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ABSTRACTS

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PC-22 Internal customer satisfaction with pharmaceutical care

Canadell Laura[1], **Cañete Carmen**[1], Gallart M[a] Jesus[1], Pardo Rocio[1], Monfort M[a] Pau[1], Aguilella Teresa[1]

[1]Pharmacy Service, Hospital Universitari Joan XXIII, Tarragona, Spain

Background and Objective: To establish a periodic evaluation procedure of doctors and nurses' opinions of hospital pharmacy activity in order to measure user perceived quality of care.
Design: A self-administered anonymous questionnaire was distributed to all physicians, nurses and assistants working at three units of the hospital (Internal Medicine, Orthopedics and Traumatology surgery, and Paediatric Service) in December 2006.

We used two different surveys with ten questions each one with a four point response scale (1 to 4) then, there was a question to give an overall global score on the pharmaceutical service. A third part of free comments to suggest aspects to improve was included.
Setting: Pharmacy service of a third level hospital.
Main Outcome Measures: This instrument provides information to evaluate customer's satisfaction with pharmaceutical assistance, accessibility, competence, friendly service and prescription counselling as well as satisfaction with dispensing systems.
Results: A total of 115 responses were received, yielding a response rate of 87.3%.

Doctors' survey showed the followings results: professionalism: 3.7, solving therapy related problems: 3.6, competence: 3.4, friendly service and prescription counselling 3.6, availability of pharmacist: 2.6. The global score obtained for pharmaceutical attention was 8.3 in a scale of 10.

Nurse's opinions were the followings: professionalism: 3.4, friendly service: 3.3, administration counselling: 3.1, availability of pharmacist: 2.4, items relating to the quality of distribution system 2.6.

The global score obtained for pharmacy service was 6.7 in a scale of 10.

Continuous attention and increasing the opening hours of the Pharmacy service are the two issues more requested, both in doctors' and nurses' surveys
Conclusions: Customers' evaluation of attention is a prominent method of assessing the quality of central health care services as Pharmacy.

From the results obtained it became remarkable that Pharmacy service gives a satisfactory attention to internal customers. The results showed the need to improve our drug dispensing systems and the demand for longer opening hours at the pharmaceutical service.
Keywords: Customers satisfaction, Survey, Pharmaceutical care

PC-27 Treatment of strongyloides stercoralis hyperinfection syndrome in immunocompromised patients with parenteral ivermectin: two case-reports

Anne Lise Pouliquen[1], Cecile Raignoux[1], Marie Helene Fievet[1], Robert Farinotti[1]

[1]Pharmacy, Groupe Hospitalier Pitié Salpétrière, Paris, France

Background and Objective: Strongyloides stercoralis infects each year millions of persons worldwide. In immunocompromised patients, this intestinal nematode can disseminate and cause a fulminant fatal illness: hyperinfection syndrome. Oral ivermectin is the principal treatment. Since one of the features of S. stercoralis hyperinfection is the development of an ileus and small bowel obstruction, the drug absorption is impaired and thus a reduced efficacy is noted. No parenteral antihelminthic drug is licensed for human use, but parenteral ivermectin is commonly used in veterinary medicine. We report two cases of S. stercoralis hyperinfection syndrome that were refractory to oral drugs and, as a life saving therapy, were treated with a veterinary formulation of parenteral ivermectin (Ivomec®, Merial) after agreement from the French drug administration (AFSSaPS).
Design: Case report.
Setting: Pneumology and Neurochirurgical Intensive Care Units, University Hospital, Paris, France.
Main Outcome Measures: case report.
Results: Patient 1
A 44-year-old African man has been hospitalized in August 2006 for a degradation of his condition in neurosarcoidosis with hydrocephalus, associated with Enterococcus faecalis meningitis. He underwent ventriculo-peritoneal shunt and was treated with corticosteroids (prednisone 65 mg/day). His condition worsened on September 2006, with the diagnosis of a disseminated strongyloidiasis with paralytic ileus. He was initially treated with ivermectin (12 mg bid) via the nasogastric tube. Antibiotics were added on day 2 to control the sepsis. On day 5 albendazole (400 mg/day) was added. Subcutaneous ivermectin was then obtained and administered on day 6 (200 μg/kg) in association with ivermectin via nasogastric tube while albendazole was discontinued. The patient's condition improved during the following days. He completed 8 days of Ivomec® and 30 days of oral ivermectin. He returned home 2 months later.
Patient 2
A 49-year-old African man was hospitalized in November 2006 because of a 30 kg weight loss. He was diagnosed with HIV, meningeal tuberculosis, urinary and pulmonary infections and S. stercoralis hyperinfection treated with oral ivermectin. On 29 January 2007 he was admitted in Pneumology Intensive Care Unit with melena on severe immunodepression. On 6 February he developed a septic shock with ARDS on an important bowel obstruction. Therefore, among other antiinfectious therapies, a veterinary formulation of subcutaneous ivermectin was administered (200 μg/kg/day). The sepsis was controlled, but on 11 February he died of an acute haematological deterioration.
Conclusions: As the occurrence of malabsorption is a frequent complication of disseminated strongyloidiasis, a parenteral formulation of ivermectin would be really helpful, especially as the efficacy of the subcutaneous form has been proved in the literature.
Keywords: Strongyloides stercoralis, Hyperinfection, Parenteral ivermectin

