$5.44 \pm 2.65$ (2–10)	$6.33 \pm 1.53$ (5–8)	$5.43 \pm 3.55$ (1–11)
Average A1c of the last year (%)	$9.53 \pm 1.40$ (7.1–12.3)	$10.29 \pm 1.32$ (8.4–12.3)	$8.23 \pm 0.31$ (7.9–8.5)	$9.07 \pm 1.28$ (7.1–10.6)
Baseline A1c (%)	$9.95 \pm 1.69$ (8.1–12.9)	$10.15 \pm 2.00$ (8.25–12.9)	$8.70 \pm 0.56$ (8.1–9.2)	$10.28 \pm 1.44$ (9.0–12.8)
A1c after SMAs	$9.8 \pm 2.06$ (7.9–14)	$10.85 \pm 2.08$ (7.9–14)	$8.06 \pm 0.80$ (7.2–8.9)	$9.08 \pm 1.68$ (7.9–11.8)

Group 1: patients not on CCT at the end of study; Group 2: Patients in CCT since the beginning of study; Group 3: Patients on CCT at the end of study. Values expressed as mean  $\pm$  DP (minimum maximum) or n (%). CCT: Carbohydrate counting therapy; SMAs: Shared medical appointments.

#### Ethics Approval

The study was approved by Santa Casa of Belo Horizonte Institution's Ethics Board, approval number 1.064.985 and written consent was obtained from all participants or from the parent or guardian if the patient is under 16.

**Fig. 1** See text for description

**Ethics approval:** The study was approved by Santa Casa of Belo Horizonte Institution's Ethics Board, approval number 1.064.985 and written consent was obtained from all participants or from the parent or guardian if the patient is under 16.

#### A387

##### Short intestinal exposure to rich diet in saturated fat induces local homeostatic breakdown, with systemic damage propagation

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**Introduction:** Studies have been showing, increasingly early, the deleterious effects in the organism associated to the saturated fat rich diet consumption, followed by molecular modifications, with immediately on physiological systems outcomes. This seems to occur in the gut exposed to the high-fat diet and is perhaps one of the initial triggers of the genesis of obesity.

**Aims:** To evaluate the relationship between the inflammatory and tight junction proteins in the distal ileum of animals exposed for a short time, and in a time dependent manner (3, 7 and 14 days) to

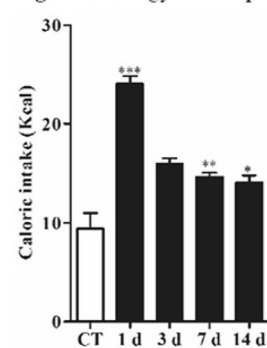
the diet rich in saturated fat. In addition, the fatty acid receptors were evaluated.

**Methods:** After approved by the Ethics Committee on the Use of Animals of the State University of Campinas (Protocol 3997-1), male C57BL/6J mice at 6 weeks of age were exposed to the normocaloric (CT) or high-fat diet (HF) for 3, 7 or 14 days. Weight gain, food consumption, and epididymal adiposity were evaluated. The distal ileum was removed for RT-qPCR analyzes related to inflammatory (TNF $\alpha$ , IL1 $\beta$ , IL6 and IL10) and junction proteins transcripts (ZO1-Zonula occludin1; Cldn7-Claudin7). The GPR120 and GPR40 fatty acid receptors gene expression were also evaluated. The data were submitted to Student's t-test and significant when  $P < 0.05$ .

**Results:** Compared to CT group, at the first moment, 1 day of HF diet consumption has impacted in 155% the caloric intake ( $P = 0.0001$ ). In the 14th day of HF diet, the food intake was reduced, however, the total caloric intake was maintained still greater than 25% compared to the CT group ( $P = 0.001$ ) (Fig. 1). The body weight gain induced by the HF diet was considerably reflected in the epididymal adipose tissue after 3 ( $P = 0.02$ ), 7 ( $P = 0.004$ ) and 14 ( $P < 0.0001$ ) days (Fig. 2 and 3). After 3 days of HF, there was a reduction in the IL10 anti-inflammatory gene expression ( $P = 0.001$ ), which normalized in 7 days. Even in 7 days, there was a reduction of the pro-inflammatory TNF $\alpha$  ( $P = 0.001$ ). Significant changes in the ZO-1, Cldn-7, GPR120 or GPR40 gene expression were not observed in any of the periods. Despite a notable increase, there was no statistical significance ( $P > 0.05$ ) after 3, 7 and 14 days of HF diet compared to GPR40, IL6, IL10, ZO1 and Cldn7 genes (Fig. 4).

**Conclusion:** The data show that even under short-term period of high-fat consumption, the diet promoted changes in body mass and in the pattern of gene expression of inflammatory bowel proteins. Short-term exposure is not, in fact, capable of initiating obesity; however, we understand that the adoption of this dietary pattern and its maintenance impairs intestinal homeostasis, and can serve as a foundation for the obesogenesis (Figs. 1, 2, 3).

**Figure 1.** Energy consumption (Kcal) during experimental time

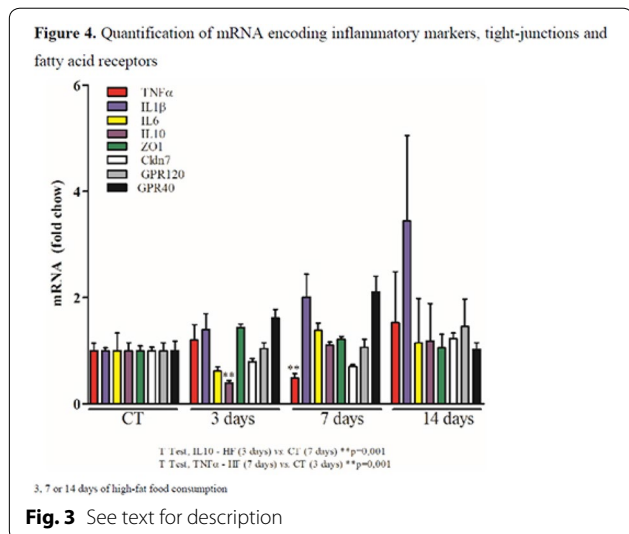
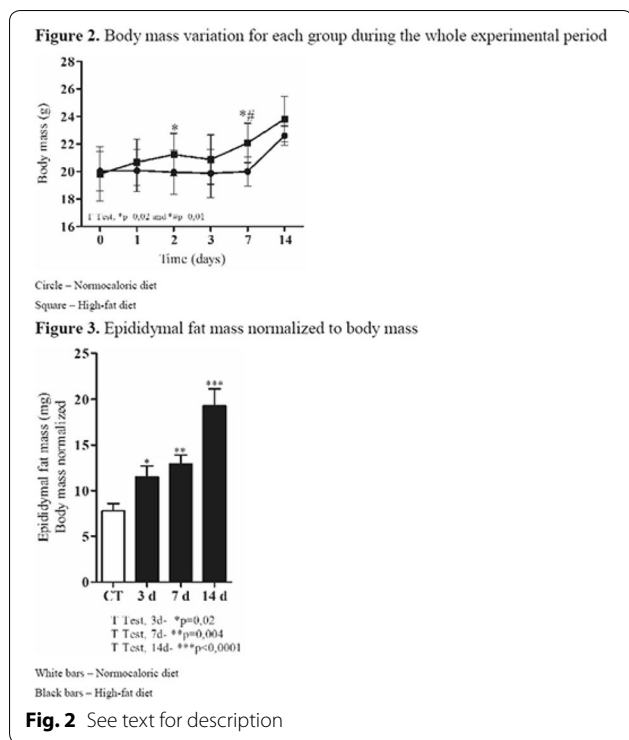


T Test, 1 day \*\*\*p 0,0001; \*\*p 0,005 and \*p 0,001

White bars – Normocaloric diet

Black bars – High-fat diet

**Fig. 1** See text for description



**A388**  
**Short message service technology as a tool to reduce absenteeism to scheduled appointments: a prospective 4 years duration study**  
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**Backgrounds:** The technology of Short Message Service (SMS) is an important tool in healthcare system and contributes to reduce the

absenteeism to the scheduled appointments and to better adhesion and treatment of chronic diseases as diabetes mellitus.

**Aims:** To evaluate whether sending scheduled appointment date reminders through SMS for attendance at a healthcare unit would reduce the absenteeism of appointments with the interdisciplinary team, during a period of 4 years of follow-up.

**Methods:** Absenteeism was accessed by the total number of patients that scheduled appointments in relation to the non-attendance at the scheduled date, as well as to the number of appointments and idleness of the team, during the study period from SMS sending since 2013. The SMS was sent 1 week before the appointment date. The appointments were scheduled 3 months in advance and included 3-5 different professionals' appointments per shift.

**Results:** The absenteeism in 2012 (before SMS intervention) was 20.0 ± 3.3% (7736 patient's appointments/1524 absentees), in 2013: 15.9 ± 2.1%, 2014: 15.4 ± 1.8%, 2015: 17.8 ± 3.7% and 2016: 16.8 ± 3.5%. There was a significant reduction in absenteeism over the consecutive years (p = 0.0035), being 20.5% (p = 0.0024) in the first year, 23.2% (p = 0.0004), 11.3% (p = 0.060) and 16.2% (p = 0.016) in subsequent years. This reduction was more evident in the first 2 years of the intervention (20.5 and 23.2%); however, it remained until the fourth year of the study (11.3 and 16.2%). Regarding the scheduled appointments, the absenteeism in 2012 was 14.9 ± 2.9% (17,196 schedules/2510 idle attendances), 2013: 11.9 ± 1.9%, 2014: 11.5 ± 1.7%, 2015: 13.9 ± 3.7% and 2016: 13.3 ± 1.7%. In the evaluation period, there was a reduction in the idleness of the agenda (p = 0.0008) and scheduled appointments (p = 0.0143).

**Conclusions:** Our data demonstrated that the SMS technology is an important tool in reducing absenteeism to the healthcare system and the interdisciplinary team. However, they indicate that in addition to sending the SMS, other interventions are still necessary to maintain these results over the long-term period.

**A389**

**Shorter time to glycemic control with fixed-ratio combination of insulin glargine and lixisenatide compared with insulin glargine treatment alone**

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Time to glycemic control with a fixed-ratio combination of insulin glargine (iGlar) and lixisenatide (iGlarLixi) vs. iGlar alone was evaluated in patients with T2DM uncontrolled on oral antidiabetic agents or basal insulin (BI) as a post hoc analysis of the LixiLan-O (LL-O) and LixiLan-L (LL-L) trials. The Kaplan-Meier method was used to estimate time to control, defined as time (days) to first achieve HbA1c < 7% or FPG ≤ 130 mg/dL. In LL-O and LL-L, 45 and 60% of patients, respectively, reached target HbA1c with iGlarLixi at 12 weeks (Table). In LL-O, 50% of patients achieved HbA1c < 7% in approximately half the time with iGlarLixi vs. iGlar (median, 85.0 days vs. 166.0 days; hazard ratio [HR]: 1.5; p < 0.0001). In LL-L, the HbA1c target was achieved by 50% of patients in a median time of 153.0 days with iGlarLixi, but target HbA1c was never reached by 50% of patients with iGlar (HR: 2.0; p < 0.0001). In contrast, when time to glycemic control was analyzed for FPG, results were comparable vs. iGlar in both studies. In addition to lowering FPG via iGlar, iGlarLixi lowers PPG, likely contributing to its greater efficacy in achieving glycemic control vs. iGlar alone. In conclusion, in patients with T2DM uncontrolled on oral agents or BI, iGlarLixi induced glycemic control (HbA1c < 7%) earlier and in more patients vs. iGlar alone. Study codes: NCT02058160 and NCT02058147. This is an ENCORE abstract previously presented at ADA 2017. Funding and editorial support provided by Sanofi (Fig. 1).

**Table.** Achievement of glycemic control targets in the LL-O and LL-L trials (safety population)

	IGlar/Lixi N=469	IGlar N=467
<b>LL-O*</b>		
HbA <sub>1c</sub> <7%		
Patients achieving target, n (%) <sup>1</sup>		
n	468	466
At 8 weeks	186 (39.7)	128 (27.5)
At 12 weeks	279 (59.6)	209 (44.8)
Days to first HbA <sub>1c</sub> <7%, median <sup>2</sup>	85.0	166.0
HR (95% CI) <sup>3</sup>		1.5 (1.3, 1.7)
p-value <sup>4</sup>		<0.0001
FPG ≤130 mg/dL		
Days to first FPG ≤130 mg/dL, median <sup>2</sup>	56.0	57.0
HR (95% CI) <sup>3</sup>		1.1 (1.0, 1.2)
p-value <sup>4</sup>		0.2134
<b>LL-L*</b>		
HbA <sub>1c</sub> <7%		
Patients achieving target, n (%) <sup>1</sup>		
n	366	365
At 8 weeks	116 (31.7)	73 (20.0)
At 12 weeks	168 (45.9)	87 (23.8)
Days to first HbA <sub>1c</sub> <7%, median <sup>2</sup>	153.0	NR
HR (95% CI) <sup>3</sup>		2.0 (1.7, 2.5)
p-value <sup>4</sup>		<0.0001
FPG ≤130 mg/dL		
Days to first FPG ≤130 mg/dL, median <sup>2</sup>	1.0	1.0
HR (95% CI) <sup>3</sup>		0.9 (0.8, 1.1)
p-value <sup>4</sup>		0.2137

\*In both LL-O and LL-L, drug titrations were based on the same algorithm; <sup>1</sup>Responder analysis based on the mITT population: estimated by proportion of patients achieving targets at Weeks 8 and 12; <sup>2</sup>Median time to control: defined as 50% of patients reaching target as estimated by Kaplan–Meier method; <sup>3</sup>Estimated using Cox regression model with treatment as the only factor; <sup>4</sup>Calculated using log-rank test. CI, confidence interval; FPG, fasting plasma glucose; HbA<sub>1c</sub>, glycated hemoglobin; HR, hazard ratio; mITT, modified intent to treat; NR, not reached (ie, target not reached by 50% of patients)

**Fig. 1** See text for description**A390****Sleep disturbance in pregnancy complicated by diabetes mellitus**

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<sup>1</sup>unichristus; <sup>2</sup>Universidade Federal do Ceará; <sup>3</sup>Centro Integrado de Diabetes e Hipertensão; <sup>4</sup>Unichristus

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**Background:** Gestational diabetes (GDM) and sleep disorders, are prevalent conditions during Pregnancy, but the interrelationships between sleep and metabolic changes are not well established in the literature. It is known that insulin resistance is a common disruptor and sleep disorders are risk factors for diabetes, obesity and the metabolic syndrome also out of gestation. The influence of sleep disturbances during diabetic gestation is not well established.

**Objectives:** To investigate the quality of sleep in a group of patients with diabetes during pregnancy attending a referral service in north-west of Brazil.

**Methodology:** This is a prospective study, with convenience sample. Data were collected through an interview. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI), a validated version in Portuguese. The study was approved by Instituto para o Desenvolvimento da Educação Ltda-IPADE ethic board, approval number 1.801.860. The statistical analysis was performed by Epi Info software version 7.1.3.10.

**Results:** Eighty-six diabetic pregnant women aged 19–44 with a mean age of 32.5 years were evaluated. The mean gestational age was 25.6 weeks (ranging from 10 to 38 weeks). It was observed 8.5% with Type 1 DM, 21.7% Type 2 DM and 69.8% GDM. They were treated with insulin 43%, Metformin: 31.4%, Glibenclamide: 1.1 and 48.8% with diet alone. 87.2% were overweight/obese. Sleep quality assessed by PSQI ranged from 1 to 16 with an average score of 7.4. Poor quality of sleep (PSQI ≥ 6) was observed in 67.5% of the patients, and more prevalent among obese pregnant women, 56.9% with BMI > 30, 42.2% with BMI ≥ 25 and < 30, and only 0.9% had BMI < 25.

**Conclusions:** Sleep disorders characterized by poor sleep quality were frequent in pregnant women with diabetes. There was an association

between overweight/obesity and poor sleep quality. Due to the importance of health and metabolic balance in women with diabetes in pregnancy, we consider it important to deepen this research and to evaluate if measures that improve the quality of sleep in these women can possibly have a positive impact on the weight gain during pregnancy or other gestational outcomes.

**A391****Social media as a platform for information about diabetes foot care: a study of Brazilian facebook groups**

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**Background:** Nowadays, Diabetes Mellitus (DM) is one of the most challenging chronic health conditions worldwide. Diabetes foot-related complications require appropriate education of the patient, but it can be prevented by proper foot care [1, 2]. On the other hand, social media such as Facebook, Instagram, and Twitter provides important opportunities for enhancing health communication and health care, including self-management of chronic conditions such as DM [3, 4]. However, no study has evaluated the occurrence of Brazilian Facebook groups used as the source of information sharing about diabetic foot care.

**Objective:** This study analyzed the occurrence of groups related to diabetic foot care on Facebook in Brazil.

**Materials and methods:** Facebook was searched on May 16, 2017, using the following terms in Portuguese: “diabetic foot”, “diabetic foot care”, “foot care”, “podiatry”, “podiatric care”, “and diabetic neuropathy”. Private groups, with less than three members, not from Brazil, and those not related to the topic, were excluded. Public groups associated with search terms were included. Two reviewers (PHL and DPC) independently collected the following information from the eligible groups’contents: privacy, language, title of the group, URL posting dates and number of likes, shares and comments. Any disagreement between the researchers was resolved by discussion until a consensus was reached [1]. The data were analyzed and described.

**Results:** Search resulted in a total of 64 groups. Of these, the following correlations were found for the search terms: 26 groups for “diabetic foot”; 0 (zero) for “diabetic foot care”; 7 for “foot care”; 1 for “podiatric care”; 11 for “podiatry”; and 19 for “diabetic neuropathy”. After applying the exclusion criteria (12 non-Portuguese groups [9: English, 3: Spanish], 6 groups with less than 3 members, and 29 private groups), 17 Brazilian Facebook groups were related to the diabetic foot care.

**Conclusion:** Facebook is a social networking system widely used in healthcare, but little explored in the field of diabetic foot care. Brazilian professionals, National Health Organizations and National Diabetes Organizations could use more this kind of online platform as a support for health education. In this context, the Internet and the social network like Facebook provides opportunities to strengthen communication and support among individuals with DM, their families, health care providers, and others. The authors are grateful to the CNPq, FAPEMIG and UFVJM for the support.

**A392****Sociodemographic and clinical profile of people with diabetic foot risk attended in basic attention**

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**Introduction:** One of the complications of diabetes mellitus (DM) is the diabetic foot, characterized by isolated lesions or several that

occur on the feet of people with DM, usually due to triad composed of neuropathy peripheral artery disease and infections. As known, the recognition of the socio-demographic and clinical profile of patients are of great importance for the planning of health actions, multiprofessional team, aiming at the integral care.

**Objective:** Draw the demographic profile and people with clinical risk for diabetic foot served in the basic attention.

**Method:** Cross-sectional study, with a quantitative approach, in 82 people with DM2 met in six units of the basic attention of Fortaleza-Ceará-Brazil. The data were collected through individual interview and physical examination of the foot and analyzed by Student's t test. The research was reported in Brazil Platform under the number of the certificate of introduction to Ethics Assessment: 47663215.5.0000.5534.

**Results:** There was a predominance of female, 59 (72%), the average was  $60.5 \pm 13.6$  years, 38 (46%) there were 5–9 years of study, with an average  $6.2 \pm 4.2$ , 44 (54%) were married, 66 (80%) played home activities and/or were retirees 72 (88%) had income of less than two minimum wages, average of  $10 \pm 7.2$  years of diagnosis, 66 (80%), used predominantly the oral hypoglycemics the food plan was not executed by 43 (52%), 8 (9.8%), blood glucose check routinely said, 70 (85.3%) reported some other disease, HAS 73 (89%), reported not be smoking, it was noticed the predominance of family, 64 (78%), whose relationship is of the first kind, on the practice of physical activity, the majority (65%), 53, if sedentary, said the data showed overweight, 26 (31%), 45 (55%) had normal values in PAS and 64 (78%) in the PAD, glucose levels, 72 (86%) were with their levels altered. In relation to clinical aspects made by examination of the foot, 56 (68.2%) had grade 0, 16 (19.5%) grade 1, 9 (11%) grade 2 and 1 (1.2%) grade 3.

**Conclusion:** The identification of the profile of people with risk for diabetic foot can contribute to the intensification of educational actions for prevention of health supporting strategies for treatment adherence and control of the complications. Informed consent to publish had been obtained from the patient.

### A393

#### Sodiometric profile and prevalence of arterial hypertension in older diabetics attended in ambulatory of endocrinology

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**Introduction:** Hypertension is one of the most prevalent health problems today, contributing to the appearance and progression of micro and macrovascular complications in the diabetic population. However, it is known that many patients do not achieve adequate blood pressure control despite antihypertensive treatment.