PC-32 Improving the quality of consultations for nonprescription medicines (NPMs): the acceptability of simulated patient (SP) visits and immediate feedback

Margaret Watson[1], Jennifer Cleland[1], Christine Bond[1]

[1]General Practice and Primary Care, University of Aberdeen, Aberdeen, United Kingdom

Background and Objective: SPs have been used extensively to assess pharmacy practice. There has been limited use of SP visits combined with immediate feedback, as a method of improving the quality of consultations for NPMs. This method was introduced in Australia to improve advice provision in pharmacies, and demonstrated that immediate feedback from pharmacy educators (PEs) was effective in changing professional practice. The objective of this study was to determine whether SP methodology is a suitable educational tool for use in British community pharmacies.
Design: Pilot study, conducted in 2006, using a randomised controlled trial (RCT) design. Pharmacies were randomised to one of two trial groups:

- SP visit with SP feedback;
- SP visit with PE feedback.

- Each pharmacy received three covert SP visits over six weeks. Verbal and written feedback was provided to the pharmacy staff after each SP visit. No pharmacy was visited by the same SP more than once. Each pharmacy was visited by the same PE throughout the study.

Setting: Twenty community pharmacies in Grampian, Scotland.
Main Outcome Measures: Acceptability of SP visits with immediate feedback was assessed using a questionnaire, focus groups and semi-structured interviews. Participants from each pharmacy were invited to attend one of two focus groups. Semi-structured interviews (face-to-face or telephone) were conducted with participants who were unable to attend the focus groups.
The effect of the visits with feedback on practice was measured using data derived from:

- Audiotapes of the consultations;
- Data collection forms (completed by the SPs).

Results: Twenty-two pharmacists and 34 Medicine Counter Assistants (MCAs) participated. Sixty SP visits were completed.
Questionnaire

Nineteen questionnaires (86.4%) were returned by pharmacists, most (>90%) of whom considered the visits to be: an effective method of improving the quality of NPM consultations; and acceptable as a future method of education and training.
Focus groups and Semi-Structured Interviews

Eighteen participants attended two focus groups: 13 pharmacists and five MCAs. Six interviews were completed, five of which were with pharmacists. Overall, participants were satisfied with the provision of feedback, and particularly appreciated the positive, non-judgemental manner in which feedback was appreciated.
Conclusions: Simulated patient visits with immediate feedback were acceptable to pharmacists and support staff as an educational method in British community pharmacies.
Keywords: Simulated patient, Feedback, Medicines, Nonprescription

PC-52 Evaluation of buccal aerosol aequasyal® for xerostomia in geriatric ward

Céline Mongaret[1], Julien Rambaud[1], Xavier X. L. Arrault[1], Nathalie Faucher[2], Philippe P. h. Arnaud[1]