**Objective:** To determine the prevalence of uncontrolled hypertension in a sample of elderly diabetics.

**Methodology:** Sectional study, descriptive in nature, based on data from type 2 diabetic patients over 65 years of age. Uncontrolled hypertension was considered if PAS  $\geq 140$  mmHg and/or PAD  $\geq 90$  mmHg during the last 3 outpatient visits.

**Study design:** Sectional Descriptive Study. Endocrinology Outpatient Clinic METHODS We analyzed 274 diabetic patients. It was considered: DM type 2—Patients older than 65 years—PAS  $\geq 140$  mmHg—PAD  $\geq 90$  mmHg.

**Results:** According to the data, 274 patients (68% men) were evaluated, with a mean age of  $57.8 \pm 5.8$  years. Uncontrolled blood pressure was verified in 32% patients ( $n = 87$ ), although 86% used antihypertensive medications. Among the group with uncontrolled blood pressure, the majority of males (82%), younger ( $49.2 \pm 1.6$  vs.  $61.3 \pm 2.7$  years,  $p < 0.001$ ) and more obese (BMI  $33.46 \pm 3.1$  vs.  $25.58 \pm 1.86$ ,  $p < 0.005$ ). There were no significant differences in the

time of diagnosis of hypertension or diabetes, serum creatinine and potassium.

**Conclusion:** According to our results, blood pressure levels above the targets were highly prevalent, mainly among the elderly male, being, however, slightly lower than the data available in the literature. We also emphasize the predominant profile found in our sample, consistent with those likely to develop macrovascular complications. Within this context, strict and simultaneous control of both pathologies is imperative, given the high rates of complications, disability and deaths associated with diabetes and hypertension.

### A394

#### Stiff-person syndrome and type 1 diabetes mellitus: report of a family

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**Case report:** A 49-year-old woman presented unable to walk after a 6-month history of progressive right leg stiffness, foot spasms and pain. Physical examination confirmed markedly increased tone muscles and revealed her right foot was plantarflexed and inverted with no active or passive movement in the right ankle or knee due to increased tone. Cerebral and spinal MRI were unremarkable and cerebrospinal fluid examination was negative for pathologies. Electroneurography and myography revealed no neurological abnormality. Suspected Stiff-Person Syndrome (SPS) was confirmed by the increased anti-GAD antibodies (722 UI/mL) and the marked improvement in rigidity and stiffness with clonazepam, baclofen and immunosuppressive treatment with azathioprine. Diabetes was diagnosed a year after (fasting glucose of 301 mg/dL, HbA1C of 9.9%, C-peptide of 0.2 ng/mL), requiring insulin since diagnosis. Patient remained in good general condition, with no new organ involvement. Some years after, her daughter, 27-years-old, presented the same clinic of SPS with slowly progressive stiffness, rigidity and painful muscle spasms. Diagnosis of SPS was confirmed. Diabetes with positive anti-GAD antibodies was diagnosed after 2 years and treated with insulin since diagnosis. Patient developed miastenia gravis after 3 years. She also presented a good response to treatment.

**Discussion:** Stiff-Person Syndrome (SPS) is a rare neuroimmunologic disorder characterized by progressive muscle stiffness, rigidity and painful spasms. Clinical manifestations of SPS have been attributed to dysfunction of inhibitory mechanisms within the central nervous system. GABA is the main inhibitory neurotransmitter, is produced by GAD (glutamic acid decarboxylase) and is decreased in the presence of anti-GAD antibodies, which are markers of SPS (prevalence of 60–80%). There is a strong association with others autoimmune-mediated disorders, as type 1 diabetes mellitus (T1DM), which is observed in 30% of SPS patients and also presents anti-GAD antibodies positivity (80%). An immune pathogenesis is accepted as the cause of SPS, but remains unclear whether anti-GAD antibodies are directly pathogenic, unlike in T1DM.

**Conclusion:** SPS is a very rare disease without well established pathogenesis and debilitating nature if not recognized in time. Association with T1DM, anti-GAD antibodies and other autoimmune disorders could contribute to clinical suspicion and earlier diagnosis.

### A395

#### Style of life and self perception of the consumption of sugars and fibers in employees of a higher education institution of Recife-PE

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**Introduction:** About 45% of the world's population and about 58% of the population over 10 years of age are part of the workforce. The work of this population supports the economic and material basis of societies that, on the other hand, are dependent on their ability to work. In this way, worker health and occupational health are crucial prerequisites for productivity and are of paramount importance for socioeconomic and sustainable development.

**Objective:** To evaluate the lifestyle and self-perception of the consumption of sugary and high-fiber foods in employees of a higher education institution in Recife-PE.

**Method:** The research was conducted in April and May 2017, with a group of 140 professionals from a higher education institution, where factors related to nutritional status, health/lifestyle and self-perception of consumption of sweets; soft drinks and processed juices and fiber. As a data collection instrument, a specific form was used, which was filled in a laboratory of the institution, using the technique of interview and direct measurement of the anthropometric measurements (weight, height) and another questionnaire of food frequency of VIGI-TEL 2014, on habits food.

**Results:** A total of 136 employees, 64.7% female, over 30 years old (57.3%), married (50%), postgraduate (54%), income up to 5 wages (62, 5%) and average workload of 43.2 h/week. It was observed that only 1.4% and 3.6% had diabetes and hypertension, respectively. However, 57.3% reported a sensation of stress in the last 2 months; 55.1% did not practice regular physical activities; 62% were overweight. In the self perception of sweet food consumption, the categories 1–2 times/week (25%) and every day (29%) were the most mentioned; in the consumption of soft drinks or industrialized juices, 40% take from 1 to 4 times a week; and 47% report low consumption of fiber-rich foods.

**Conclusion:** Following the recommendations of the World Health Organization, the health of the worker and the work environment must be considered important axes in the promotion of the quality of life and in the promotion of healthy practices, aiming at the prevention of chronic diseases. In this study, we observed the factors that may, in the long term, compromise the health status of this population.

### A396

#### Sustain 6: a post-HOC analysis of the effect of semaglutide on cardiovascular outcomes over time in subjects with type 2 diabetes

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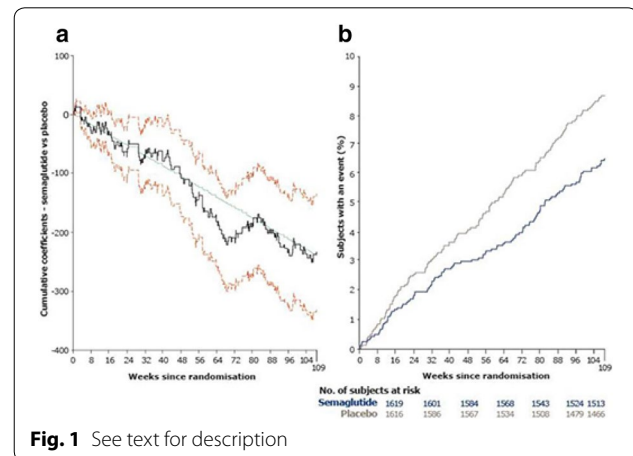
**Introduction:** Semaglutide is a glucagon-like peptide-1 (GLP-1) analogue in development for type 2 diabetes (T2D). SUSTAIN 6, a 2-year, cardiovascular (CV) outcomes, randomised, placebo-controlled trial, was conducted in 3297 adults with T2D at high CV risk. Once-weekly subcutaneous semaglutide (0.5 or 1.0 mg) added to standard of care led to a significant 26% reduction (hazard ratio [HR], 0.74; 95% confidence interval [CI] 0.58–0.95) in risk of the primary outcome (CV death, non-fatal myocardial infarction [MI] or non-fatal stroke) vs placebo, driven by risk reductions in non-fatal MI (26%; HR, 0.74; 95% CI 0.51–1.08) and non-fatal stroke (39%; HR, 0.61; 95% CI 0.38–0.99).

**Objective:** To explore the effect of semaglutide on the primary outcome over time. This analysis can help support mechanistic understanding by evaluating whether there is evidence of a weakened, strengthened or constant treatment effect during the trial.

**Methods:** An extended Cox model with a time-varying treatment effect was used to plot the cumulative treatment coefficient (logarithm of the HR) in order to further assess the dynamic in the overall treatment effect. These results were compared to the cumulative incidence over time of subjects with a CV event for each treatment, as depicted in a Kaplan–Meier plot.

**Results:** The beneficial effect observed with semaglutide vs placebo on the primary outcome was constant over time, demonstrated by the negative and uniform slope throughout the duration of the trial (Fig. 1A). Thus, CV events accumulated at a lower rate with semaglutide vs placebo for the entire 2 years, confirming an effect from treatment onset that persisted throughout the trial. This was consistent with the constantly diverging cumulative incidences of subjects with events shown in the Kaplan–Meier plot (Fig. 1B). Similar results were observed for the non-fatal MI and non-fatal stroke individual components.

**Conclusions:** In SUSTAIN 6, in subjects with T2D at high CV risk, a clinically relevant benefit of semaglutide on risk of CV events was constant and persisted for the entire 2-year duration of the trial (Fig. 1)



**Fig. 1** See text for description

### A397

#### Sweeteners consumption in diabetes mellitus pregnancy: a systematic review

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**Introduction:** Diabetes Mellitus (DM) has become a worldwide epidemic, among the clinical presentations of DM, there is gestational diabetes (GDM) which is characterized by a metabolic change that may affect 3–25% of pregnant women. Nutritional therapy is the first treatment option for GDM and sweeteners are considered to be coadjutant in dietary management.

**Objective:** The objective of evaluating the use of sweeteners in DMG through systematic review of the literature.

**Method:** The scientific search was conducted between 2006 and 2015, where the following databases were consulted: Medline/Pubmed, Scientific Electronic Library Online/SciELO and Latin American and Caribbean Center for Health Sciences Information/BIREME. The keywords used were: Gestational diabetes; Sweeteners and Sweeteners, in Portuguese and English. Inclusion criteria were: studies with pregnant women adults and elderly diabetics; studies on the consumption of sweeteners, frequency and the type most consumed.

**Results:** Thirty-one studies were selected, of which two were with diabetic pregnant women. It was found that the majority of pregnant women evaluated the used sweeteners saccharin and/or cyclamate, which was higher by consuming these processed products, up to 98% of pregnant women consuming drinks with sweeteners. However, these studies did not show the reasons for such consumption, but pointed out that the choice of sweetener was based on taste satisfaction.

**Conclusion:** The use of sweeteners based on saccharin and cyclamate was verified, as well as the consumption of soft drinks with sweeteners in the evaluated pregnant women. It is necessary new studies

evaluating safe dosage and possible health risks from the consumption of sweeteners during pregnancy.

**A398**

**Switching to insulin glargine 300 U/ml (GLA-300) after failure of basal supported oral therapy (BOT) with other basal insulins (BI) in T2DM patients (PTS) improved glycemic control with less nocturnal hypoglycemia (TOP-2)**

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TOP-2 is a 12 months prospective observational study in Germany, Austria and Switzerland investigating the effects of switching T2DM pts uncontrolled on BOT with other BI to Gla-300 in daily clinical practice. Adult pts currently on a BOT with an indication for changing their insulin therapy due to non-achievement of glycemic targets (A1c 7.5–10.0%) are enrolled. Primary endpoint (EP) is the rate of pts achieving a fasting plasma glucose (FPG) ≤ 110 mg/dL after 6 and 12 months, respectively. Secondary EPs include change in A1c, FPG, body weight (BW) and insulin dose, hypoglycemia incidence and safety. Here we report on an interim analysis including all German pts, for whom 6 month results were available 15 months after study start (n = 661). Pts baseline characteristics, efficacy and hypoglycemia EPs are shown in Table 1. Main previous BI was insulin glargine 100 U/mL (50.1%). Most common oral therapy was Metformin ± DPP-4 inhibitors (46.1%). Six months after switching to Gla-300 mean (± SD) A1c was improved from 8.21 ± 0.8 to 7.67 ± 1.0%. Less pts experienced nocturnal hypoglycemia (0.5% vs 1.2%). BW remained stable. In conclusion, switching the BI in BOT to Gla-300 allowed uncontrolled pts to reduce their A1c by 0.5% with > 50% less nocturnal hypoglycemia. Final results are expected for 2018 (Fig. 1)

**Table 1.** Patient baseline characteristics, efficacy and hypoglycemia endpoints.

Patients baseline characteristics	TOP-2 FAS baseline [mean±SD]	N	TOP-2 FAS 6 month [mean±SD]	N	Difference [mean±SD]	N
	Age [years]	64.4±10.5	661			
Diabetes duration [years]	11.0±6.7	513				
Sex m/f [%]	57.6/42.4	661				
Indiv. Target HbA <sub>1c</sub> [%]	7.0±0.5	661				
BMI [kg/m <sup>2</sup> ]	32.3±5.7	622				
BMI <30kg/m <sup>2</sup> [%]	37.2	246				
BMI ≥30kg/m <sup>2</sup> [%]	56.9	376				
Height [cm]	171.0±9.1	634				
<b>Efficacy endpoints</b>						
Weight [kg]	94.6±18.7	638	95.3±19.1	575	0.1±5.4	572
FPG [mg/dL]	172.7±43.6	649	142.4±38.9	614	-30.4±49.3	606
HbA <sub>1c</sub> [%]	8.21±0.8	659	7.67±1.0	623	-0.52±0.9	621
Insulin dose total [U/d] per kg body weight [U/kg*d]	28.6±15.8	651	33.1±17.8	638	4.4±9.7	629
	0.31±0.16	628	0.35±0.18	620	0.04±0.11	608
<b>Hypoglycemia endpoints</b>						
	Incidence before start of Gla-300* [N(%)]	N	Incidence after start of Gla-300* [N(%)]	N	Hypoglycemia rate <sup>†</sup> [events/patient year; N (95% CI)]	
Symptomatic hypoglycemia	8 (1.2%)	650	8 (1.2%)	645	0.05 (0.03, 0.07)	
Confirmed (SMBG<70mg/dL) symptomatic hypoglycemia	7 (1.1%)	650	5 (0.8%)	645	0.04 (0.02, 0.06)	
Nocturnal (10pm-6am) confirmed (SMBG<70mg/dL) or symptomatic hypoglycemia	8 (1.2%)	650	3 (0.5%)	645	0.01 (0.00, 0.02)	
Severe confirmed (SMBG<56mg/dL) or symptomatic (assistance required) hypoglycemia	1 (0.2%)	650	1 (0.2%)	645	0.00 (0.00, 0.01)	
Severe nocturnal (10pm-6am) confirmed (SMBG<56mg/dL) or symptomatic (assistance required) hypoglycemia	1 (0.2%)	650	1 (0.2%)	645	0.00 (0.00, 0.01)	

BMI, body mass index; FPG, fasting plasma glucose; SMBG, self measured blood glucose; \*Incidence within 12 weeks before start of Gla-300; †Incidence within 12 weeks 6 months after start of Gla-300; ‡ Calculated for month 0-6 for all patients with treatment duration an number of hypoglycemia available.

**Fig. 1** See text for description

**A399**

**Techniques for preparation and application of insulin: an analysis of youtube videos**

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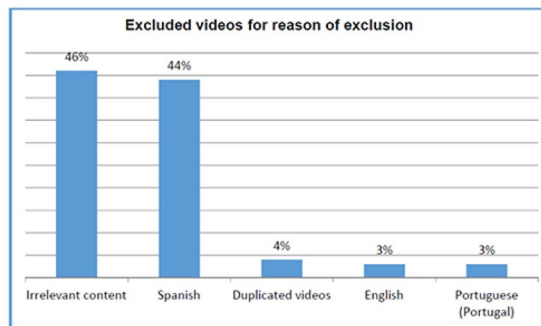
**Background:** YouTube is a resource that can influence people’s behavior, including the diabetic patient and their caregivers [1–4]. Studies highlight the importance of YouTube as a source of information about some diseases including Diabetes Mellitus (DM) [3, 5, 6]. However, no study has evaluated the use of YouTube as a source of information about the technique of preparation and application of insulin.

**Objective:** In this study, our aim was to research the videos on YouTube Brazil regarding the application of insulin.

**Materials and methods:** This is an exploratory and quantitative study. The search was conducted on YouTube on July 15, 2017, using the terms “insulin application”. The videos of greater than 30-min duration, without audio, not recorded in Brazilian Portuguese language and those not related to the focus were excluded. Were included the videos associated with the terms and available on the first 10 pages (200 videos) of search results [3]. An instrument was created to evaluate the technique of preparation and application of insulin, based on the Guidelines of the Brazilian Society of Diabetes [SBD, 2016]. The videos were analyzed independently by MD and VP. Were recorded the following parameters for all videos: the upload date, number of views, duration, “likes”, “dislikes”, and comments. Approval by the ethics committee was not required, since YouTube search is not directly involved with humans using public domain material [7].

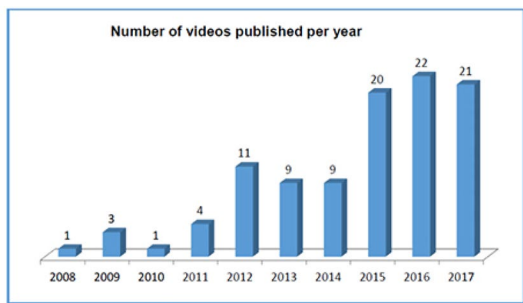
**Results:** Our search resulted in a total of 8450 videos, of which 200 corresponding to the first 10 pages were pre-selected, and 99 videos were excluded, according to the criteria (Graphic 1). The other 101 videos analyzed were published between 2008 and 2017, and presented the following metrics: 2,883,951 views; 58,693 “likes”; 1171 “dislikes”; 22 comments; and total duration of 8 h, 9 min and 51 s. The 10 most viewed videos are shown in Graphics 2–6.

**Conclusion:** The number of video publications on insulin application has been increasing, showing that YouTube has been increasingly used in both search and video transmission for diabetes education. However, the analysis revealed incomplete or incorrect information regarding the preparation and application of insulin, which may be negatively influencing adherence to insulin treatment. In this sense, it is emphasized the need to know more about how the insulin preparation and application technique on YouTube has been reproduced and disseminated in Brazil, in order to contribute to safer insulin practices. The authors are grateful to the CNPq, FAPEMIG and UFVJM for the support (Figs. 1, 2, 3)

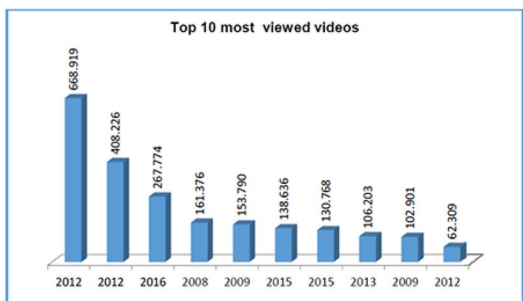


**Graphic 1:** Excluded videos according to inclusion/exclusion criteria.

**Fig. 1** See text for description

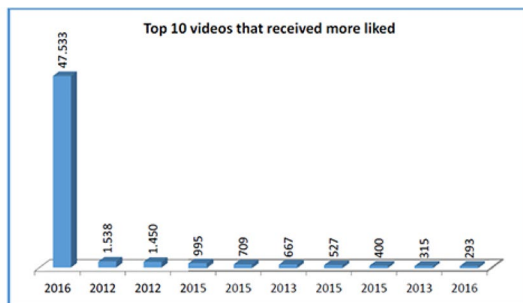


Graphic 2: Number of videos published per year from 2008 onwards.

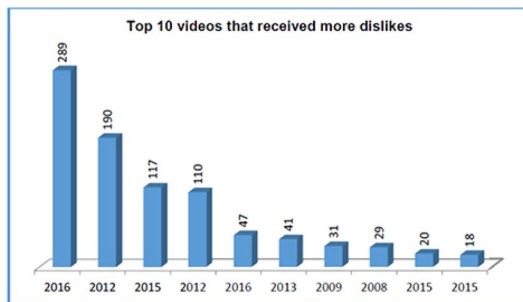


Graphic 3: The top 10 most widely viewed YouTube videos by year of publication and number of views.

Fig. 2 See text for description



Graphic 4: The top 10 videos that received more likes on YouTube by year of publication and number of likes.



Graphic 5: The top 10 videos that received more dislikes on YouTube by year of publication and number of dislikes.

Fig. 3 See text for description

**A400**

**The association of the g allele of rs1990760 polymorphism of the IFIH1**

**gene with risk for arterial hypertension in type 1 diabetic patients**

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**Background:** The rs1990760 polymorphism of the IFIH1 gene has been associated with the presence of type 1 Diabetes Mellitus (T1DM), and its allele A is associated with protection to hypertension in those patients [1]. In this study, we propose to investigate this association using the 24-h ambulatory blood pressure monitoring (ABPM) in patients of the Hospital de Clínicas de Porto Alegre (HCPA).

**Results:** In patients with the polymorphism analyzed previously, 127 also had an ABPM. These patients were stratified according to their genotype (G/G, G/A or A/A) and the results of the ABPM were analyzed under dominant, recessive and additive inheritance model. Under a recessive model (Table 1), the GG and GA genotypes are associated with higher prevalence of hypertension diagnosed by the ABPM (56.3% vs. 29.0%, p = 0008), especially in the nocturnal period (54.2% vs 25.8%, p = 0,006), higher levels of blood pressure (BP) in the nocturnal period (69 mmHg ± 9 vs 65 mmHg ± 9, p = 0,02) and lower occurrence of the dipping pattern at night (55.2% vs 71%, p = 0,04) compared with the AA genotype (Fig. 1). These findings (Table 2) remained significant after adjusts for time of diabetes and glycated hemoglobin levels (OR 3.68; IC 95% 1.39–9.74); p = 0,009). The presence of the G allele was associated with an absolute fall of 4.74 mmHg + - 2.03 in the diastolic blood pressure (p = 0.021). HbA1c also has affected this finding.

**Conclusion:** T1DM patients that present with the G allele of the genotype for the rs1990760 polymorphism present with alterations in blood pressure, mainly at the nocturnal period, affecting the dipping pattern, which confirmed the alterations found in previous study. The utilization of the 24 h ABPM is more sensitive than office blood pressure measures for the diagnosis of hypertension in T1DM patients, so it is useful in those without the AA genotype (Figs. 1, 2)

**Table 1.** Clinical and laboratory characteristics of patients with type 1 diabetes mellitus, broken down by the different genotypes of the IFIH1 rs1990760 (G/A) polymorphism, under a recessive model.

	RECESSIVE MODEL		p*
	AA (N=31)	GG and GA (N=96)	
Gender (%male)	64,52%	47,37%	0,097
Time of diabetes (years)	14,68+-7,95	18,05 +-10,18	0,120
Hb1Ac (%[mmol/mol])	7,87+-1,64	8,65+-1,84	0,037
Nephropathy (%)	14,81%	20,73%	0,499
Ambulatory Arterial Hypertension(%)	19,35%	36,17%	0,082
Arterial Hypertension ABPM (%)	29,03%	56,25%	0,008
Nocturnal Arterial Hypertension (%)	25,81%	54,17%	0,006
Systolic Dipping Pattern at night(%)	48,39%	28,26%	0,040
Diastolic Dipping Pattern at night(%)	70,97%	56,52%	0,155

**Fig. 1** See text for description

Nocturnal systolic blood pressure (mmHg)	112,4±10,3	117,7±14,1	0,094
Nocturnal diastolic blood pressure (mmHg)	64,9±9	69,3±9	0,022
Mean nocturnal blood pressure (mmHg)	80,7±9,2	85,8±9,7	0,035

Table 2. Results of ABPM after logistic regression for time of diabetes and glycated hemoglobin levels.

	TT	CC e CT	OR	IC 95%	Adjusted p
Nocturnal ABPM	25,81%	54,17%	3,68	1,39 – 9,74	0,009
ABPM 24h	29,03%	56,25%	3,46	1,35 – 8,91	0,01

Figure 1. Comparison of results of 24-Hour Ambulatory Blood Pressure between T1DM patients broken down by recessive model of the IFIH1 rs1990760 (G/A) polymorphism.

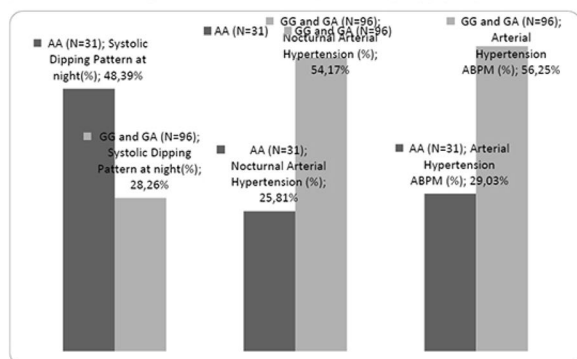


Fig. 2 See text for description

**A401**

**The consumption of soy protein isolate by wistar rats in the lactation program the corporal composition and metabolic parameters in the adult progene**

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**Introduction:** Studies show positive effects of soy protein isolate (SPI) on lipid and glucose metabolism, and may act to prevent chronic diseases, such as mellitus diabetes. However, because contains phytoestrogens (isoflavones) in its composition has been questioned the safety of its consumption during critical stages of development (gestation and lactation). Studies evaluating this effect are scarce.

**Objective:** To evaluate the effects of SPI consumption by rats during lactation, nutritional and metabolic status of offspring and adulthood.

**Method:** The study was approved by Federal University of Juiz de Fora Ethics Board (nº nº 018/2014). Lactating rats were placed in cages with 6 male offspring and divided into 2 groups: 1. Casein Control (C): received ration based on casein (20% protein); 2. Soy protein isolate (SPI): received SPI-based feed (20% protein). At weaning, 3 offspring/litter, randomly separated, began to receive commercial ration up to 150 days. Have been evaluated: Food intake (FI), body weight (BW), body composition (Carcass method), glycemia, insulinemia, leptinemia, lipid profile and total catecholamine content in the adrenal medulla and serum estradiol (mothers).

**Results:** The S mothers presented sporadic increase in FI, without altering the other parameters. The offspring SPI did not change FI, BW and visceral adiposity in the evaluated periods. At weaning, the offspring SPI presented a reduction in total cholesterol (– 32.82%, p < 0.0001) and LDL-cholesterol (– 39.61%, p < 0.001), without

altering the other metabolic parameters. In the adulthood, the SPI progeny had a reduction of the body protein mass (– 10.10, p < 0.01) and of the total mineral content (– 18.91; p < 0.007); hyperinsulinemia (+ 19.2%, p < 0.04) and hypertriglyceridemia (55.39%, p < 0.03), with no change in glycemia, leptinemia and total catecholamine content in the adrenal medulla.

**Conclusion:** Maternal SPI consumption in lactation programming negative effects on body composition, lipid profile and glycemic homeostasis of adult progeny. This way, soy protein intake in critical stages of development should be cautious.

**A402**

**The development of autoimmune diabetes after nivolumab therapy—case report**

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**Case report:** A 75-year-old male patient with diagnosis of squamous cell carcinoma of the hypopharynx and pulmonary metastasis 2 years ago, after a failed treatment with conventional chemotherapy and radiotherapy, started a new class of cancer medication called Nivolumab—human immunoglobulin G4 monoclonal antibody. Patient had no personal or family history of diabetes or other autoimmune disease, but after the third cycle of this medication, he entered the emergency room with hyperglycemia, polyuria and polydipsia. He did not present criteria for diabetic ketoacidosis, so he was diagnosed with decompensated diabetes mellitus and sent to the ICU to receive vigorous hydration and intravenous insulin pump. Investigation about the cause of the onset of diabetes founded positivity for diabetes antibodies, anti-GAD and anti-ICA, confirming autoimmune diabetes. Patient has been on intensive insulin therapy since then, with difficult glycemic control due to great glycemic variability.

**Discussion:** Type 1 diabetes is characterized by a state of low insulin secondary to the destruction of pancreatic beta cells, being subdivided into type 1A and 1B. Type 1A affects 5–10% of cases of diabetes and involves genetic and environmental factors leading to the immune-mediated destruction of beta cells. The main genes involved in this pathology are in the HLA II system and these alleles can trigger or protect the body against the onset of this disease. Nivolumab is an antineoplastic immunotherapeutic that acts by presenting the cancer cells to body defense system to recognize and fight them. It is known that this medication can develop some serious endocrinological complications, the most common being thyroid diseases, both hypo and hyperthyroidism, in addition to hypophysitis and more rarely diabetes. It is unclear why this medication may trigger diabetes, but it may be related to the patient’s previous HLA.

**Final comments:** This class of medication has come to revolutionize cancer treatment by increasing survival and causing less side effects than conventional treatment. However, because it was recently approved, physicians should be alert to diagnose and treat possible related complications that can bring important morbidity to patients. Informed consent to publish had been obtained from the patient.

**A403**

**The glycemia effects of wistar rats treated with progressive high doses of prednisone**

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The Prednisone is a glucocorticoid (PRD) that has great therapeutic use, but may induce glycemic changes. The side effects are primarily determined by dosage and time of use. The objective was to evaluate

the effects of increasing doses of PRD on the action of endogenous insulin in Wistar rats. Normoglycemic adult rats weighing 450–510 g were divided into 5 groups, differentiated by their daily treatment (18 days) orally, as the PRD dose used [CONT, PRD1 (0.625 mg/kg), PRD2 (1.250 mg/kg), PRD3 (2.500 mg/kg) and PRD4 (5000 mg/kg)]. Rats received water and food ad libitum, and on 0, 8 and 16 days of treatment the fasting glycemia was measured. On the 17th day, the oral glucose tolerance test (TOTG) was performed, collecting blood for glucose levels at fasting times (– 1 min) and 30, 60 and 120 min after administration of glucose solution. From these results, the areas under the partial curve (ASCp) and total (ASCT) were estimated. The data were statistically analyzed with significance of 5%. On days 8 and 16 of treatment, compared to the CONT group, there was a glycemic increase in PRD1 (day 8 = 30% and day 16 = 20%) and PRD2 (day 8 = 27% and day 16 = 9%). The PRD1 group showed higher glycemia than PRD3 on days 8 and 16 (25% and 17%, respectively) and also a 16% increase compared to PRD4 group on day 16. Regarding the TOTG, the time -1 min showed that the PRD1 group had a higher glycemia than the CONT mice ( $106 \pm 5.8$  vs.  $87.7 \pm 5.7$  mg/dL). In the 30 and 60 min times there were no changes in serum glucose, but in the 120 min time the PRD1 and PRD2 groups had higher glycemia than the CONT ( $122.8 \pm 15.7$  and  $120.6 \pm 11.6$  vs.  $93.7 \pm 4.1$  mg/dL, respectively). The analysis of the ASCT showed that, even though there were no differences between CONT and PRD4, this treated group increased the glycemic load ( $37.8 \times 10^3$  mg/dL) compared to the other treated groups (PRD1 =  $12.2 \times 10^3$ , PRD2 =  $12.2 \times 10^3$  and PRD3 =  $10.3 \times 10^3$  mg/dL). The glycemic values of ASCp showed increased glycemic load by 36% in ime interval 30–60 min only in the PRD4 group when compared to the CONT. Although lower doses of PRD have increased glycaemia, the values found are not considered to be harmful. In larger doses, the glycemia is regulated by good insulin secretion, being evidenced in the TOTG. However, a dose of 5.0 mg/kg should be used with caution, as it may slow the secretion and insulin action.

#### A404

##### The impact of baseline bmi and HBA1C on glycemic control after treatment with fast-acting insulin aspart in individuals with type 2 diabetes

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**Introduction:** Baseline characteristics related to severity of disease can be predictors of the HbA1c-lowering effect of a treatment.

**Aim:** The impact of baseline BMI and HbA1c on the efficacy and safety of mealtime fast-acting insulin aspart (faster aspart).

**Methods:** Type 2 diabetes (T2D) was assessed in a post hoc analysis of two randomized phase 3a trials: a 26-week, double-blind, treat-to-target trial with mealtime insulin aspart (IAsp) in a basal-bolus regimen as the comparator (onset 2), and an 18-week, open-label trial with basal insulin alone as the comparator (onset 3). All individuals were also taking metformin.

**Results:** In this analysis, individuals were grouped by baseline BMI (< 25, 25–30, ≥ 30 kg/m<sup>2</sup>) or HbA1c (≤ 7.5, > 7.5 to < 8.0, ≥ 8.0%). In onset 2, the overall change in HbA1c was non-inferior to faster aspart (n = 345) versus IAsp (n = 344), with an estimated treatment difference (ETD) (95% CI) of – 0.02% (– 0.15; 0.10). In onset 3, overall change in HbA1c was superior with faster aspart (n = 116) versus basal insulin alone (n = 120), with an ETD of – 0.94% (– 1.17; – 0.72). The ETD for change in HbA1c in each trial was similar for all BMI and HbA1c subgroups (Table). No major differences between treatments were observed in risk of hypoglycemia (Table) or insulin dose across subgroups in either trial.

**Conclusion:** Neither baseline HbA1c nor BMI altered the glycemic response to faster aspart in individuals with T2D (Fig. 1)

**Table: Change in HbA<sub>1c</sub> and incidence of hypoglycemia with faster aspart in T2D stratified by BMI and HbA<sub>1c</sub>.**

	Baseline characteristics					
	BMI, kg/m <sup>2</sup>			HbA <sub>1c</sub> , %		
	<25	25–30	≥30	≤7.5	>7.5–8.0	≥8.0
<b>onset 2</b>						
N	32/35	106/107	203/199	108/120	70/73	163/148
Change in HbA <sub>1c</sub> after 26 weeks	–0.21	0.01	–0.01	–0.07	0.13	–0.06
ETD [95% CI]	[–0.61; 0.19]	[–0.21; 0.23]	[–0.17; 0.16]	[–0.28; 0.15]	[–0.14; 0.40]	[–0.24; 0.12]
Severe or BG-confirmed hypoglycemia <sup>a</sup>	1.60	0.95	1.11	1.05	0.84	1.27
Event rate ratio [95% CI]	[0.80; 3.20]	[0.65; 1.40]	[0.84; 1.48]	[0.72; 1.54]	[0.52; 1.35]	[0.92; 1.75]
<b>onset 3</b>						
N	10/19	46/35	64/61	38/36	31/25	51/54
Change in HbA <sub>1c</sub> after 18 weeks	–0.85	0.67	–1.12	–0.77	–1.07	–1.03
ETD [95% CI]	[–1.55; –0.15]	[–1.06; –0.28]	[–1.43; –0.81]	[–1.18; –0.37]	[–1.54; –0.61]	[–1.37; –0.69]
Severe or BG-confirmed hypoglycemia <sup>a</sup>	10.40	9.25	7.78	17.39	6.26	7.06
Event rate ratio [95% CI]	[1.59; 67.95]	[4.05; 21.09]	[4.02; 15.05]	[6.42; 47.09]	[2.31; 16.99]	[3.41; 14.59]

Data from full analysis set.  
<sup>a</sup>Values correspond to faster aspart arm/comparator (insulin aspart [onset 2] or basal insulin [onset 3]).  
 For episode that is severe (requiring assistance of another person to actively administer carbohydrate or glucagon, or take other corrective actions) or BG-confirmed by a plasma glucose value <56 mg/dL, with or without symptoms consistent with hypoglycemia.  
 ETD (faster aspart arm – comparator). Event rate ratio (faster aspart arm/comparator).  
 HbA<sub>1c</sub>: blood glucose; BMI, body mass index; CI, confidence interval; ETD, estimated treatment difference; faster aspart, fast-acting insulin aspart.  
 Clinicaltrials.gov: NCT01819129, NCT01850615.

**Fig. 1** See text for description

#### A405

##### The impact of baseline BMI and HBA1C on glycemic control after treatment with mealtime fast-acting insulin aspart in people with type 1 diabetes

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**Introduction:** Fast-acting insulin aspart (faster aspart) is an ultra-rapid insulin analogue being investigated for the treatment of both type 1 and type 2 diabetes.

**Objective:** Post-hoc analysis of the impact of baseline body mass index (BMI) and HbA1c on glycemic control comparing faster aspart and insulin aspart (IAsp).

**Methods:** 26-week, randomized clinical trial evaluating the efficacy and safety of faster aspart in adults with type 1 diabetes (T1D).

**Results:** Patients were randomized to double-blind mealtime faster aspart (n = 381), IAsp (n = 380) or open-label post-meal faster aspart (n = 382); each with insulin detemir. This post hoc analysis investigated the impact of baseline BMI (subgroups: < 25, 25–30, ≥ 30 kg/m<sup>2</sup>) and HbA1c (subgroups: ≤ 7.5, 7.5–8.0, ≥ 8.0%) on glycemic control with mealtime faster aspart and IAsp. In the overall population, change in HbA1c after 26 weeks was non-inferior (0.4% limit) for mealtime faster aspart vs. IAsp, with an estimated treatment difference (ETD [95% CI]) of – 0.15% (– 0.23; – 0.07). ETD for change in HbA1c was similar across analyzed BMI and HbA1c subgroups (Table). No major differences between treatments were observed for severe or blood glucose (BG)-confirmed hypoglycemia across subgroups (Table). Total daily insulin dose was similar in patients across all baseline HbA1c groups and the BMI < 25 or 25–30 kg/m<sup>2</sup> groups, but was significantly lower with mealtime faster aspart compared with IAsp in subjects with baseline BMI > 30 kg/m<sup>2</sup> (Table).

**Conclusion:** In conclusion, treatment difference between faster aspart and IAsp for glycemic control in people with T1D was not affected by baseline BMI or baseline HbA1c (Fig. 1)

**Table 1. Change in HbA<sub>1c</sub> with faster aspart in T1D stratified by baseline BMI and HbA<sub>1c</sub>**

	Baseline characteristics					
	BMI, kg/m <sup>2</sup>			HbA <sub>1c</sub> %		
	<25	25-30	≥30	≤7.5	7.5-8.0	≥8.0
Onset 1						
N						
Faster aspart/insulin	144/129	168/174	69/77	188/201	83/84	110/95
Change in HbA <sub>1c</sub> after 26 weeks	-0.16	-0.15	-0.12	-0.15	-0.23	-0.08
ETD (95% CI)	(-0.30;-0.03)	(-0.27;-0.03)	(-0.31;0.07)	(-0.26;-0.04)	(-0.40;-0.05)	(-0.24;0.07)
Severe or BG-confirmed hypoglycemia* event rate ratio at 26 weeks (95% CI)	0.95 (0.76;1.19)	0.96 (0.79;1.17)	1.27 (0.93;1.72)	0.97 (0.80;1.16)	1.12 (0.84;1.49)	1.00 (0.77;1.29)
Total daily insulin dose ratio at 26 weeks (95% CI)	1.04 (0.95;1.15)	1.01 (0.93;1.10)	0.82 (0.71;0.93)	0.95 (0.88;1.03)	0.96 (0.85;1.09)	1.02 (0.91;1.14)

Data from full analysis set. \*An episode that is severe (requiring assistance of another person to actively administer carbohydrate or glucagon, or take other corrective actions) or BG-confirmed by a plasma glucose value <56 mg/dL with or without symptoms consistent with hypoglycemia.

N-values correspond to faster aspart/insulin aspart. ETD [faster aspart - comparator]. Ratio [faster aspart vs. comparator].

Change from baseline in HbA<sub>1c</sub> and log-transformed dose, respectively, are analyzed using a mixed-effect model for repeated measures. Number of hypoglycemic episodes are analyzed using a negative binomial regression model with a log-link function. In addition to the pre-specified covariates, the models included interactions and main effects between treatment and baseline BMI and HbA<sub>1c</sub>, respectively.

ETD, estimated treatment difference; CI, confidence interval; BMI, body mass index; T1D, type 1 diabetes.

ClinicalTrials.gov: NCT01831765

**Fig. 1** See text for description

#### A406

##### The impact of education in the prevention of eating disorders in patients with diabetes and their families

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**Objective:** To demonstrate the usefulness and efficacy of an informative material in parents of adolescents with Diabetes Mellitus (DM) for the detection of eating disorders. Summary: The prevalence of eating disorders in adolescents with Diabetes Mellitus (DM) is increasing. According to studies, about 30% of youth with T1DM has Bulimia Nervosa (1% in the range between 9 and 13 years, 14% between 12 and 18 years and 34% between 16 and 22 years). In a public hospital in Rio de Janeiro, we perceived in the care practice that the symptoms of eating disorders appear after the diagnosis of DM and early insulin treatment. This occurs because the intensive treatment of insulin to avoid critical complications of DM also promotes weight gain and the consequent dissatisfaction with body image. Insulin restriction is a symptom of calorie purging that is unique to people with DM1, called Diabulimia. It may increase the early occurrence of clinical complications of DM. In the year following the publication of our book called Diabulimia—a dangerous combination, we try to alert parents and family about the problem from three psychoeducational sessions of an hour and a half of duration. With the participation of parents of patients with DM1, a doctor Endocrinologist and 2 Psychologists we performed 3 sessions with the reading of 3 chapters of the book (Better understanding diabetes; Eating Disorder: do you really know what it is?; Diabulimia—a new ED?) and question time. After 15 days we made a fourth session to apply a questionnaire that aimed to recognize Diabulimia symptoms in their children. Number of Parents: 24. Education level: 78% completed high school and 22% only basic education. Average age of parents: 38 years. DM 1: 24, (18 female and 6 male) Mean age of them: 13.54 years. Mean diabetes duration: 4.2 years. Average of A1c levels: 11.3%.