[1]Clinical Pharmacy, [2]Geriatry, Bichat Claude Bernard Hospital, Paris, France

Background and Objective: To evaluate a new medical device Aequasyal®, a mixture of oxidized glycerol triesters (TGO) in oral dryness of old patients in palliative care. This hyposalivation is mainly caused by medical treatment or radiotherapy. The consequence is xerostomia involving a deterioration of the quality of life in these patients. TGO have lubricating, adhesive and protective characteristics against local aggressions by respect of the pH and reduction of the local inflammatory process.
Design: To establish and analyse different evaluation criteria for this device in a prospective study.
Setting: Geriatric unit in an academic hospital.
Main Outcome Measures: The study begins on March 2006 and finish in marsh 2007. Medical device is dispensed for each patient with evaluation form. It was used four times per day. Different criteria with score 1 (very well) to 4 (bad) were assessed by nurses: facility of use, appreciation of tastes, reestablishment of the moisturizing of the mucous membrane after several days of treatment, improvement felt in the difficulties of speaking, of chewing, of swallowing, loss of taste and burn feelings, and also tolerance of the device.
Results: 19 patients were included in this evaluation. Average age is 84, 2 years old and sex ratio (F/M) is 0, 6. The spray presents a facility of use (84%), a pleasant taste (94%); buccal moisturizing is restored at 100% of the patients. An improvement in the difficulties of speaking (88%) is underlined like improvement in chewing (92%) and swallowing (94%). Burn feelings are also improved (81%). Since the beginning of the study, no undesirable event has been notified.
Conclusions: This study shows a real improvement in the quality of life for these patients. A better therapeutic observance of this polymedicamented population could be expected. Nevertheless it should be noted that the presentation of this device, a vial of 400 doses, is not adapted for a hospital use. In the same way an applicator would be necessary in order to reach the various zones of the buccal cavity.
Keywords: Medical device, Xerostomia, Hyposalivation

PC-58 Causes of heart failure exacerbation leading to hospital admission: a cross-sectional study

Elin C. Lehnbom[1], Anna C. Bergkvist[2], Klas Gränsbo[3]

[1]Department of Pharmaceutical Sciences, Division of Pharmacokinetics and Drug Therapy, Uppsala; [2]Hospital Pharmacy, [3]Department of Internal Medicine, Malmö University Hospital, Malmö, Sweden

Background and Objective: Heart failure (HF) is a common disease with an estimated prevalence of 0.4 to 2% in Europe. Patients with HF have frequent episodes of exacerbation. Non-compliance to medical and dietary advice is a significant clinical problem as is suboptimal treatment. One example of factors influencing the ability to comply with a treatment plan is impaired comprehension. The objectives were to construct a medication assessment tool and to establish face validity for its use in this project, to construct an interview schedule in order to identify non-compliance, poor patient comprehension and suboptimal treatment, to conduct a survey and to report the findings to the clinic.
Design: A cross-sectional study performed during April 2007–May 2007.
Setting: The emergency department and medical wards at Malmö University Hospital.
Main Outcome Measures: Comparison of compliance, comprehension and optimal treatment on a population basis between men and women, younger (<75 years) and elderly (>75 years) patients, and patients in different New York Heart Association (NYHA) classes, in order to assess if exacerbation could have been caused by any of these factors.
Results: Of the 47 patients included, 60% reported high compliance. In the subgroup analysis, women and elderly patients reported a significant higher compliance than men and younger patients. Comprehension on self-care was poor. Only 30% weighed themselves regularly and 45% did not limit the amount of fluids. No more than 28% reported they would contact a health care provider in case of experiencing more symptoms. Suboptimal treatment was also found to be a great concern with only 47% being treated with angiotensin-converting enzyme inhibitors (ACEI) or angiotensin II receptor blocker (ARB), 66% with beta blockers, and 51% with aldosterone receptor antagonists, but no consideration to other co-morbidities has been taken into account. The majority treated with recommended agents had not achieved target dose as recommended in guidelines.
Conclusions: Poor patient compliance and comprehension as well as suboptimal treatment could contribute to HF exacerbation and efforts should be made to improve these factors in order to reduce HF exacerbation.
Keywords: Heart failure, Compliance, Sub-optimal treatment

PC-56 Clinical pharmacist impact in collecting admitted patients medication history in a rheumatology department: risk reduction and optimization of consecutive hospitalization orders