**Results:** 16.66% of the adolescents with DM1 was positively diagnosed with omission or negligence of insulin doses. 88% of these patients denied the fact of omitting or skipping insulin dose in order to lose weight.

**Conclusion:** It is very important also to inform parents about this so dangerous eating disorder because of the risk of early chronic diabetes complications such as retinopathy and nephropathy. Education

and Prevention in DM and ED is the basis for proper treatment and it is one of the cornerstones for a better quality of life.

#### A407

##### The lúdico in food and nutritional education with diabetic children and adolescents type 1 attended in the hospital of clinics of ufpe

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**Introduction:** Considering the significant increase in diabetes and its metabolic complexity, especially in childhood and adolescence, Education for self-management of health care facilitates knowledge and the discovery of abilities: skills necessary for self-care in the disease. Education is fundamental for the treatment of the patient in the short and long term.

**Objectives:** To develop playful and creative activities as a pedagogical strategy in Food and Nutrition Education.

**Methodology:** This is an action research in Food and Nutrition Education, which was developed by teachers and students of the Nutrition Course of UFPE. The study group is made up of children and adolescents with Diabetes who are accompanied by the outpatient service of the Hospital das Clínicas of the institution. The work is the result of a partnership with an Extension Project that has been working in this hospital since 2015: "Playing with Art". The educational activities are carried out weekly, respecting the principles of nutritional education and popular education in health, in a playful way and directed to the demands of the group of children/adolescents and their caregivers.

**Results:** The educational strategies included activities in operative groups, workshops, dynamics, conversation wheels, puppet theater, commemorative and staging, minicinema and educational games. From the accomplishment of these activities, at the time before the medical consultations, it was possible to create spaces for the expression or verbalization of fears, yearnings, anxieties and hatred or denial; for the sharing of feelings and experiences. It also provided knowledge for alternatives of more conscious food choices, based on doubts about the nutritional treatment of the disease and awareness of the importance of feeding in this context. At the end of each meeting, the parents and the children evaluated the satisfaction and acquisition of useful and applicable knowledge for the different realities.

**Conclusion:** The use of play strategies to promote better understanding of the subject Diabetes is seen as a positive methodology by health professionals. The EAN is a constructive and empowering approach that allows the construction and experience of autonomy; as well as the discovery of knowledge about feeding for diabetic patients; subsidizing more conscious food choices.

#### A408

##### The relationship between vitamin D deficiency and obesity in diabetic patients—partial results

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The relationship between obesity and Diabetes Mellitus (DM) is well known, in which the former predisposes or aggravates the latter. It is believed that patients with DM might have higher prevalence of hypovitaminosis D and that vitamin D insufficiency is a risk factor for obesity, thus creating a vicious circle. Vitamin D plays a vital role in bone metabolism and helps controlling satiety and energy expenditure. Serum levels lower than 30 ng/mL define its insufficiency. This study aimed to verify the relationship between vitamin

D insufficiency and obesity in patients already diagnosed with DM. It is a case-control study conducted in 69 patients seen at a DM out-patient clinic between 2016 and 2018. Those who presented hemophilia, anemia, gastrointestinal and cardiovascular diseases, cancer, thyroid and renal disorders or took multivitamins in the past 6 months were excluded. We used a data sheet with social-demographic and clinical-epidemiological data, laboratory tests, and anthropometric measurements. Collected data were stored and analyzed using SPSS 14.0 software through Chi square test using a 5% significance level. Among the 60 patients who had their vitamin D level tested, 50% had levels of sufficiency and 50% had levels of insufficiency. Among the 64 patients who had their anthropometric measurements evaluated, 20.3% (n = 13) had normal BMI (< 24,9 kg/m<sup>2</sup>); 25.0% (n = 16) were overweight (25–29.9 kg/m<sup>2</sup>); 28.1% (n = 18) were obese—class 1 (30–34.9 kg/m<sup>2</sup>); 21.9% (n = 14) were obese—class 2 (35–39.9 kg/m<sup>2</sup>), 4.7% (n = 3) were obese—class 3 (≥ 40 kg/m<sup>2</sup>). Among the 59 patients who had both their vitamin D level tested and their anthropometric measurements evaluated, 50.85% (n = 30) presented hypovitaminosis D and 49.15% (n = 29) had levels of sufficiency. Among the 30 patients with hypovitaminosis D, 6.7% (n = 2) had normal BMI, 26.7% (n = 8) were overweight, and 66.7% (n = 20) were obese. Among the patients with vitamin D levels of sufficiency, 31.0% (n = 9) had normal BMI, 24.1% (n = 7) were overweight, and 44.8% (n = 29) were obese. Therefore, we observed a significant relationship between vitamin D deficiency and BMI > 24.9 kg/m<sup>2</sup> (p = 0.05). Even though there are evidences that vitamin D deficiency and low calcium intake correlate with obesity development, the subject is a huge target for discussion, and it remains little known. Finally, we found a relationship between obesity and deficiency/insufficiency of vitamin D in patients with DM.

#### A409

##### The role of vildagliptin in pulmonary arterial hypertension: an old pleiotropic effect of GLP-1 in clinical practice

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The main etiology of pulmonary arterial hypertension (PAH) is idiopathic. In more than one-third of these cases, patients have criteria for metabolic syndrome. Alone, obesity, dyslipidemia and type 2 diabetes mellitus (T2DM) have a direct and indirect relationship in the pathophysiology of PAH. The presence of glucagon-like peptide-1 (GLP1) receptors in different organs of our body gives this incretin several pleiotropic effects, in addition to its already well established role in the treatment of obesity and T2DM. Ancient studies, in vitro and in animals, have demonstrated that GLP1 is capable of promoting vasorelaxation of the pulmonary artery. Obese patients with PAH undergoing bariatric surgery have a significant improvement in the pulmonary status, even before they lose weight significantly. Considering this and using a weight-neutral incretin-based therapy, we opted for the use of a DPP4 inhibitor (vildagliptin 50 mg 2x/day) to increase GLP1 levels in a patient with DM2, hypertension, dyslipidemia, obesity grade I (BMI of 30.2 kg/m<sup>2</sup>) and PAH. In February/2014, the 74-year-old female patient had fasting glycemia of 107 mg/dL, A1c 6.2%, and used only glibenclamide 5 mg/day because she had gastric intolerance to metformin and at that time had some episodes of hypoglycemia. On the echocardiogram, the patient had a right ventricular systolic pressure (RVSP) of 45 mmHg compatible with PAH. We switched sulfonylurea for iDDP4 and 6 months after its use, the patient had a fasting glycemia of 111 mg/dL, A1c 6.0%—without episodes of hypoglycemia—and RVSP of 38 mmHg. During 3 years of follow up, the patient had a good glycemic control, with stable values and within the normality of RVSP, without respiratory symptoms related to PAH. In January/2017 the patient had a BMI of 30.6 kg/m<sup>2</sup>, fasting glycemia of 112 mg/dL, A1c 6.5% and RVSP of 31 mmHg. The patient had an improvement in

the PAH even without weight loss and maintaining a good glycemic control, without episodes of hypoglycemia, after starting a medication that increased her native GLP1 levels. In addition to its efficacy and safety, the use of vildagliptin has been shown to be a good therapeutic option for patients with T2DM and PAH, but further research is needed to confirm these findings.

#### A410

##### The rs2292239 (C/A) polymorphism in ERBB3 gene is associated with risk for diabetes mellitus type 1

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**Introduction:** The type 1 diabetes is a multifactorial disease that genetic and environmental factors are necessary for its development. Genome-wide association studies demonstrated that the ERBB3 gene is one of the major non-HLA loci associated with DM1. This gene encodes a member of the intracellular protein tyrosine kinase receptor family, which activates signaling pathways, including PI3 K-AKT and MAPK, thereby regulating cell survival and proliferation. Furthermore, ERBB3 seems to contribute to the pathogenesis of type 1 diabetes by modulating the function of antigen presenting cells (APCs), autoimmunity, apoptosis and production of insulin by the pancreatic beta cells.

**Objective:** To evaluate the association between the rs2292239 polymorphism in the ERBB3 gene and the susceptibility to type 1 diabetes in a Brazilian population.

**Methods:** A total of 490 patients with type 1 diabetes (cases) and 598 non-diabetic individuals (controls) were analyzed. All patients underwent a standard clinical and laboratory evaluation after signing the informed consent form. The polymorphism was genotyped through real-time PCR allele discrimination assays (Thermo Scientific Inc). The dominant, recessive, and additive inheritance models were tested.

**Results:** Genotypes of the rs2292239 polymorphism were in Hardy-Weinberg equilibrium at the controls (P > 0.05). The A/A genotype was more frequent in diabetic patients than in nondiabetic subjects (P = 0.007). The frequency of the A allele was 39.75% in the cases and 32.75% in the controls (P = 0.008). In addition, the A allele was associated with risk for DM1 in the recessive (OR = 1.58, 95% CI 1.04–2.40, P = 0.031) and additive (OR = 1.67, 95% CI 1.07–2.62, P = 0.023) after adjustment for high-risk HLA haplotypes for DM1.

**Conclusion:** Our data confirm the association of the A allele of the rs2292239 polymorphism in the ERBB3 gene with the risk for DM1.

#### A411

##### The strong and positive relationship between atherogenic dyslipidemia and high waist-hip ratio (WHR) among people with type 2 diabetes

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**Background:** It is well established that a more aggressive approach of co-morbid conditions that occurs almost in parallel with the hyperglycemia is mandatory to avoid or delay the onset of cardiovascular disease which takes place within two to four times higher in diabetic subjects than in nondiabetic persons. Some features of the history and

physical examination, such as the anthropometric aspects, can provide us relevant data on cardiovascular health and prognosis in these patients [1, 2]. (See Table 1) Table 1: Classification of weight status in adults according to Body Mass Index (BMI)

**Objectives:** Thus, the purpose of this study was to determine the relation between anthropometric indicators with cardiovascular risk factors, especially systemic arterial hypertension and lipid profile, in a sample of patients with type 2 diabetes (T2D).

**Materials/methods:** A cross-sectional study was carried out between January and June 2017 based on clinical data, physical examination and laboratory tests—fasting blood glucose (FBG), glycated hemoglobin (A1c) and lipid profile. Patients were classified having hypertension when diastolic blood pressure (DBP)  $\geq$  90 mmHg and systolic blood pressure (SBP)  $\geq$  140 mmHg or those taking antihypertensive medications. Anthropometric data (gender, age, weight and height) were used to calculate the anthropometric indicators body mass index (BMI = kg/m<sup>2</sup>) (Fig. 1) and waist-hip ratio (WHR). The optimal WHR cutoffs were 0.9 and 0.8 for Brazilian men and women, respectively (Table 2) Fig. 1. Body Mass Index (BMI) Table 2. Cut-off points of waist-to-hip ratio (WHR) For men Low risk Moderate risk Increased risk < 0.95 0.95–1.00 > 1.00 For women Low risk Moderate risk Increased risk < 0.8 0.8–0.85 > 0.85

**Results:** We studied 254 patients with an average age of 53  $\pm$  13.5 years and most of them were male (58%). With sample data, a logistic regression model was applied to assess the relationship between the anthropometric indicators and cholesterol fractions. High WHR had a significant association with LDL  $\geq$  100 mg/dl (p = 0.032), low HDL ( $\leq$  45 women and  $\leq$  35 men; p = 0.031) and high triglyceride levels (p < 0.005). Among those with high WHR, 62% had increased levels of LDL; similarly, those with low WHR had increased levels of LDL in only 10% cases. Moreover, it was observed that the OR of 5.0 to WHR for the occurrence of increased levels of LDL (IC 95%:2.08–16.79) when compared to low HDL cholesterol. With regard to hypertension, 34% had high blood pressure, even those taking antihypertensive medications; with respect this group, virtually the whole, comprised patients with overweight or obese (87%).

**Conclusion:** Body mass index (BMI) and waist-hip ratio (WHR) have been widely used to judge overweight and obesity in order further to recognize risks of cardiovascular disease. While BMI is used as the measurement of overall obesity, WHR is the measurement of central obesity. In our study, anthropometric indicators were good parameters of obesity, hypertension and dyslipidemia. It's important to emphasize that WHR is a useful, practical and extremely predictive of dyslipidemia in T2D patients, correlates strongly with visceral fat, phenotypic characteristic associated with insulin resistance (Figs. 1, 2)

Fig 1. Body Mass Index (BMI)

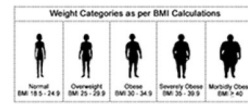


Table 2. Cut-off points of waist-to-hip ratio (WHR)

For men		
Low risk		<0.95
Moderate risk		0.95-1.00
Increased risk		>1.00
For women		
Low risk		<0.8
Moderate risk		0.8-0.85
Increased risk		>0.85

Fig. 2 See text for description

**A412**

**The use of an mhealth strategy to improve the quality of diabetes care in underserved areas of Argentina**

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**Background:** In developing countries, the rising prevalence of diabetes mellitus (DM) has been linked to the obesity epidemic. In Argentina, the prevalence of DM increased from 8.4 to 9.8% between 2005 and 2013, as reported by national population-based surveys of risk factors. As in other low and middle-income countries (LMIC), Argentina carries a disproportionate burden of chronic diseases. Our health system is facing a critical shortage of health professionals and resources, making health services for people with chronic diseases unavailable or low quality. Although there are national programs to address diabetes care in Argentina, clinical practice recommendations have not been widely implemented in public primary care clinics (PCCs) in low resource settings and diabetes care is far from optimal. Mobile health (mHealth) interventions constitute a promise for health care delivery especially in resource-constrained settings in developing countries where mobile technology has a high penetration. In many places in Argentina, people have better access to mobile phones services than to basic services such as water, electricity, sewage, and sanitation. In a recent systematic review, we found that mHealth yielded positive health outcomes in diabetes in LMIC because of improvements in the supply side of health care systems. These improvements were used as a channel to deliver education, increase patients' and care givers' knowledge and improve health-seeking behaviors and health-related lifestyle decisions. Aims: To describe the design, implementation and evaluation after 6 month of a diabetes program (DP), that includes mHealth components in an underserved diabetic population that attends PCCs in the province of Corrientes in Argentina.

**Method:** Quasi-experimental design (before and after intervention) with outcome measurements at baseline and 6 months follow-up. We recruited diabetic patients from 18 PCCs located in underserved areas

Classification	BMI (kg/m <sup>2</sup> )	Risk of co-morbidities
Underweight	< 18.5	Low (but risk of other clinical problems increased)
Normal range	18.5 – 24.9	Average
Overweight:	$\geq$ 25	
Pre-obese	25 – 29.9	Increased
Obese class I	30.0 – 34.9	Moderate
Obese class II	35.0 – 39.9	Severe
Obese class III	$\geq$ 40.0	Very severe

Source: WHO (1998)

Table 1: Classification of weight status in adults according to Body Mass Index (BMI)

Fig. 1 See text for description



in Corrientes. The DP included the following interventions: (a) A Diabetes Registry (DR) using a mobile application to collect, store, manage and analyze diabetic patients' health related data. We used the SANA framework (<http://sana.mit.edu/>), a highly customizable, open-source, android-based mHealth information system to develop the registry. Data collected can be either transmitted online via 3G/4G or stored offline in the tablet or then synchronized later via Wi-Fi. In addition, the software allows the surveillance of high risk patients to re-establish care, generate reports and for further statistical analysis. Training and practice audit with feedback to health care providers was provided to implement the registry in each PCC. (b) Text Messaging: A web-based platform was used to deliver customized weekly SMS containing reminders for medical appointments and educational messages to patients included in the DR. SMS were previously developed and validated to provide diabetes-related education and promote medication adherence. (c) Training of the primary care team: We developed workshops on clinical practice guidelines and to provide self-management education. Educational outreach visits were also conducted.

**Results:** 935 participants from 18 PCCs around the province of Corrientes were included. Mean age was  $53.7 \pm 11.6$  years, 62.2% were woman; 49.4% without health coverage, 82.2% had low educational attainment and 88.9% type 2 diabetes. The median time of duration of diabetes was 4 (IQR 1–10 years). 746 have access to a cell phone and 96.6% accepted to receive SMS. Sixty percent of the population enrolled accomplished with a 6 months follow-up visit.

**Discussion:** Although baseline results showed poor metabolic control and sub-optimal control of CVD risk factors in our population, the DP showed improvement in process and outcome indicators in the population with a 6 months follow-up. The use of mHealth has emerged as an important innovation in LMIC with the potential to strengthen health systems in underserved settings, improving access to knowledge and information in diabetic patients and service delivery in primary care teams. Acknowledgments This project is funded by the World Diabetes Foundation (WDF 14-837) (Fig. 1)

Table 1 Comorbidities and chronic complications (n=935)

Comorbidities and chronic complications	%
Hypertension	61.3
Dyslipidemia	32.6
Obesity	59.6
Smoking	10.7
Chronic macrovascular complications	9.5
Chronic microvascular complications	14.3

Table 2: Indicators of quality of diabetes care

Indicators	Baseline N=935	6 month N=494 (%)
A1c test conducted in the last year	17.22	61.7
Cholesterol lab in the last year	34.8	68.0
A1c >8%	63.1	36.3
Uncontrolled blood pressure values (SBP $\geq$ 140 / DBP $\geq$ 90 mmHg)	48.2	42.7
Screening of diabetic peripheral neuropathy	63.3	84.0
Eye exam in the previous year	30	59.9
Antidiabetic treatment	93.5	94.1
Insulin	14.4	14.6

Fig. 1 See text for description

#### A413

##### The use of light technology in a group for people with diabetes and hypertension

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**Introduction:** Diabetes Mellitus (DM) and Hypertension are chronic diseases prevalent in Brazil. In this way, health promotion activities become indispensable, being necessary to find strategies to support and to cope these conditions. Under this perspective, the use of health

technologies is essential, because it allows the information to be more extensive, blend in and understood.

**Objective:** To describe the use of light technologies in health education group for people with diabetes and hypertension.

**Methodology:** Case studies about the use of technology in an educational group implemented in a university located in Fortaleza-Ce-Brazil, in the period from May to July 2017. There were 13 servers that had diabetes and/or hypertension, being piloted by professors and scholars from nursing, nutrition and physical education.

**Results:** The group grew out of an extension project "Health education for people with chronic disease", performing five meetings. In the first meeting, the group was welcomed with details of the proposal and explanation of the themes together. There was recited a literature of twine, using the regional language about DM and hypertension. In the second meeting, we played the game True x Myth to inspire the participants' knowledge about these diseases, their symptoms and mediate the discussions. The third meeting on physical activity started with a labor activity and finalized with data exposure that show the benefits of physical exercises. The fourth meeting, on nutrition, we used the game menu which consisted of choice for each participant: food figures representing the food from their menu and routine, in order to facilitate discussion and generate new knowledge about eating healthy. On the fifth meeting, illustrative tables were constructed to aid in taking medicines, in order to reduce the forgetfulness of the pharmacological treatment.

**Conclusion:** We believe that the use of light technologies contributed for the performance of the educational group, exchange of experiences and presence of the participants. The care needs of paths covering innovative strategies for health promotion, allowing interpersonal relations, as the host, the link, empowerment, among others, are respected in this process, the authorization of participants with respect to their health.

#### A414

##### Thyroid dysfunction and insulin resistance in patients with congenital generalized lipodystrophy

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**Background:** Thyroid dysfunction (TD) and insulin resistance (IR) are common endocrine disorders. Studies suggest a bidirectional causal relationship between these conditions. However, most of them evaluated obese/overweight patients, which can be a confounding factor. Therefore, to evaluate the relationship of TD and IR in the absence of obesity is important. Patients with absence of adipose tissue and severe insulin resistance (IR), like those with congenital generalized lipodystrophy (CGL), a rare autosomal recessive disease, allow a better characterization of this potential relationship. The objective of this study was to evaluate the association of IR/diabetes mellitus (DM) with thyroid stimulating hormone (TSH) and free thyroxine (T4 I) levels in patients with CGL.

**Results:** A cross-sectional study conducted in a hospital in Brazilian Northeast, in 2016, that was approved by Walter Cantidio University Hospital of Universidade Federal do Ceará Ethics Board (approval number 1.360.021). There were included 21 patients. The mean age was  $16.3 \pm 11.6$  years old (min 3 – max 38 yo), with 66% female. All subjects had clinical diagnosis for CGL (reduction or absence of subcutaneous adipose tissue on the face, trunk and limbs, muscle hypertrophy, hepatomegaly, acanthosis nigricans, phlebomegaly, severe insulin resistance or diabetes and hypertriglyceridemia). The mean TSH and T4 I levels were, respectively,  $2.19 \pm 1.62$   $\mu$ U/mL and  $1.14 \pm 0.28$  ng/dL. The mean HOMA-IR was  $13.3 \pm 9.9$ , (min  $0.4^{\text{th}}$  max 36.9). There was a trend towards higher levels of TSH in the presence of altered HOMA-IR, although not statistically significant ( $p = 0.206$ ). There was a negative correlation between T4 I levels and HOMA levels ( $p = 0.015$ ). DM was

present in 65% of the patients, but there was no correlation between the presence of DM and the levels of TSH and T4I.

**Conclusion:** There was a tendency of CGL patients with severe IR without obesity present lower levels of T4I and higher levels of TSH.

#### A415

##### Thyroid function in pregnant women with gestational diabetes mellitus attended at the endocrinology outpatient clinic of the hospital das clínicas da UFMG from 2012 to 2016

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**Introduction:** Diabetes mellitus and hypothyroidism are the two most frequently pregnancy's endocrine diseases. Several studies have already established the relationship between Gestational Diabetes Mellitus (GDM) and thyroid dysfunction resulting in worse maternal and neonatal outcomes.

**Objective:** Evaluate the presence of thyroid dysfunction in pregnant women diagnosed with diabetes and to correlate with obstetric outcomes.

**Methods:** One hundred and seventy-five pregnant women with GDM were followed from 2012 to 2016, through a protocol approved by the Endocrinology and High Risk Pregnancy Service of the Hospital das Clínicas da UFMG, approval number 50724015.3.0000.5149. The participants signed a free and informed consent term. The analyzed data were obtained from the medical records. We sought to know and analyze thyroid function, with serum TSH and free T4 levels, the diagnosis of other comorbidities, anthropometry, physical examination, obstetric history, use of medications, outcomes and obstetric and neonatal complications. Then, all data were submitted to descriptive statistical analysis with Microsoft Excel. The results were organized and compared with data from the literature.

**Results:** The mean age, of the 175 pregnant women followed up at the time of the first visit, was 32 years old and the average gestational age at the first visit to Endocrinology was 26 weeks and 4 days. Only 19.88% of them had preconception counseling. The mean BMI was 27.6 kg/m<sup>2</sup>, and 40.28% were already obese at pregnancy (BMI > 30). Hypothyroidism was identified in 17.81% of them, a percentage higher than the one usually observed in pregnant women without GDM (between 0.2 and 0.6%), which corroborates the data in the literature, which associates hypothyroidism with GDM. Among the patients with a previous diagnosis of hypothyroidism (14.49%), the onset of follow-up with the endocrinologist was also late, with a mean gestational age of 22 weeks and 2 days, which delayed the dose adjustment of levothyroxine, necessary to reduce unfavorable outcomes. In the delivery data analysis (n = 152), the high cesarean index (51.97%) was similar to that observed in high-risk pregnancies conducted in the same institution between 2012 and 2013 (52.78%), however, it was even higher in the group of diabetic pregnant women with hypothyroidism (69.23%).

**Conclusion:** The pregnant women studied presented a high prevalence of overweight and obesity, which reinforces the importance of the nutritional monitoring of these pregnant women, preferably before pregnancy. The greater occurrence of hypothyroidism in the group of pregnant women with GDM, especially when compared with literature data (17.8 × 0.6%), in part, can be explained by the more frequent screening of thyroid dysfunction in the Endocrinology and high risk prenatal service, but it is also partially related to the association between GDM and thyroid dysfunction, already demonstrated in other studies. Further studies are still needed to investigate and clarify this association; however, the data corroborates favorable the possibility about a universal screening for thyroid dysfunction in patients with GDM.

#### A416

##### Thyroid hormone resistance syndrome associated with decompensated type 1 diabetes mellitus in young patient: case report

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**Introduction:** It is known that there is a relationship between glycaemia, cellular metabolism and thyroid hormones. Hence, thyroid hormone resistance syndrome (THRS) is supposed to have increased pathological effects on cellular metabolism, insulin role, and glycaemia in relation to diabetes. Despite that, THRS and type 1 diabetes mellitus (T1DM) have hardly been associated before.

**Case presentation:** LCB, female, 18 years-old, has a decompensated T1DM, diagnosed at the age of 4, and presents controversial symptoms of hypo- and hyperthyroidism, such as tachycardia, osteoporosis, osteopenia, goitre, lowstature and weight-gain. Moreover, she complains about systemic arterial hypertension and isolated proteinuria, showing subtle learning difficulties. Her silky exams showed high free thyroxine (T4) with physiological levels of thyroid stimulating hormone (TSH). She reports making use of insulin analogues to control her diabetes and beta-blockers to control her tachycardia.

**Discussion:** The relationship between T1DM and thyroid hormone resistance syndrome is not clear on scientific literature. However, it is known that THRS is defined by a mutation on the gene by which cells synthesize thyroid hormone receptors (either alpha or beta, as a mutation in both is not compatible with life). It is also known that there are different clinical features on each type of mutation and the patient's symptoms (tachycardia and goitre) are more likely to be caused by a beta-receptor mutation, which was confirmed by genetical exams. As in some tissues the thyroid hormones are not captured, including in the hypothalamus, free T4 is expected to be elevated, as there will be a difficulty on negative feedback mechanisms and silky hormone use. At the same time, her alpha thyroid hormone receptor is highly stimulated, which explains her tachycardia and high muscular and bone metabolisms. For treating diabetes, it was installed an insulin-infusion pump, reducing the occurrence of hypo- and hyperglycaemia. About thyroid-related symptoms, she is in observation and said symptoms are treated as they appear.

**Conclusion:** There is not, on literature, case reports about T1DM associated with THRS as it appears on this patient. Thus, the case is a rare medical condition and is a therapeutic challenge. Finally, it must be said that it is an important case to report, as it helps to increase the medical knowledge about the subject.

**Consent to publish:** Informed consent to publish has been obtained from this patient.

#### A417

##### Title: diabetes in infant. 2 cases report

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**Introduction:**

**Case 1 presentation:** Patient, 2 years and 5 months, Diabetes Mellitus Type 1 (DM1) diagnosed at the age of 11 months during a hospitalization because of a pneumonia and evolution into a metabolic acidosis, with a 713 mg/dl glycemic index, confirming the diabetic ketoacidosis. The anti-island antibody dosage was positive. Regular and NPH insulin were used. It has evolved with hypoglycemia, the insulin was changed for detemir and ultrafast insulin. It has kept the glycemic variability. The continuous infusion of insulin system was used, however, there wasn't accession to the treatment. It has been used the glargine and

ultrafast insulin without significant hypoglycemia, but has been keeping the inappropriate Diabetes control.

**Case 2:** Patient, 1 year and 2 months, Diabetes Mellitus Type 1 (DM1) diagnosed at the age of 11 months. In this case the child presented polydipsia, polyuria, vomiting and dyspnea. It was hospitalized in the ICU dehydrated in diabetic ketoacidosis. The examinations have shown metabolic acidosis with an 825 mg/dl glycemia index. In the etiological investigation, the decarboxylase antibody of the glutamic acid (anti-GAD) and the anti-island were positive. The patient has used the glargine and the ultrafast insulin, but has evolved with a huge glycaemic variability. This way, he has started the therapy with the continuous infusion of insulin system and has improved the glycaemic control.

**Discussion:** The DM1 is a challenge in the pediatric age group, mainly the earlier diagnosis in infant, in order to avoid the diabetic ketoacidosis. The Diabetes etiologic diagnosis in children younger than 1 year must include the monogenic effects, specially during the 6 first months. Between 6 months and 1 year, the auto immune DM1 is more common. The treatment with insulin in this age group leads to hypoglycemia risks, so the insulin therapy needs to be individualized. The continuous infusion of insulin system use is an option in order to improve the metabolic control. Informed consent to publish had been obtained from the patient.

#### A418

##### Title: LPGD day: learning, playing and growing with diabetes. Children Hospital of Brasilia Jose de Alencar's diabetes education project

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**Introduction:** The diabetes mellitus type 1 (DM1) is a chronic disease which requires continuing care from patients and family. The effectiveness of the treatment of this disease is based on the decisions taken by the patients. That's why it's very important that they receive a quality education, fitted on their necessities and provided by qualified health professionals. Aiming the improvement of the health of the patients included in the Children Hospital of Brasilia Jose de Alencar's Diabetes Program, will be hold the "Learning, Playing, and Growing with Diabetes Day—LPGD Day", a Diabetes educational program designed to the patients who present low accession to the treatment and/or worse control and need a more effective action by the health staff, besides the family and caregivers, in order to reduce the risks associated to the disease and its precarious control, improving the treatment accession, disease control and patients' quality of life. Goals: 2.1—General goal: Stimulate the self-care in assisted patients in the Diabetes Program who present a low accession to the treatment, through the Diabetes education, aiming the improvement of the glycaemic control, autonomy and quality of life.

**Materials and methods:** Target group Pediatric patients assisted by the Children Hospital of Brasilia Jose de Alencar's Diabetes Program who present an unsatisfactory glycaemic control and low accession to the treatment, with constant hospitalization and intercurrent, as well as their family and caregivers. 10 patients from the Diabetes Program who present treatment accession difficulty and a bad control of the disease will be chosen. The selected patients will be assisted by the Program's multidisciplinary staff and the day's activities will be divided in stages. Stage 1: You in the control: The self-care importance and the glycaemia monitoring Stage 2: Healthy feeding is not diet! Stage 3: Nobody is alone! Stage 4: Demystifying the Diabetes treatment. Stage 5: Glycaemic profile evaluation and therapeutic answer.

**Conclusion:** The LPGD Day was elaborated with the objective of reducing the walls with the multidisciplinary staff and involve the children and teenagers with Diabetes Type 1 and the families in the treatment.

#### A419

##### Tracking of foot at ulceration risk among aged individuals with type 2 diabetes mellitus in primary health care service

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Tracking of foot at ulceration risk has been a priority in the care planning of individuals with diabetes as recommended strategies for treatment and follow-up. We aimed to evaluate the feet of aged individuals with type 2 diabetes mellitus regarding the risk of ulceration. This is a cross-sectional study developed in the Primary Health Care Service of a city in Ceará, Brazil, including a sample of 254 aged individuals that were randomly chosen through proportional stratified sampling. We collected data from August 2016 to January 2017 using a form that contains sociodemographic variables and the evaluation and tracking form of neuropathic pain, loss of protective sensitivity and peripheral artery disease for the basic care from the Brazilian Society of Diabetes. We obtained sociodemographic data and those regarding the identification of neuropathic pain through interviews, while data regarding the components of feet examination were collected through physical examination following the techniques recommended by Brazilian and international guidelines with validated instruments. Therefore, we used 10 g Semmes-Weinstein monofilament and 128 Hz diapason for assessing the loss of plantar protective sensitivity. To calculate the ankle-arm score and to track the peripheral artery disease, we used the 8 MHz portable manual doppler sonar. We analyzed data based on the descriptive and inferential statistics. The following variables were more prevalent: female sex (71.7%), being married (42.5%), being retired (70.9%), having low income and low educational level (50.4%), fatigue (67.4%), pain (62.4%), and cramps (61.2%) of moderate intensity (33.9%). In the feet assessment, we identified dried feet, with cracks and fissures (96.5%), use of inappropriate shoes (86.2%) and deformities (61.4%). Loss of plantar protective sensitivity and peripheral artery disease were respectively present in 16.5 and 7.1% of the sample. Regarding risk classification, 43% of the aged individuals presented risk 1 for the development of ulcerations. There was statistical significance between risk and sociodemographic variables (age, family income). In conclusion, aged individuals have important alterations in their feet and a level of risk that might predispose them to ulcerations and amputations; therefore, we need to implement the feet evaluation and risk classification as a routine in the care of aged individuals with diabetes mellitus in Primary Health Care Services.

#### A420

##### Transaminases e ferritin evaluation in pre-diabetic and type 2 diabetic obese patients with hepatic steatosis candidates for bariatric surgery

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**Introduction:** The non-alcoholic fatty liver disease is subdivided into hepatic steatosis (HS) and steatohepatitis, both of which may progress to cirrhosis and hepatocellular carcinoma. The prevalence of HS in morbidly obese, pre DM2 and DM2 is 60–90, 38 and 14%, respectively.

**Purpose:** To determine the prevalence of HS in obese candidates for bariatric surgery with pre DM2 and DM2 and to analyse the transaminases and ferritin levels.

**Materials and methods:** Cross-sectional study of 243 medical records from the Endocrinology Outpatient Clinic of Santa Marcelina Hospital, São Paulo—Brazil. The study was performed from January 2011 to

November 2016. Patients were divided into 03 groups: pre DM2 with HS (G1), DM2 with HS (G2) and DM2 without HS (G3). The diagnosis of HS was performed by ultrasound. We stratified mean values and standard deviations of age, BMI, blood glucose, HbA1c, AST, ALT and ferritin. All variables were compared among these three groups. ANOVA test was applied, being significant  $P < 0.05$ .

**Results:** 03 alcoholics patients were excluded. From 243 patients, 69.95% had pre DM2 or DM2. The prevalence of HS was 44.59% in the group with pre DM2 and 37.5% in the group with DM2 (Table 1).

**Conclusion:** The absence of elevated transaminase and ferritin levels in obese population with DM2, pre DM2 and HS indicates that is necessary to apply liver fibrosis risk scores due to the fact that these patients have a predisposition to adverse developments. The presence of hepatic steatosis was not associated with the worsening of glicemic control (Fig. 1)

**Table 1.** Analysis of anthropometrics and laboratory variables with patients from group 1, 2 and 3 with hepatic steatosis candidates for bariatric surgery

	G1 (n=86)	G2 (n=32)	G3 (n=49)	P
Age (years)	43 ± 1.9	47 ± 1.8	53 ± 1.4	n.s.
BMI (kg/m <sup>2</sup> )	40 ± 1.5	40.3 ± 1.1	40.6 ± 1.0	n.s.
Blood glucose (mg/dL)	100 ± 2.08	119 ± 5.0	104.6 ± 8.8	<0.05
HbA1C	5.9 ± 0.1	7.0 ± 0.1	8.014 ± 0.20	<0.05
AST (U/L)	26.1 ± 4.8	16.1 ± 1.3	21.62 ± 1.9	n.s.
ALT (U/L)	25.4 ± 3.1	22.7 ± 1.7	22 ± 2.4	n.s.
Ferritin (ng/mL)	142 ± 33.8	138 ± 23.9	107 ± 20.8	n.s.

n.s. = not significant

**Fig. 1** See text for description

**A421**

**Transcultural adaptation and validation of questionnaires and prevalence study and risk factors associated with the presence of asymptomatic hypoglycemia in adults with type 1 diabetes**

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**Background:** Impaired awareness hypoglycemia (IAH) is a syndrome in which the ability to detect alerting symptoms are reduced or absent, increasing the risk of severe hypoglycemia and death. In this context, we see the need for identification of patients with this syndrome.

**Aims:** The aim of this study was to adapt to Brazilian Portuguese, validate Clarke and Gold questionnaires. The other objective of this study was to determine the prevalence of IAH in patients with T1DM attending a tertiary hospital outpatient clinic and to evaluate the risk factors for IAH.

**Methods:** Patients with T1DM1 for at least 12 months and older than 18 years have been invited for the study. Validation of the questionnaires was done according to the following steps: (1) Authorization of the Authors; (2) Translation of questionnaires into Portuguese, by two health professionals fluent in English, natives of the Portuguese language (version 1 and 2); (3) synthesis of the two translations by an evaluating committee, generating version 3; (4) back translation of version 3 by two native language translators, forming version 4; (5) comparing versions 3 and 4 with the original questionnaires, in order to verify the semantic, idiomatic, cultural and conceptual equivalence; (6) preparation of version 5, in Portuguese, through the modifications judged necessary according to previous stages; (7) application of version 5 of the questionnaires in a small number of patients representative of the target public, in order to identify possible difficulties in the interpretation and understanding of the instruments by the patients; (8) review and elaboration of the final version of the questionnaires (version 6); (8) application of the questionnaires (version 6) through supervised self-administration in 40 patients with T1DM. After all stages of cross-cultural adaptation process the questionnaires were

applied in other 103 T1DM patients, to estimate the prevalence of IAH and the risk factors associated with severe hypoglycemia.

**Results:** The Cronbach's alpha assessed the internal consistency. Clarke Questionnaire presented a Cronbach's alpha = 0.73 and Gold presented a Cronbach's alpha = 0.84. Values above 0.7 are acceptable. The prevalence of hypoglycemia unawareness was 35.9% with Clarke questionnaire and 20.38% with Gold questionnaire. The prevalence of at least one episode of severe hypoglycemia in the previous 12 months was 54.36%. Of them, 32% had received intravenous glucose to treat hypoglycemia. Clarke and Gold questionnaires correlated negatively with the need for EV glucose to treat hypoglycemia when patients were diagnosed with preserved perception of alert symptoms ( $r = -0.613$  and  $r = -0.34$  respectively). IAH was associated with a lower HbA1C, longer DM and lower glomerular filtration rate.

**Conclusion:** In conclusion, the Brazilian Portuguese adapted versions of the evaluated instruments demonstrated acceptable psychometric properties and validity with similar results. The prevalence of asymptomatic hypoglycemia was high and associated with lower HbA1C, longer DM and lower glomerular filtration rate. The high prevalence of asymptomatic hypoglycemia in this population warns of the need for more vigilant care of these patients in order to reduce morbidity and mortality and these questionnaires are of great value in this context (Fig. 1)

Característica clínica	Percepção dos sintomas *	Hipoglicemia assintomática *	P
Idade (anos)	37,42 (± 11,14)	42,05 (±12,08)	0,052
IMC (kg/m <sup>2</sup> )	24,19 (± 3,51)	24,58 (± 3,67)	0,597
Tempo de DM (anos)	19,33 (± 10,11)	25,38 (± 9,96)	0,004
Dose de insulina (ui/kg/dia)	0,72 (± 0,23)	0,68 (± 0,17)	0,3
HbA1C	8,66 (± 1,45)	8,08 (± 1,28)	0,039
TFG	84,18 (± 35,6)	59,84 (± 42,49)	0,004

**Fig. 1** See text for description

**A422**

**Transitory hepatic elastography in a patient with mauriac syndrome**

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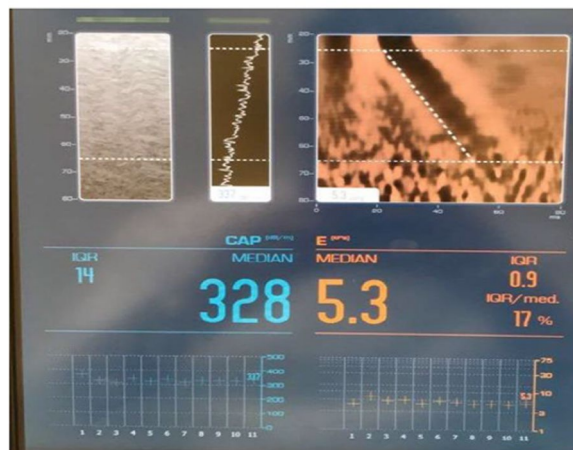
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**Background:** JBRF, female, 15 years old, diabetic since 9, began follow-up at 10 years. At this time, she used insulin (0.85 IU/kg/day) and had glycated hemoglobin (HbA1c) of 11.5%, height in the 95th percentile and pubertal stage M3P3. Pubarche and telarche occurred at 6 years old when she had an episode of vaginal bleeding, without other menstrual cycles. At 10 years and 11 months, she developed abdominal pain, increased transaminases, amylase and triglycerides. After 1 year, her transaminases remained elevated and hepatomegaly was evident on physical examination and on ultrasonography. Secondary causes of hepatopathy were excluded and hepatic alteration secondary to poor glycaemic control was diagnosed (Table 1). Transient hepatic elastography (THE) showed a controlled attenuation parameter (CAP) of 328 dB/m, compatible with 66% of hepatic steatosis, without hepatic fibrosis detected in FibroScan® (Fig. 1). Over the past 3 years, HbA1c presented at a mean of 10.7%, 6 episodes of diabetic ketoacidosis occurred and high doses of insulin (0.85–1.63 IU/kg/day) were used. She remained in amenorrhoea (Table 2) and there was reduction of the growth rate (Fig. 2).

**Discussion:** This is a patient with poorly controlled type 1 diabetes mellitus (DM1) and precocious puberty, who developed hepatomegaly, increased transaminases and interrupted sexual maturation. Mauriac syndrome (MauS) is characterized by hepatomegaly and/or transaminases alteration, short stature, delayed puberty and cushingoid characteristics in decompensated DM1 patients. Hepatic glycogenosis, characteristic of MauS, is a result of prolonged periods of hyperglycemia, followed by periods where insulinization mediates the conversion of glucose to glycogen. Histopathology of the hepatic tissue of patients with MauS also show varying degrees of hepatic steatosis and fibrosis. In this case, the patient presented grade 3 hepatic steatosis, without associated fibrosis. Hyperglycemia causes direct effects on the pulsatility of the gonadotrophin releasing hormone or on the responsiveness of LH to it, resulting in hypogonadotrophic hypogonadism.