Emmanuelle Orru Bravo[1], Beatrice Menneglier[1], Mathilde Gilet[1], Eric Auv[1], Delphine Tuil[1], Mireille Nang[2], Agnes Certain[1], Olivier Meyer[2], Philippe Arnaud[1]

[1]Pharmacy Department, [2]Rheumatology Department, Hospital Bichat Claude Bernard, Paris, France

Background and Objective: To measure quality improvement of hospitalized patients orders through clinical pharmacists involvement in systematically reviewing treatments at admission.
Design: 6-month prospective study, survey on the usual treatment of a patient (clinical dossier, retail prescriptions, interview with the patient, drugs surrendered by the patient, contact with the retail pharmacist or GP).
Setting: Rheumatology Department.
Main Outcome Measures: Number of analysed prescriptions, analysis of discrepancies between the prior treatment of a patient at admission and the hospital prescription, number pharmacist interventions, number of personal drugs used and of medication errors avoided.
Results: During a 6 month period 251 questionnaires at entry (70% of the 358 admissions), were completed, on average one day after admission.

Main sources of information for the treatment prior to admission: patient interview 92.4% (n = 232), drugs surrendered by the patient 55% (n = 139), retail prescriptions 36.2% (n = 139), contact with the retail pharmacist or GP 1.2% (n = 3).

Errors were detected for 24.7% (n = 61) prescriptions at hospital admission mainly by omission of one or several drugs in 82% cases (n = 50) and/or dosage error 23% (n = 14). Each error involved a pharmacist for intervention and correction (1 prescription out of 4).

36% (n = 91) of the patients used one or more personal drugs without always informing the physician or nurses. Several cases of double intake were avoided.
Conclusions: Difficulties in getting reliable and complete information about prior treatment of admitted patients lead to high risks of errors in hospital prescriptions. Clinical pharmacists, practicing with a global approach of treatments, have a key-role in collecting patient's drugs histories and thus optimizing quality assurance of hospital admission prescriptions.
Keywords: Medication history, Clinical Pharmacist, Rheumatology, Medication errors, Discrepancies, Admission prescriptions

PC-159 Pharmacist intervention at the pain clinic

Lilian M. Azzopardi[1], Anthony Serracino-Inglott[1], Maurice Zarb Adami[1], Ann-Marie Flores[1]

[1]Department of Pharmacy, University of Malta, Msida, Malta

Background and Objective: Patients with chronic pain tend to deviate from advice provided as often is the case in chronic conditions which require long-term medication. This leads to non-compliance with chronic pain medication resulting in suboptimal chronic pain control. The objective of the study was to assess the impact of the pharmacist intervention at the pain clinic and to assess patient compliance with drug therapy.
Design: Two questionnaires were designed: 'Knowledge of Pain Medication Questionnaire' and 'Assessment of Patient Compliance and Perception of Pain Management Questionnaire'. Thirty-one patients were recruited for the study and were followed for two months. During the first visit to the Pain Clinic, the patients received their prescription. At the second visit (after 4 weeks), the questionnaires were administered and the pharmacist prepared a treatment chart. This was reviewed at the third visit (after 4 weeks). During this third visit the pharmacist intervention was also assessed. Results were analysed using the Mcnemar Test of Symmetry and the Wilcoxon Test.
Setting: Pain clinic, Medical Out-Patients, St Luke's General Hospital.
Main Outcome Measures: Patient compliance with the medication, assessment of pharmacist intervention, patient sources of knowledge about their condition and medications.
Results: Patient demographics: mean age- 56 years, age range- 28–88 years, gender- 20 female, 11 male. After the pharmacist intervention, the number of patients who did not comply with the prescribed medication because they forgot to take it decreased by 11% ($p = 0.0082$). There was a decrease in number of patients who did not comply with the prescribed medication, because they felt they could do without (3%), were not bothered (1%), who felt that the dosage schedule did not fit with their lifestyle (1%) and who experienced side effects (1%). As regards pharmacist intervention, 18 patients (58%) found the treatment chart very useful and 25 patients (81%) were very satisfied with the services provided by the pharmacist. Patients stated that their main sources for information about their medication were their family doctor (25, 81%) and their pharmacist (12, 39%).
Conclusions: The study indicates that the pharmacist intervention at the pain clinic leads to an improved patient compliance and was favourably assessed by the patients. Once this service is established a larger study will be undertaken over a longer period of time to assess patient outcomes following pharmacist intervention.
Keywords: Pain, Pharmaceutical care, Pharmacist intervention