**Conclusions:** MauS is a rare condition that results from poor glycemic control in DM1 patients and courses with hepatic changes such as glycogen deposition, steatosis and liver fibrosis. THE is a noninvasive method capable of simultaneously diagnosing and graduating such complications. Being alert to the existence of MauS is fundamental, considering the reversibility of complications. Informed consent to publish had been obtained from the patient (Fig. 1, 2, 3)

FIGURE 1



Elastography made in dia 3/7/2017

\*CAP-Controlled Attenuation Program, IQR- interquartile range, E – elasticity

FIGURE 2

Fig. 2 See text for description

TABLE 1

INVESTIGATION OF HEPATOPATHY			
	AT DIAGNOSIS OF MauS	AFTER ONE YEAR	REFERENCE VALUE
AST	106	63	15 a 40
ALT	193	207	10 a 40
HBSAG	NON REACTIVE		
ANTI-HBC IGM	NON REACTIVE		
ANTI-HBC TOTAL	NON REACTIVE		
ANTI-HCV	NON REACTIVE		
CERULOPLASMINA	29,1		21 A 53
FERRITINA	150		10 A 291
ANTI-MUSCULO LISO	NON REACTIVE		
ANTI-LKM	NON REACTIVE		

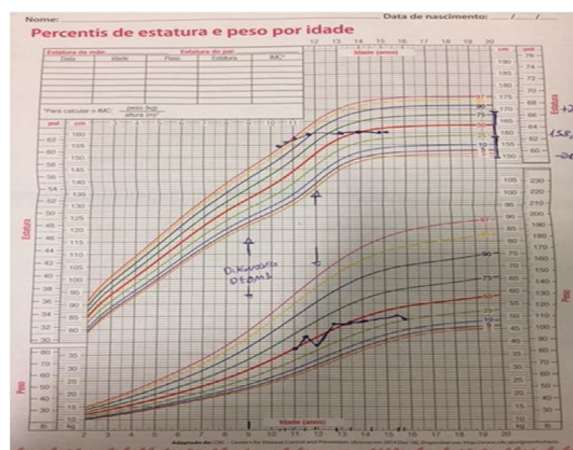
\* AST: aspartate aminotransferase; ALT: alanine aminotransferase; HBSAG: hepatitis B surface antigen (HB); ANTI-HBC: antibodies against the Hepatitis B core antigen; anti-HCV antibody to hepatitis C virus; anti-LKM: antimicrosomal antibodies of the liver and kidney

TABLE 2

INVESTIGATION OF AMENORRHEA		REFERENCE VALUES
ESTRADIOL	5	13 A 166
ANDROSTENEDIONE	2,05	0,9 A 3
FSH	0,5	PRÉ-PUBERE ATÉ 3,3
LH	0,4	PRÉ-PUBERE ATÉ 1,4
PROLACTIN	13,9	2 A 23,3
TOTAL TESTOSTERONE	36	3 A 63
S-DHEA	232	65 A 492
CORTISOL	32,3	5 A 25
17 α HIDROXIPROGESTERONE	0,5	0,3 A 155
IGF1	79,6	228 A 839
KARYOTYPE	46XX	

\* FSH: follicle stimulating hormone; LH: luteinizing hormone; S-DHEA:dehydroepiandrosterone sulfate; IGF1: Insulin-1 growth factor

Fig. 1 See text for description



Caption: First arrow corresponds to the moment of the diagnosis of DM and second arrow corresponds to the moment of the diagnosis of SMau.

Fig. 3 See text for description

**A423**

**Translation and cultural adaptation of the instrument “diabetes self-report tool (DSRT)” for the brazilian population**

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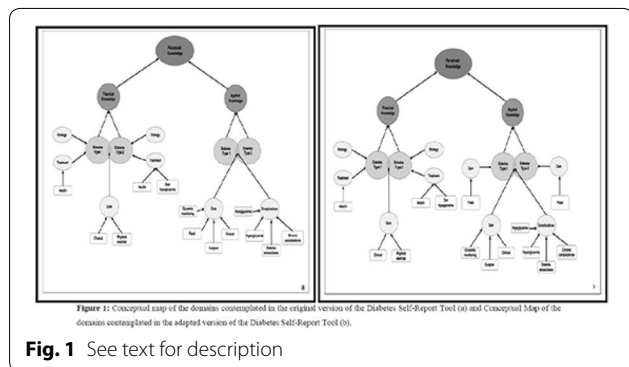
**Background:** Diabetes Mellitus (DM) is a chronic condition that requires continuous care. Hence, patient follow-up carried out by trained health professionals is an essential process. One of the ways to establish a professional updating process is to measure their level of knowledge through valid and reliable tools, such as the Diabetes Self-Report Tool (DSRT).

**Objective:** To translate the DSRT into Portuguese, to adapt it to Brazilian culture, and to evaluate the semantic, idiomatic, experiential, cultural and conceptual equivalence of the instrument.

**Methods:** A study developed in Belo Horizonte, MG, between October and November 2016. The translation and adaptation of the DSRT, originally written in the English language, involved discussions with a committee of specialized judges from both fields of linguistics and health. The transcultural translation and adaptation stages of the instrument comprised four of the five stages recommended in the literature: 1—Initial translation; 2—Synthesis of translation; 3—Retro-translation or translation back to the original language; 4—Evaluation by the Judges Committee. The data obtained was organized in Excel, followed by the consistency analysis and specific formulas to determine the Content Validity Index (CVI). The study was approved by Santa Casa of Belo Horizonte Institution's Ethics Board, approval number 1.524.898 and consent was obtained from participants.

**Results:** Comparison of the T1-T2 version with the original version resulted in cultural and linguistic adaptations with the purpose of guaranteeing the effective application of DSRT adapted to the characteristics of the population and to the Brazilian culture (Fig. 1). In addition, good semantic, idiomatic, experiential, and conceptual equivalence between the final Portuguese version and the DSRT English original were observed. The judges' committee was also well accepted for the items evaluated, since the mean CVI of the instrument was 0.85, and most of the items presented CVI ≥ 0.78, which is considered good (Table 1).

**Conclusion:** The adapted DSRT can contribute to the evaluation of the perceived knowledge of the health professionals about DM in different fields of action in the health services. In addition, it enables the identification of the most deficient areas of knowledge and information regarding this disease. Consequently, more assertive actions during the whole process of training and qualification of the health professional can be taken (Figs. 1, 2)



**Fig. 1** See text for description

**Table 1:** Presentation of the value of the Content Validity Index and suggestions of the judges' committee regarding each item. Belo Horizonte - Minas Gerais, 2016.

ITEM	CONTENT VALIDITY INDEX (CVI)				SUGGESTIONS				
	Bad (< 0,78)	Acceptable (≥ 0,78 < 0,80)	Good (≥ 0,80 < 0,90)	Optimum (≥ 0,90)	Change in markings	Change of Term and/or Interpretation	Semantic change	Change in translation	Expand Detailing
1	-	-	0,83	-	X	X			
2	-	-	0,90	-		X			X
3	-	-	0,90	-		X			X
4	-	-	0,90	-					X
5	-	-	0,90	-					X
6	0,53	-	-	-		X		X	X
7	0,68	-	-	-		X	X	X	X
8	0,71	-	-	-		X	X	X	X
9	-	0,79	-	0,96		X	X		X
10	-	-	-	-					X
11	-	-	0,86	-				X	X
12	-	-	0,86	-		X	X	X	X
13	-	-	0,89	-		X			X
14	0,61	-	-	-		X	X		X
15	-	-	0,89	-					X
16	-	-	0,86	-					X
17	0,68	-	-	-			X	X	X
18	-	-	0,89	-			X		X
19	0,75	-	-	-			X	X	
20	-	-	0,89	-			X		X
21	-	-	0,86	-			X		X
22	-	0,79	-	-		X	X		

**Fig. 2** See text for description

**A424**

**Transversal study of type 2 diabetes patient profile in three general ambulatories of endocrinology of a reference service**

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A424**

**Introduction:** Diabetes mellitus (DM) is a metabolic disease, whose complications have a great socioeconomic impact in quality of life and patient survival.

**Objective:** Cross-sectional study of the profile of patients with type 2 diabetes mellitus (DM2) in three general ambulatories of endocrinology, with secondary objective an evaluation of the frequency of chronic complications.

**Method:** There were 224 patients, of which 132 were insulin users and 92 were non-users. Of the total, were evaluated age; glycated hemoglobin (HbA1c); comorbidities such as dyslipidemia, hypertension, obesity; creatinine clearance; duration of disease and presence of macrovascular complications (myocardial infarction, peripheral arterial disease, stroke) and microvascular complications (diabetic retinopathy, microalbuminuria); separating the frequencies between users and non-insulin users. In the analysis, the Chi square test was used to continuous variables and Mann-Whitney test was used for quantitative variables.

**Results:** It was found that the mean age of the insulin users was 64.3 ± 10.8 years and the non-users 65.5 ± 12.1 years. It was also found that insulin users had a higher prevalence of dyslipidemia (91.7% × 82.6%, respectively, p-value 0.041), diabetic retinopathy (58.3% × 27.3%, respectively, p value < 0.001) and creatinine clearance < 60 ml/min (22% × 9.8%, respectively, p value 0.019) (Table 1); and a higher body mass index (BMI) value (30.6 ± 6.5 × 28 ± 7, respectively, p-value 0.004) and systolic blood pressure (146.6 ± 27.7 × 131 ± 21, respectively, p value 0.024) compared with

patients not insulin users (Table 2), with statistical difference. Other variables evaluated, such as the presence of hypertension and macro complications, are also more prevalent in insulin users, but without statistical significance. The duration of the disease was also higher in insulin users, with statistical significance (p value < 0.001). The value of the last HbA1c was found to be higher in insulin users compared to non-users, with values above 9% with a prevalence of 22.7% × 1.1%, respectively, and below 7% with a prevalence of 26.6% × 73%, respectively, with statistical difference (p value < 0.001) (Table 3).

**Conclusion:** Patients not insulin users are better disease handling, but also have a shorter time of disease and fewer complications. It was found that insulin users patients, however, have worst disease control and increased presence of complications (Fig. 1)

**Table 1.** Frequency of qualitative variables in users and non-users of insulin, analysis by the Chi-square test, for value of P <0.05

	Insulin users	Not insulin users	P-value
Dyslipidemia	91,7%	82,6%	0,041
Hypertension	78%	75%	0,631
Creatinine clearance <60ml/min	22%	9,8%	0,019
Diabetic retinopathy	58,3%	27,3%	<0,001
Microalbuminuria	18,4%	12,5%	0,262
Macro complications	60,2%	46,5%	0,190

**Table 2.** Frequency of continuous variables in users and non-users of insulin, analysis by the mann-whitney test, for value of P <0.05.

	Insulin users	Not insulin users	P-value
Duration of the disease	17,4+/- 9,4	8,4 +/- 6,9	<0,001
Age	64,3 +/- 10,8	65,5 +/- 12,1	0,385
Creatinine clearance	75,9 +/- 28,2	82 +/- 19	0,397
Systolic blood pressure	146,6 +/- 27,7	131 +/- 21	0,024
Dyastolic blood pressure	83 +/- 13	78 +/- 12	0,066
BMI	30,6 +/- 6,5	28 +/- 7	0,004

**Table 3.** Analysis of the frequency of the value of the last glycated hemoglobin (HbA1c) between users and non-users of insulin, for value of P <0.05.

	Insulin users	Not insulin users	P-value
≤7	26,6%	73%	<0,001
7,1-8,0	32%	21,3%	
8,1-9,0	18,8%	4,5%	
>9,0	22,7%	1,1%	

**Fig. 1** See text for description

#### A425

##### Treatment of prednisone in mildly diabetic rats: biochemical parameters and cell response

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**Background:** The prednisone (PRD) is a glucocorticoid that may lead to the development of temporary hyperglycemia. Moreover, the most individuals with mild diabetes do not know their own pathophysiological conditions, and may use PRD. The objective was to evaluate the effects of PRD in mild diabetic rats by biochemical and immunological biomarkers. Mild diabetes was neonatally induced with streptozotocin (100 mg/kg) in male rats and its glycemia confirmed at 75 days of age by oral glucose tolerance test (OGTT). The rats were separated into 4 groups: control (C), treated control C + PRD (oral treatment of 1.25 mg/kg/day PRD); diabetic DM (mild diabetes) and treated diabetic DM + PRD (mild diabetes, treatment with same dose as C + PRD group). Untreated groups received vehicle, adjusted volume according to body weight. The treatment daily for 21 days and it were weekly

measured the body weight, food and water intake, and glycemia. In the 3rd week of treatment, the oral glucose tolerance test (OGTT) and insulin tolerance test (ITI) were performed, area under the glycemic curve (ASC) values were calculated. In the 21st day, the rats were killed and the blood was collected for serum biochemical, leukogram and immunoglobulin G determinations. All data was statistically evaluated with 5% significance.

**Results and conclusions:** The body weight decreased in DM and DM + PRD groups at about 27% in all measures. However, the DM + PRD group, compared to C group, showed food intake increasing at 2nd and 3rd week (18%); and glycemia in all weeks of treatment (51%). Also, the same group increased the number of total leukocytes (30%), lymphocytes (19%) and neutrophils (200%); but decreased the levels of triglycerides (21%), high-density lipoprotein (8%) and very low-density lipoproteins (10%). The diabetic groups showed high glycemic values in timepoints 30 and 60 min of the DM group (201 and 211 mg/dL, respectively); and 30, 60 and 120 min of the DM + PRD group (275, 258 and 161 mg/dL, respectively) in OGTT, and these results were also reflected in the increasing of ASC. The ITT data show a decreasing of glucose levels in timepoints 5, 10 and 15 min in all groups, but the DM + PRD rats showed higher values compared to other groups. We conclude the use of prednisone is not recommended to glucose intolerant individuals, and should be replaced in order not to aggravate this condition.

#### A426

##### Treatment with caloric restriction for 27 days is sufficient to control the glycemic, lipid and blood pressure levels of individuals with type 2 diabetes and severe metabolic disorder

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Caloric restriction has been shown to be an excellent non-drug intervention in the fight against metabolic diseases in different species, from rodents to mammals. However, data on caloric restriction in humans are not well established, much less in individuals with type 2 diabetes mellitus, requiring more complex and detailed studies in order to really understand the mechanism of action of this intervention. Using personalized and rigidly controlled nutritional approaches, we submitted subjects with Type 2 Diabetes Mellitus with metabolic decompensation to caloric restriction of 25% for 27 days at the Clinical Research Unit of Hospital das Clínicas, Ribeirão Preto. The results of the treatment showed that subjects submitted to these protocols presented reduction of fasting blood glucose levels in 56.9%, accompanied by the reduction of 15.7% of Hb1Ac. Using the Hyperinsulinemic Euglycemic Clamp technique, we observed a 62.9% increase in glucose infusion rate (GIR), comparing Clamp results at the beginning and at the end of treatment. This response is corroborated with the results obtained by HOMA-β and HOMA-IR, which presented an increase of 508.9% and a reduction of 59.6% respectively. Total cholesterol levels decreased 34.4% along with triglyceride values 49.7%. The inflammatory process measured by C Reactive Protein presented a fall of 60.9%. On average, participants in the treatment had a body weight reduction of 8.0%. The interesting thing is that the reduction of weight loss is related to the reduction of fat mass only 12.1% with the maintenance of lean mass. Consistent with the metabolic results, we also observed that all individuals with arterial hypertension presented reduction systolic and diastolic blood pressure reduced to the ideal levels 31.0 and 27.7%, respectively. Our results demonstrate that controlled and personalized dietary restriction is able to reduce glycemic and lipid levels in addition to reversing systemic arterial hypertension. Future experiments are being done to elucidate the molecular mechanisms of action of caloric restriction in patients with Type 2 Diabetes Mellitus.

**Ethics approval:** The study was approved by research ethics committee of HCRP-USP process 16286/2015.

**Consent to publish** Informed consent to publish has been obtained from these patient.

#### A427

##### Type 1 diabetes mellitus and autoimmunity

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M.P.S., a 24-year-old woman, insulin dependent, with type 1 Diabetes Mellitus (T1DM) had both anti-glutamic acid decarboxylase (GAD) and anti-islet autoantibodies positives at diagnosis 13 years ago. 4 years after diagnosis, serum levels of thyroid stimulating hormone (TSH) e free thyroxine (T4) were compatible with hypothyroidism and there was positivity for anti-thyroid peroxidase antibody (TPO-Ab), thus diagnosed with Hashimoto's Thyroiditis. At the age of 17, she presented Idiopathic Sudden Hearing Loss (ISHL), characterized by sudden sensorineural hearing loss, right ear temporary tinnitus, and left ear permanent tinnitus, proven by serial tonal audiometries and electrocochleography. Further tests were carried out to exclude other etiologies. T1DM occurs as a result of an autoimmune destruction of pancreatic beta cells and it is believed that the main genetic determinants are on chromosome 6p21.3, related to human leukocyte antigen (HLA) DR3 and DR4, variable number of repeated frequencies of insulin gene, cytotoxic T lymphocyte-associated antigen 4 (CTLA-4), and Protein tyrosine phosphatase non-receptor type 22 (PTPN22). Moreover, it is believed that the polymorphism A49G of CTLA-4 gene is associated with other autoimmune diseases, so that up to 30% of T1DM cases are related to Hashimoto's Thyroiditis, Graves' Disease, Autoimmune Atrophic Gastritis, Pernicious Anemia, Celiac Disease, Addison's Disease, Vitiligo, Myasthenia Gravis and Rheumatoid Arthritis. There has been found a relation between the CTLA-4, PTPN22, and HLA DR3 and DR4 genes and the development of thyroid disease in patients with T1DM, so that the prevalence of thyroid antibody positivity in patients with T1DM reaches 30%, in which 80% will develop the disease. Regarding ISHL, the presence of an autoimmune disease seems to increase the frequency of positivity for antibodies against inner ear antigens. Even though it is a controversial issue on the literature, there are some reports of diseases such as Cogan's syndrome, polyarteritis nodosa, systemic lupus erythematosus, rheumatoid arthritis, Berger's disease, Sjögren's syndrome, Behcet's syndrome, ulcerative colitis, rheumatoid arthritis, and others, correlated with ISHL, especially on young people. Autoimmunity is the pathological basis of T1DM and its relationship with diseases presenting interconnected immunological mechanisms, as in this case, has been shown to be increasingly frequent.

Informed consent to publish has been obtained from this patient.

#### A428

##### Type 1 diabetes mellitus and graves disease: analysis from a case report

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**Case report:** SCM, female, school child, has been attending the Diabetes Service since 2011, with adequate glycemic control. Previously healthy, family history of a parent with Diabetes Mellitus type 1 (T1DM) and Hashimoto's thyroiditis (HT). Initial tests with normal thyroid function, antithyroid antibodies and screening for celiac disease are negative. In 2014, patients developed irritability, worsening school performance and poor glycemic control. At the time, tests showed TSH < 0.011, anti-TPO 21 (VR < 9), TRAb 2.2 (VR < 1.75), T4L 2.1

(VR 0.7–2.1), confirmed Graves disease (DG) and started methimazole. US of thyroid showed irregular thyroid with heterogeneous texture. Patient evolved with improvement of the symptoms, with decision to suspended of methimazole in July/2016. In February/2017, patient asymptomatic, but with TRAb positive and TSH suppressed, being restarted methimazole.

**Discussion:** The autoimmune nature of T1DM was confirmed by the detection of autoantibodies against pancreatic islet cells. Endocrine disrupters include genetic and environmental factors. Autoimmunity can affect other organs, resulting in autoimmune polyendocrine syndromes (APS). SPA type 3 (APS-3) involves the association of autoimmune thyroid disease (ATD) with other autoimmune disorders, and one of the most common is T1DM. About one-third of T1DM patients manifest APS at diagnosis or throughout disease progression. In general, T1DM is the first manifestation of APS. In patients with APS-3, it is estimated that 20–30% develop T1DM. The prevalence of ATD in patients with T1DM is two to four times higher than in the general population and usually manifests with HT and less frequently DG. Hyperthyroidism should be suspected in T1DM patients with difficulty maintaining glycemic control, in addition to the classic signs and symptoms of hyperthyroidism. This course has an increased metabolism and stimulates gluconeogenesis, glycogenolysis, lipolysis, reduced insulin sensitivity and increased glucose absorption, justifying metabolic worsening and increased risk of diabetic ketoacidosis.

**Final comments:** Patients with T1DM have a higher risk of developing other autoimmune diseases, including with an impact on metabolic control. ATD screening is recommended for diagnosis. The antithyroid antibodies usually appear during the clinical course of diabetes, which justifies assessing thyroid function annually in patients with negative antibodies and each 6 months if antibodies positive. In these cases or goitre, annual thyroid ultrasound should be performed. Informed consent to publish had been obtained from the patient.

#### A429

##### Type 1 diabetics without cardiovascular morbidities attended at the university hospital showed higher central hemodynamic parameters and vascular resistance in comparison of type 2 diabetics

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**Introduction:** Diabetes mellitus (DM) is associated with increased arterial stiffness by reducing aortic distensibility, affecting central hemodynamics, cardiac overload and blood pressure.

**Objective:** To compare peripheral and central hemodynamic parameters between type 1 and 2 diabetics.

**Methods:** Eighteen patients with DM were allocated in 4 groups: women with type 1 DM (1-DM; n = 4), with age of 58.2 ± 3.8 years and BMI of 26.1 ± 1.0 kg/m<sup>2</sup>; women with type 2 DM (2-DM; n = 6), with age of 60.1 ± 4.0 years and BMI of 28.9 ± 2.2 kg/m<sup>2</sup>; men with type 1 DM (1-DM; n = 5), with age of 59.8 ± 5.2 years and BMI of 23.9 ± 1.2 kg/m<sup>2</sup>; men with type 2 DM (2-DM; n = 3), with age of 59.0 ± 6.0 years and BMI of 25.4 ± 1.8 kg/m<sup>2</sup>. Fasting glycemia, glycated hemoglobin (HbA1c), systolic (SAP), diastolic (DAP) and mean arterial pressure (MAP), central systolic pressure (cSP), central diastolic pressure (cDP), central pulse pressure (cPP), total vascular resistance (TVR) and pulse wave velocity (PWV) were obtained using a noninvasive method (pulse wave analysis by oscillometric method).

**Results:** The 1-DM women showed higher fasting glycemia (140.1 ± 22.7 mg/dL) than in 2-DM women (137.9 ± 18.5 mg/dL; p = 0.004), 1-DM men (161.6 ± 20.3 mg/dL; p = 0.022) and 2-DM men (124.5 ± 26.3 mg/dL; p < 0.001). The same results were also observed in relation to HbA1c in 1-DM women (9.4 ± 0.6%) when compared with 2-DM women (6.9 ± 0.5%; p = 0.010), 1-DM men (7.4 ± 0.5%; p = 0.037) and 2-DM men (5.9 ± 0.7%; p < 0.001). The 1-DM men presented higher levels of SAP (140.4 ± 17.6 mmHg) in comparison



with 2-DM men ( $124.0 \pm 2.3$  mmHg;  $p = 0.035$ ). Similar results were obtained for MAP ( $107.6 \pm 14.3$  mmHg), TVR ( $1.3 \pm 0.2$  mmHg/ml), cSP ( $132.6 \pm 15.3$  mmHg) e cPP ( $39.4 \pm 7.0$  mmHg) in 1-DM men in comparison with 2-DM men ( $95.0 \pm 3.1$  mmHg;  $p < 0.05$ ), ( $1.1 \pm 0.1$  mmHg/ml;  $p < 0.05$ ), ( $113.0 \pm 8.0$  mmHg;  $p < 0.05$ ) and ( $29.0 \pm 7.0$  mmHg;  $p < 0.05$ ), respectively. No significant alterations were observed between the groups of the present study in relation to PWV.

**Conclusion:** Our data demonstrate that 1-DM women have significant hyperglycemia in comparison with all groups. Independent of cardiovascular morbidities, the central hemodynamics parameters and vascular resistance are higher in 1-DM men than in 2-DM men, without changes on central hemodynamics parameters in both groups of diabetic's women

#### A430

##### Type 3 diabetes: elevation of the glycemic levels in patients alzheimer's disease

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**Background:** Epidemiological studies provide convincing evidences for a significant association between type 2 diabetes mellitus (T2DM) and mild cognitive impairment or dementia, and furthermore suggest that the T2DM is a significant risk factor for the development of Alzheimer's disease (AD). The studies on post-mortem human brain tissue provide solid evidences that the AD is associated with fundamental abnormalities in the mechanisms of insulin/IGF signaling, which are highly correlated with the development and the progression of structural, molecular and biochemical lesions, correlated with dementia. In spite of the abnormalities noted in the AD share common characteristics with the type 1 diabetes mellitus (T1DM) and T2DM, they are, nevertheless, distinct by the dual presence of trophic factor deficiencies and trophic factor's receptor resistance, therefore the term "type 3 diabetes", that accurately reflects the fact that the AD represents a form of diabetes that engages selectively the brain and has molecular and biochemical characteristics that overlap with T1DM and T2DM. This study aims to identify alterations in the blood glucose levels in outpatients with the diagnostic of Alzheimer's disease (AD).

**Methods:** 125 outpatients with the diagnostic of Alzheimer's disease (AD) according to criteria proposed by NINCDS-ADRDA (2011), followed-up in a geriatrics clinic, had their glucose seric levels assessed.

**Results:** 54 (43.2%) patients presented alterations of the glucose levels, of which 38 (30.4%) in pre-diabetic condition and 16 (12.8%) with type 2 diabetes mellitus (T2DM).

**Conclusion:** There is in this sample of patients with Alzheimer's disease (AD) a consistent alteration of the blood glucose levels, observed in more than 43% of the patients, a fact that reinforces the need of prospective studies that measure the strength of this association

#### A431

##### Type B insulin resistance in overlap syndrome—case report

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**Case report:** A postmenopausal patient with overlap syndrome (scleroderma, antiphospholipid antibody syndrome and Sjögren), diagnosed in 2013 with diabetes mellitus, with glycemia 400 mg/dL and Body Mass Index  $16 \text{ kg/m}^2$ , using azathioprine and prednisone. Initially prescribed insulin at the dose of 1 IU/kg. Six months later she was hospitalized due to lack of glycemic control. Due to the high doses of insulin used, hypothesis of type B insulin resistance (IR) was proposed, despite anti-insulin receptor negative. Intravenous insulin was

made with minimal impact on glycemia. She underwent pulse therapy with methylprednisolone followed by the use of azathioprine, with no response. She was followed up in an outpatient clinic using high doses of insulin (1800 IU/day), with inadequate glycemic control. In December/2015, she presented severe hypoglycemia and, from then on, improved glucose levels, without insulin until July/2016, when was admitted with weight loss and return of hyperglycaemia, requiring high doses of insulin. Re-dosed anti-insulin receptor antibody, this time strongly positive. Pulse therapy was performed with cyclophosphamide and methylprednisolone, with no response. Due to social conditions, psychiatric disorder, multiple infections, rheumatology team counter-indicated future immunosuppressive therapies. Patient continues with glycemic control, occasionally with paradoxical hypoglycemia in the morning.

**Discussion:** The case refers to a patient with type B IR, who presented a transient episode of spontaneous remission of the disease. This rare syndrome is an autoimmune phenomenon caused by polyclonal IgG antibodies directed against insulin receptors. Until 2012, report of 67 cases in the world. A number of autoimmune diseases can induce these autoantibodies. The antibody binds to the insulin receptor and can have two actions: inhibition or stimulation. When at low titers, autoantibodies appear to act as partial agonists and result in hypoglycemia; when in high titers, there is apparently a down-regulation of the receptor response, which results in hyperglycemia. A variety of immunosuppressive agents are used to induce remission. Spontaneous recovery of euglycemia, without therapeutic intervention, is not uncommon.

**Final comments:** Because it is a rare disease, there is no standardization for its diagnosis and treatment. The treatment strategy should be individualized based on the other demands of the patient. Informed consent to publish had been obtained from the patient.

#### A432

##### Type1 diabetes mellitus and pregnancy: maternal and fetal outcomes

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**Background:** Different studies suggested that pregnancy in women with type 1 diabetes mellitus (T1DM) is associated to increased risk of obstetric complications, congenital abnormalities and neonatal morbi-mortality. These outcomes are mainly associated to poor metabolic control since the preconception period to latest gestation.

**Aims:** To evaluate gestational and neonatal outcomes in T1DM pregnant women attended in a Reference Diabetes and Pregnancy Regional Center and to correlate the metabolic control before and during pregnancy to maternal and fetal morbidity and mortality.

**Methods:** A retrospective cohort study which enrolled T1DM pregnant women from Jan/2010 to Dec/2015. Clinical and laboratory data were collected from a care protocol performed in medical visits. Glycated hemoglobin (HbA1c) was performed monthly (Immunoturbidimetry, reference normal value: 4.8–5.9%).

**Results:** 102 pregnancies of 94 T1DM patients were included. The patients mean age was of  $23.5 \pm 5.0$  years. Of the sample, 84.3% were Caucasian, 19.6% had preeclampsia, 14.1% had diabetic nephropathy and 30.1% had retinopathy. Of these 52.8% reported a family history of systemic arterial hypertension and 52% familiar diabetes. During the gestational period, HbA1c values progressively decreased, demonstrating improvement in metabolic control during pregnancy (HbA1c prior, initial and final:  $9.4 \pm 2.2$ ,  $8.6 \pm 1.8$  and  $7.1 \pm 1.2\%$  respectively,  $p < 0.0001$ ). There was also an initial HbA1c difference between women who had abortion and those who did not ( $10.3 \pm 2.3\%$  vs.  $8.5 \pm 1.7\%$ ,  $p = 0.04$ ). Regarding the weight gain during pregnancy: 37% was adequate, 35.8% was insufficient and 27.2% was excessive.

Concerning the neonatal outcomes 23.1% had fetal macrosomia, 69.2% were at-term and 19.3% presented congenital abnormalities, mainly cardiac diseases. There were no differences between the presence of macrosomia or congenital abnormalities and HbA1c (previous, initial or final).

**Conclusions:** Our data suggest that T1DM pregnant patients with elevated HbA1c values have a greater incidence of abortion. Nevertheless, a significant improvement of glycemic control during pregnancy was evidenced in our sample. Additionally, our results emphasize the importance of the good metabolic control since pre-conception to reduce maternal and fetal adverse outcomes.

#### A433

##### Ukpds: stratification of macrovascular risk of people with type 2 diabetes mellitus at núcleo de atenção em diabetes of Blumenau—Santa Catarina

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Currently, type 2 Diabetes Mellitus (DM) is one of the major chronic non-communicable diseases that affect humanity. It is an important independent risk factor for coronary artery disease, stroke, peripheral artery disease and heart failure. This fact justifies the relevance of identifying people with DM who are at greater risk for macrovascular complications. In order to stratify this type of risk, the most appropriate calculation tool is the UKPDS calculator, which estimates the risk of CHD and fatal or non-fatal stroke in patients with type 2 DM. A descriptive cross-sectional and quantitative study was conducted in the months between March, and May 2017. The data collection was performed by analyzing the medical records identifying the variables required for the UKPDS. The sample was consisted of 404 medical records and the patients were selected according to the following inclusion criteria: to be registered in a Family Health Center; to be diagnosed with type 2 DM; been utilizing the public health service for at least 2 years; to have the test results recorded in the medical record. Among the sample, 228 users were women and 176 were men. It was verified the predominance of users in the age group between 50 and 70 years. In addition, only 10.3% of them are regular smokers, while 36.1% are ex-smokers. The last glycated hemoglobin test recorded in medical records showed an average value of 8.6%. Regarding the time of the diagnosis of DM, 40.9% presented the diagnosis between 1 and 10 years; 23% between 11 and 20 years; and 36.8% for more than 20 years. When calculating the patients' cardiovascular risk, it was identified that 39.5% are at high risk of having a cardiovascular event in 10 years; 26.9% had intermediate risk and 33.6% had low risk. This study shows the importance of using the UKPDS risk calculator for people with type 2 DM in order to formulate strategies for changes in modifiable risk factors and to avoid further morbidity and mortality. Therefore, the results of this research will serve as a subsidy for the development of the Supported Self-Care model, as a strategy capable of empowering these users to self-manage their health, in order to reduce or minimize the type 2 DM's complications and positively influence in the life quality and expectancy.

#### A434

##### Unsaturated fatty acids reverts the endoplasmic reticulum stress and inflammatory process in the aorta of obese and diabetic animals—the role of the GPR120 receptor

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**Introduction:** The inflammatory response triggered during obesogenesis induces a vascular injury which began endothelial disturbances, culminating in atherosclerosis. The anti-inflammatory properties of omega 3 fatty acids (n3) could be induced by its receptor GPR120, however, without investigation in the vascular tissue.

**Objective:** To describe the role of n3 (C18:3) from flaxseed oil, through its receptor GPR120, on the inflammation and endoplasmic reticulum stress process in the aorta of obese and diabetic type 2 mice.

**Methods:** Swiss e LDL<sup>-/-</sup> male mice, were fed during 8 wk with standard rodent diet (CT group) or high-fat diet (HF group). After this period, the CT and HF groups were maintained in the same diets. A part of animals from HF diet was fed with a new diet, substituted in 10% of lard by flaxseed oil, rich in n3 (52.3%). These new groups were treated for another 8 weeks. After this period, we carried out food intake, weight gain, insulin sensitivity (ITT) and glucose tolerance (GTT) as physiological parameters. The aorta gene expression was measured by RT-qPCR and proteins were identified by Western Blot analysis. Our targets were proteins involved in pathways such as insulin signaling, inflammation and reticulum stress. The n3 bioavailability and tissue incorporation was attested by mass spectrometry. The immunohistochemistry identified GPR120 in the endothelial structure.

**Results:** On arterial wall, the anti-inflammatory action exhibited by n3 from flaxseed oil on both experimental mice models were evidenced by IL1 $\beta$ , TNF $\alpha$ , JNK and I $\kappa$ B $\alpha$  proteins reduction. This phenomenon was accompanied by reduction of PERK, eIF2 $\alpha$ , IRE1 $\alpha$  and XBP1 s proteins. The insulin signaling was reestablished with increment on IR, IRS1 and AKT phosphorylation. There was systemic metabolic improvement with increased glucose and insulin tolerance and sensitivity. The GPR120 was activated by n3, which recruited b-arrestin2. The lipidomics shown n3 endothelial incorporation. The immunohistochemistry attested GPR120 on arterial wall and, surprisingly, on surface of infiltrated macrophages. Consecutively, n3 drives macrophages polarization to M2 antiinflammatory profile, targeted by Iba antibody.

**Conclusion:** In fact, omega 3 fatty acids probably will not reverse an pre-existent atheroma, however, the results of this work clearly appoints to the high capacity of n3 fatty acids into decrease the risk development of the cardiovascular disease, with epidemiological behavior. To the first time we demonstrated the mechanistic prevention role of n3 fatty acids related to atherogenesis, controlling the infiltrated macrophages polarization in the aorta. This work reinforces the protective capacity of food.

#### A435

##### Using an app for the treatment of diabetic ketoacidosis, the improvement in the treatment and in the diagnosis cases

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**Introduction:** Diabetic ketoacidosis (DKA) has an increasing incidence and high morbidity and mortality. Treatment is complex and requires frequent adjustments of insulin doses and electrolytes. After an adverse event, we implemented a protocol of DKA tracking through ketonuria and treatment with support of a web platform application that, according to weight, glycemia, electrolytes and acid-base balance, suggests the doses of insulin, the hydroelectrolytic intake and the interval of the exams, following the guidelines of the Brazilian Society of Diabetes.

**Objective:** To describe the incidence of DKA in our institution and the impact of the application on the treatment of these patients.

**Methods:** We performed a retrospective comparative analysis of the hospitalizations by DKA, before (2010–2015) and after (2016–2017) of the beginning of the protocol. In cases with detailed information on glycemic evolution, we compared the proportion of blood glucose levels below 70 mg/dl, between 181 and 250 and above 250 during the first 24 h of hospitalization, on the second and third day of treatment.

**Results:** Between 2010 and 2017, there had 46 hospitalizations per DKA, of which 18 were after the initiation of the protocol. The

diagnosis of DKA increased from 4.7 to 9 cases/year and the proportion increased from 0.09 to 0.25 cases for every 1000 admissions ( $P < 0.05$ ). There were no deaths. In the patients included in the protocol, 47% presented infection, 41% due to omission of insulin dose. There were 2 cases of SGLT2 inhibitor use and 2 cases related to insulin pump problems and one case due to initial diagnosis of diabetes. For comparison of glycemic control, 10 cases were included before and 16 after the beginning of the protocol. After implantation, the proportion of blood glucose levels below 70 mg/dl in the first 24 h decreased from 3.5 to 1.5% ( $P < 0.05$ ). There was no variation in the proportion of blood glucose in the target range. Between the 2nd and 3rd day of hospitalization, there was a reduction in the proportion of glycemia above 250 mg/dl from 43 to 31% ( $P < 0.05$ ). No case of severe neurological or metabolic complication was observed among inpatients since the beginning of the protocol.

**Conclusion:** The implantation of a ketonuria DKA protocol was associated with an increased diagnosis of ketoacidosis and treatment with an application allowed the reduction of hypoglycemia in the first 24 h of hospitalization and reduction of rebound hyperglycemia in the days following treatment.

**A436**

**Using podcasts on a social audio platform to diabetes education**

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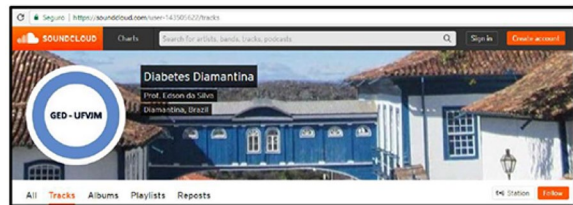
**Introduction:** Learners are faced with the challenges of a constantly growing knowledge base, combined with multiple, competing information sources. There are many technologies currently being used in diabetes education, including podcasts, which are often shared in SoundCloud. Podcasts are audio files distributed by way of the Internet to share information asynchronously. In this sense, SoundCloud is a social audio platform launched in 2008 that allows users to create and share sounds across the web. So, music and audio creators use SoundCloud to share their content with a global audience, as well as receive detailed access listener statistics and feedback from the SoundCloud community.

**Objetives:** This work aimed to analyze the general characteristics and metrics of podcast production and podcast sharing on a educational diabetes page in the social network SoundCloud.

**Methods:** During 1 year (July 2016 to July 2017), podcasts with information about several subjects of diabetes were recorded on the Campus Radio 99.7 FM. For preparation of each podcast, first a literature review was made to choose the theme based on the Guidelines of the Brazilian Society of Diabetes, or data of the International Diabetes Federation (IDF), or papers with updates about diabetes. After choosing the theme a short text for each podcast was written using a language easy to understand, but without losing the scientific quality of subject explored in the podcasts. Then the audios were recorded on 99.7 FM and transformed into podcasts in mp3 format. The Diabetes Diamantina page on SoundCloud was used to share one podcast per week (Fig. 1). Once a month, the following post metrics were recorded: plays, likes, comments, reposts, and downloads. Data were analyzed and described.

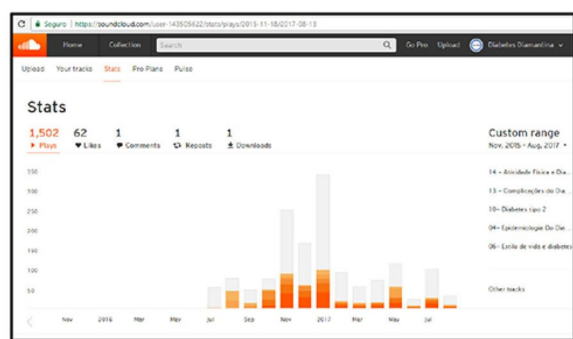
**Results:** For a year there were 37 podcasts shared on Soundcloud (Fig. 2). The podcasts were played online 1502 times and received 62 likes, 1 comment, 1 repost, 1 download and 14 followers (Fig. 3).

**Conclusion:** The results of this research evidenced the experience with the production and use of podcasts in diabetes education. In this sense, research indicates that traditional methods of diabetes education has had limited effectiveness and suggest that different educational approaches be explored. So, in our research podcasts were a valuable method for sharing idea. But, next steps include conducting new studies with to understand more about the use of the podcast. Apoi: Proexc/Proace UFMJM (Figs. 1, 2)

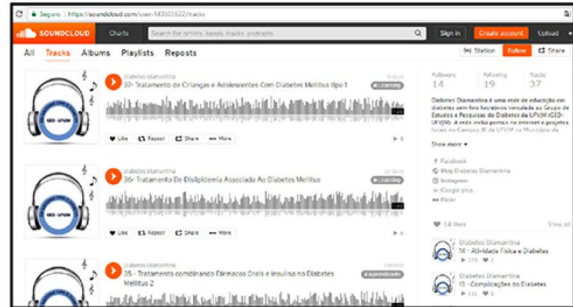


**Figure 1.** Illustrative image of the Diabetes Diamantina page on SoundCloud. Database from: <<https://soundcloud.com/user-143505622>>. Accessed on 10.19.2017.

**Fig. 1** See text for description



**Figure 2.** General results taken from the Diamantina Diabetes database at SoundCloud with information for the period from July 2016 to July 2017. Identify the number of all evaluations online. Database from: <<https://soundcloud.com/user-143505622>>. Accessed on 10.19.2017.



**Figure 3.** List of latest posts of Diabetes Diamantina on SoundCloud among the 37 publications online available (Portuguese) between July 2016 and July 2017. Database from: <<https://soundcloud.com/user-143505622>>. Accessed on 10.19.2017.

**Fig. 2** See text for description

**A437**

**Value of spectral analysis in type 2 diabetic patients without signs or symptoms of autonomic dysfunction and without cardiovascular autonomic neuropathy defined by traditional tests (EWING)**

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**Background:** The gold standard for the diagnosis of cardiovascular autonomic neuropathy (CAN) are tests that evaluate the heart rate variability (HRV) during deep breathing, Valsalva maneuvers, orthotatism, and orthostatic hypotension [1–4]. The addition of 3 tests of analysis in the frequency-domain (spectral analysis) to the traditional 4 tests, totaling 7 tests, has been used. However, no consensus exists

regarding the need for or recommendation of 7 tests instead of the traditional 4 tests [1-4].

**Objective:** This study evaluated the value of spectral analysis in patients with type 2 diabetes mellitus (DM2) without signs or symptoms of autonomic dysfunction and without CAN defined by the traditional 4 tests (Ewing).

**Methods:** Patients with DM2 who reported no exercise intolerance and who had no known autonomic dysfunction and no postural hypotension or resting tachycardia were selected. First, the tests evaluating HRV during deep breathing, Valsalva maneuver, and orthostatism were performed. Definite CAN was diagnosed in the presence of  $\geq 2$  abnormalities [1-4]. Spectral analysis of HRV (spectral amplitude in the three bands: very low-frequency, low-frequency, and high-frequency) was performed on patients without definite CAN. Next, CAN was defined as the presence of  $\geq 3$  abnormalities and incipient CAN was assumed when 2 abnormalities were present [3]. A control group without DM, which was similar in terms of sex, age and BMI, was studied.

**Results:** Forty-five patients (32 women and 13 men) aged  $\geq 40$  years, with a mean BMI of 28 kg/m<sup>2</sup> and diagnosed with DM2 at least 3 years ago, were included. The mean value of the last HbA1c was 8%. Among 8 patients with initially possible CAN (i.e., 1 altered traditional test), one had 1 and three had 3 abnormal spectral analysis tests, permitting the diagnosis of incipient and definite CAN, respectively. Among the 37 patients without any altered traditional test, in spectral analysis, four patients had 1 altered test and two other patients had 2 altered tests. The latter patients were diagnosed with incipient CAN. None of the subjects of the control group had any altered spectral analysis test (100% specificity).

**Conclusion:** Among patients with DM2 without signs or symptoms of autonomic dysfunction and without definite CAN by the traditional tests (Ewing), spectral analysis permitted the diagnosis of CAN in 13.3% (incipient in 3 and definite in 3), with 100% specificity. Compliance with Ethical Standards The study was approved by the Research Ethics Committee of our institution. Informed consent was obtained from all individual participants included in the study.

#### A438

##### Vascular and neurological evaluation of foot the people with diabetes mellitus type 2

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**Background:** Diabetes Mellitus (DM) is a chronic metabolic disorder, one of the complications being the diabetic foot, characterized by the presence of ulcerations precipitated by diabetic neuropathy and peripheral vascular disease [1]. Purpose of the study to perform the vascular and neurological evaluation of people with type 2 DM from a municipality in the South of Minas Gerais and to classify the risk of developing diabetic foot.

**Methodology:** Descriptive cross-sectional study with a sample of 100 volunteers with DM2 enrolled in the e-SUS of the municipal health services. Data collection took place between March and June 2017, using a structured questionnaire, based on the criteria of the Manual of the Diabetic Foot of the Ministry of Health, which includes: sociodemographic and clinical data; vascular assessment such as staining, temperature, palpation of the posterior and pediatric tibial pulses, verification of signs of venous insufficiency such as edema and varicose veins; neurological evaluation through tactile sensitivity with monofilament of 10 g, vibration sensitivity with 128 Hz tuning fork and Aquileu tendon reflex with reflex hammer. In addition, it allowed to classify the risk of Diabetic Foot, in which 0—without PSP (Loss of Sensitivity Protective of feet) and without DAP (Peripheral Arterial Disease, 1—PSP with or without deformity, 2—DAP with or without PSP, 3—history of ulcer or amputation Ethical assessment: Project was approved by Institution's Ethics Board of the Federal University of Alfenas, number 55954816.1.0000.5142.

**Results:** 67% are women and have a mean age of 63.60  $\pm$  12.01 years the time of diagnosis of DM was on average 10.89  $\pm$  0, the mean blood glucose was 156.21  $\pm$  63.83 mg dl, 7% reported having a history of ulceration and 2% of amputation. In the vascular evaluation, 22% with altered skin color, 86.3% of these bluish, with 92% with normal temperature, 44% have venous insufficiency, 19% with edema and 52% with varicose veins, the mean number of volunteers with the posterior tibial and pedicle pulses of both feet present was 80  $\pm$  1.82, decreased 19.75  $\pm$  2.21 and absent 0.25  $\pm$  0.5 In the neurological evaluation, 24% had altered tactile sensitivity, 26% absent and 49% with alteration in the Achilles tendon reflex. Risk classification: 58% with risk 2, 20% risk 0, 15% risk 1, while 7% with risk 3.

**Conclusion:** Study showed that a considerable number of volunteers have vascular and neurological changes in the feet, contributing to a higher frequency risk 2 in developing diabetic foot.

#### A439

##### Vitamin D supplementation improves oxidative stress biomarkers in type 2 diabetes

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**Introduction:** Oxidative stress (OS) is characterized by imbalance between harmful free radicals and the body's mechanisms to efficiently detoxify them. Diabetes is a multifactorial disease characterized by persistent hyperglycemia and there is increasing evidence for the role of OS in development of many diseases, including cancers, cardiovascular diseases and diabetes. In addition, the possible role of vitamin D as antioxidant in diabetes is discussed.

**Aim:** The objective of this randomized placebo-controlled clinical trial was to assess the effect of the vitamin D supplementation on metabolic and OS biomarkers in type 2 diabetes mellitus (T2DM).

**Methods:** The participants (n = 31; age 46  $\pm$  6.45 years; sex 21/10 female/male) with T2DM were enrolled in this study in two groups. One group received one capsule/week of vitamin D (50.000 U) or placebo for 90 days. At the beginning and after intervention, laboratory analyses (biochemical and OS markers) were performed. After fasting for 12 h, the subjects underwent the following laboratory blood analysis: glucose, lipid profile, uric acid, and C-reactive protein (CRP) which were evaluated by a biochemical autoanalyzer (Dimension Dade AR; Dade Behring), insulin and vitamin D were evaluated by MEIA (AxSYM, Abbott Laboratory, Abbott Park, IL, USA). Advanced oxidation protein products (AOPP) were determined in the plasma using the semi-automated method described by Witko-Sarsat. Analysis of plasma hydroperoxide concentrations was evaluated by two methods (tert-butyl hydroperoxide-initiated chemiluminescence and FOX assay). This study was conducted according to the principles of the Helsinki, and the study protocol was approved by the ethics committee of the University (CAAE: 41718014.9.0000.5231). Kruskal-Wallis with post hoc Dunn'test was performed to verify differences across intervention (placebo or vitamin D). Graph Pad Instat 3 version was used for evaluations.

**Results:** As expect, there was a significant increase in vitamin D levels in vitamin D group after intervention (p < 0.0001). Compared with placebo group, after 90 days of intervention, there was a significant reduction in AOPP (p = 0.05) and hydroperoxides levels (p = 0.008), and a trend to decrease in FOX levels (p = 0.08) in the vitamin D group. In the placebo group the analyses remained unchanged after this period.

**Conclusion:** In conclusion, 90 days of vitamin D supplementation was capable to reduce OS (protein and lipid oxidation) in T2DM.

**A440**

**Waist-to-height ratio for the identification of cardiovascular risk in patients with diabetes mellitus type 2**

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**Introduction:** Cardiovascular risk is increased among obese people, mainly in those who present central obesity. Waist circumference (WC) is the most used indicator for measuring the centralized distribution of adipose tissue. Another indicator that has shown a strong correlation with cardiovascular risk factors is the waist-to-height ratio (WHtR), where the waist should be less than half of the height to indicate a lower risk of all-cause mortality.

**Objective:** To evaluate the risk of cardiometabolic complications through anthropometric measures in patients with type 2 diabetes mellitus (DM2).

**Method:** It was a cross-sectional study carried out in a specialized healthcare unit in the city of Fortaleza, CE, from July 2016 to August 2017. Were included patients with a diagnosis of T2DM of both sexes, coming from nutrition and endocrinology services. Weight (kg), height (m) and WC (cm) were measured. The WC measurement was performed at the midpoint between the last costal arch and the antero-superior iliac crest. Cut-off points used to indicate risk of metabolic complications associated were WC:  $\geq 94$  cm in men and  $\geq 80$  cm in women at high risk; and  $\geq 102$  cm in men and  $\geq 88$  cm in women at very high risk. The cut-off point for WHtR was 0.52 for women and 0.53 for men.

**Results:** The sample consisted of 109 patients, with a mean age of  $57.3 \pm 12.47$  years and 65.1% (71) were female. According to WC, 93% (66) and 60.6% (23) of women and men, respectively, presented a high or very high risk for the development of cardiometabolic complications. Regarding the WHtR, 88.7% (63) of the women and 98.7% (36) of the men presented a cardiovascular risk.

**Conclusion:** It was observed that both measures were useful tools to identify cardiometabolic risk in this population. However, WHtR was able to predict this risk in a greater percentage of males, when compared to the WC in the studied population. Therefore, the use of WHtR in clinical practice is suggested, in order to allow an early intervention in a greater number of individuals, aiming at a consequent reduction of morbidity and mortality.

**A441**

**Weight loss with antihyperglycemic agents and mortality in type 2 diabetes: a meta-analysis of randomised controlled trials**

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**Background:** Weight loss with antihyperglycaemic medications may be a marker for favourable outcomes. The objective of this review was to evaluate the relation between antihyperglycaemic medications for type 2 diabetes, weight loss and mortality and cardiovascular events.

**Methods:** PubMed, EMBASE, Cochrane Library, and clinicaltrials.org were reviewed up to March 2017. We included randomised trials that assessed antihyperglycaemic medications in type 2 diabetes, reported all-cause mortality, and had a duration longer than 1 year. To maintain glycaemic equipoise, studies with a difference greater than 0.5% in glycated haemoglobin were excluded. The main outcomes were all-cause and cardiovascular mortality. Myocardial infarction, stroke, and heart failure were also assessed. Weight loss medications were defined as those with a weight reduction  $\geq 1$  kg in the experimental group and a difference of at least  $-1$  kg in comparison with control arm.

**Results:** The review identified 26 studies (77,887 patients, 4147 all-cause and 1931 cardiovascular deaths). While weight loss medications were associated with reduced risk of all-cause mortality (RR 0.84, 95% CI 0.75–0.96), the remaining studies were not (RR 0.93, 95% CI 0.84–1.04). Cardiovascular mortality results were similar (weight loss, RR 0.78, 95% CI 0.66–0.92; no weight loss, RR 0.86, 95% CI 0.71–1.04). Weight loss was also associated with decreased myocardial infarction.

**Conclusion:** Treatment with antihyperglycaemic medications that reduced weight lead to decreased all-cause and cardiovascular mortality risk, independently from glycaemic effects. Beneficial effects on weight might be considered when selecting antihyperglycaemic agents for patients with type 2 diabetes. PROSPERO registry: CRD42016043895 (Fig. 1)

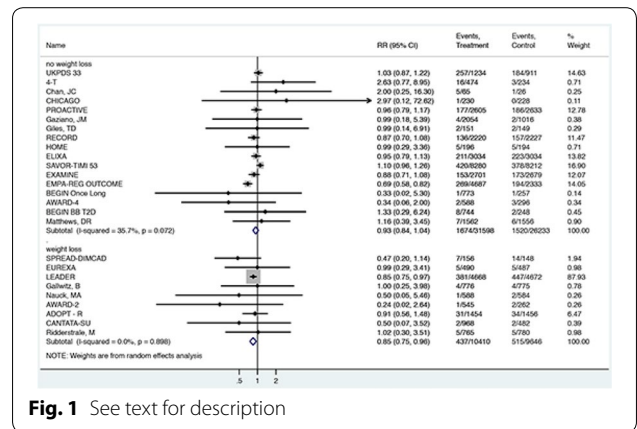


Fig. 1 See text for description

**Funding:** Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) and Fundo de Incentivo à Pesquisa e Eventos–Hospital de Clínicas de Porto Alegre (FIPE-HCPA).

**A442**

**What is the impact of a combination of fructose and prednisolone intake on glucose and lipid homeostasis? it is never too late to repair bad habits**

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*Journal of Diabetology & Metabolic Syndrome* 2018, **10(Suppl 1):A442**

**Introduction:** It is well known that regular ingestion of fructose and continuous treatment with glucocorticoid (GC), separately, causes diabetogenic effects.

**Objective:** Thus, we sought to evaluate the impact of a combination of fructose and prednisolone ingestion on glucose and lipid homeostasis as well as the impact of the interruption of this combined treatment.

**Methods:** Male Wistar rats were divided into five groups as follows: control (C) group, fructose (F) group (20% fructose in the drinking water), prednisolone (P) group (12.5 µg/mL prednisolone in the drinking water), fructose plus prednisolone (FP) group (treated as F and P groups) for 90 consecutive days. Half of the rats (group R) from the FP group were maintained for 90 more days with a discontinuation of fructose and prednisolone to monitor the parameters.

**Results:** The combination of fructose and GC intake rendered rats hypertriacylglyceridemic from the fourth week of treatment until the end of treatment (p < 0.05). The FP group also developed augmented abdominal adiposity, plasma insulin values, reduced insulin sensitivity, increased urecemia, and impaired hepatic redox balance with elevated content of fat in the liver (p < 0.05). No major impact on glycemia or glucose tolerance was observed in the FP group. This phenotype

observed in the FP group was associated to an increase in the beta cell mass per body mass ( $p < 0.05$ ). Moreover, the combination of sugar and GC treatment led to a reduction in the total hepatic protein kinase B (PKB) content and to a reduction in the phosphorylated 5' AMP-activated protein kinase (AMPK) content in the adipose tissue ( $p < 0.05$ ). Quantification of proteins involved with the proinflammatory pathway revealed no alteration related with the combination of fructose and GC intake. Cessation of treatments was satisfactory for the normalization of triacylglycerolemia and urecemia in the R group. Interruption of treatments also led to normalization of the peripheral insulin sensitivity, hepatic fat content and redox state ( $p < 0.05$ ).

**Conclusion:** We conclude that combination of fructose and prednisolone intake induces a metabolic syndrome-like phenotype and that cessation of treatments ameliorates practically all metabolic adverse effects. These findings point to the risk of associating GC-based therapies with a regular intake of sweetened beverages and draws attention to the plasticity of the organism and the benefits of removing the causal factors, whenever possible.

#### A443

##### World diabetes day—assessment of the impact of activities aimed to detect chronic complications diabetes-related in the metropolitan area of the city of Sao Paulo, Brazil

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**Introduction:** Type 2 diabetes mellitus (T2DM) have become one of the main problems in public health and accounts for 90% of cases of diabetes globally. As already it happen in other developing countries, Brazil is one of the most important examples of the alarming picture of T2DM, being the country with the fourth largest number of people with diabetes [1, 2]. It is well established that the screening campaigns to detect suspected diabetes cases produce impressive results, as well as demonstrated in the incidence of new cases of diabetes from capillary blood sugar tests performed during the campaign. However, a large number de patients with diabetes mellitus were also actively participating in the World Diabetes Day campaign, without the exact measurement of complications for the population already diagnosed with diabetes mellitus.

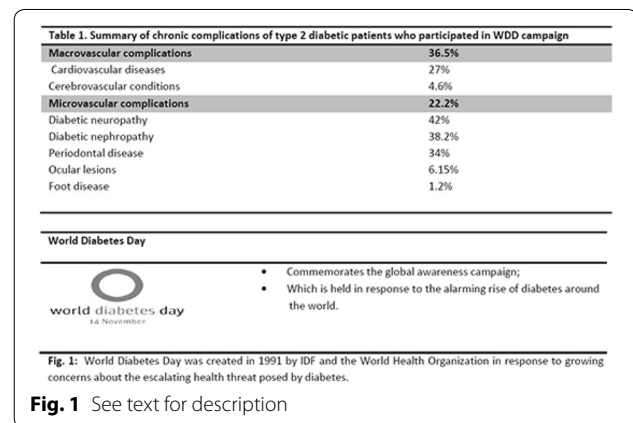
**Objectives:** The aim of this study was to describe the prevalence of chronic complications among patients with type 2 diabetes mellitus in the metropolitan area of the city of Sao Paulo, Brazil.

**Materials/methods:** This was a retrospective, observational search, involving a cross-sectional epidemiologic survey about chronic complications relating to diabetes in the metropolitan area of the Sao Paulo city. The data were collected from people who participated in the campaign in celebration of World Diabetes Day (WDD) and analyzed from January to April 2017. All participants signed the informed consent in this research.

**Results:** Of the 7896 subjects who participated in the campaign, 1066 (13.5%) with type 2 diabetes mellitus previously diagnosed. Among these population, 53% were female ( $n = 565$ ) and the mean age was  $61.5 \pm 8.7$  years. After evaluation of a multidisciplinary team, at least one chronic complication was diagnosed in 501 individuals (47.0%) of the study subjects; 183 (36.5%) presented with macrovascular complications and 111 (22.2%) with microvascular complications. The prevalence of cardiovascular and cerebrovascular conditions, neuropathy, nephropathy, periodontal disease, ocular lesions and foot disease

were 27, 4.6, 42, 38.2, 34, 6.15 and 1.2%, respectively. Relationship cannot be established between the prevalence of complications and duration of diagnosed diabetes, since the objective of the campaign was the screening of new cases of diabetes mellitus.

**Conclusion:** Community screening campaigns for diabetes mellitus are extremely important projects, once diabetes is an important public health problem worldwide and more than half of patients are undiagnosed. Furthermore, the significant number of type 2 diabetic outpatients and high rates of chronic complications are facts that cannot be ignored, because they showed poor glycemic control and ineffective medical treatment received. Future efforts should be directed at intensive blood glucose control in order to minimize the occurrence of new complications and progression of the those already installed (Fig. 1)



**Fig. 1** See text for description

#### A444

##### "Bullous diabeticorum"- bullous lesions caused by diabetes mellitus—case report

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"Bullous Diabeticorum" is a rare cutaneous disease that affects 0.5% of long-standing diabetics and manifests as tense blisters with unknown etiology. The aim is the description of a case report with the occurrence of bullous lesions and systemic and dermatological repercussions. A 50-year-old male Caucasian patient reported that 5 years ago he noticed that his urine was voluminous, foamy and "attracted ants" [sic] and also considerable weight loss. He didn't seek medical attention and maintained his habit of drinking distilled spirits (2 L a week for 12 years) and diet very low on calories and proteins. He came to the Basic Health Unit 3 months after tense blisters appeared on his forearms, hands and right foot in various sizes and containing clear liquid without signs of inflammation and associated pruritus, when the diagnosis of diabetes mellitus was made. The lesions burst spontaneously or he pierced them, which evolved into cutaneous erosions. The foot lesion evolved into an ulcer with purulent secretion and necrosis. The patient was hospitalized for 11 days in the infirmary with altered levels of blood sugar in the tests (ranging from 78 to 495); hydroelectrolytic disturbance (potassium 3.2 mg/dl and magnesium 1.4 mg/dl); albumin 2 mg/dl. The biopsy (date) of the lesions on the right hand and the 3rd finger showed findings compatible with pellagra or bullosis

diabeticorum. As treatment, he received potassium and magnesium replacement, glycemic control with NPH insulin 3 times a day and regular insulin, surgical debridement of the lesion on the right foot, antibiotic therapy for secondary infection (Ceftriaxone + Oxacillin for 7 days) and silver sulfadiazine for 6 days. There are few studies regarding the treatment of Bullous Diabeticorum since the serous blisters are sterile. However, it was observed that from a strict glycemic control, the skin lesions regressed and no new blisters appeared during hospitalization. Months after the clinical treatment, the patient underwent amputation of his right leg, which emphasizes the importance of early diagnosis and proper glycemic control, in addition to the correct diagnosis of the dermatological lesions that led to the extensive ulceration with the appearance of necrosis and diabetic foot with risk of amputation. Informed consent to publish had been obtained from the patient. (Fig. 1)



**Fig. 1** See text for description

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