PC-167 Monitoring of repeat prescriptions for asthma by pharmacist and general practitioner leads to increased control of astma

Henk-Frans Kwint[1], Marcel M. L. Bouvy[2], Anne-Margreeth J. M. Krijger-Dijkema[3], Just J. Eekhof[4], Joost J. de Kanter[4]

[1]Stevenshof Pharmacy and SIR Institute for Pharmacy Practice and Policy, [2]SIR Institute for Pharmacy Practice and Policy, [3]Stevenshof Pharmacy, [4]GP Practice Stevenshof, Leiden, Netherlands

Background and Objective: Adherence with inhaled corticosteroids has repeatedly been reported to be poor. Poor adherence could lead to inadequate control of asthma complaints. Monitoring of repeat prescriptions by a pharmacist could offer an opportunity to reach concordance with the patient and improve adherence. The objective of this study is was to improve asthma control by optimizing use of asthma medicines.
Design: Retrospective follow up study. All pharmacy dispensing records concerning respiratory medication (R03) from 1st October 2003 to 30th September 2006 were collected. Between 1st October 2005 to 30th September 2006 monitoring of repeat medication was conducted by a pharmacist. Pharmacists discussed asthma complaints and use of asthma medicines with all patients calling for repeat prescriptions. When indicated the pharmacist proposed adjustments of asthma medicines to the GP after this telephone consultation.
Setting: Community pharmacy and one GP practice (5 GP's) in Leiden, the Netherlands, serving a community of 6.000 patients.
Main Outcome Measures: Self-reported use of short-acting beta-agonists (SABA) by intervention patients.
Defined Daily Doses (DDDs) of short-acting beta-agonists (SABA), long-acting beta-agonists (LABA) and inhaled corticosteroids (ICS).
Results: 120 consultations were registered for 68 intervention patients. For 29 patients more than 1 consultation was registered. At the first consultation only 5 of 29 patients (17%) reported use of

SASA 2–3 times a week or less (adequate control of asthma symptoms). At the last contact 17 of 29 patients (55%) reported adequate control of asthma.

Average Defined Daily Doses (DDDs) of SABA for 68 patients decreased from 133/year (October 2004–September 2005) to 86/year (October 2005–September 2006): a decrease of 35%. DDD of ICS for intervention patients decreased from 411 to 342(−17%) and DDD of LABA increased from 198 tot 212 (+7%)

Conclusions: Monitoring of repeat prescriptions by the community pharmacist resulted in an increase of patients achieving asthma control. Moreover monitoring resulted in a decrease in use of short acting sympaticomimetics which was only partly accounted for by an increase in long acting sympathicomimetics.

Keywords: Asthma control, Repeat prescriptions, Pharmacist

PC-168 pharmaceutical care and drug related problems in internal medicine hospitalized patients

Salah AbuRuz[1], Kawla M. AbuHamour[1]

[1]Departement of Clinical Pharmacy, Faculty of Pharmacy, University of Jordan, Amman, Jordan

Background and Objective: For most diseases, drug therapy will enhance health- related quality of life; however, inappropriate use of drugs may be harmful and could evoke new symptoms. Drug related problems (DRPs) have often been addressed through studies on databases. The clinical approach—bedside evaluation of patients' DRPs—has rarely been applied. More importantly only few randomized controlled trials of the effect of pharmaceutical care on DRPs in hospitalized patients were done. The primary aim of this study was to investigate the impact of providing pharmaceutical care on DRPs in hospitalized internal medicine patients.

Design: The study was a prospective randomized controlled trial. 152 patients were included and divided between intervention and control group. The research team composed of 10 clinical pharmacists. Group differences (intervention, control) groups were examined using independent sample t-test.

Setting: The study was carried out at the internal medicine wards at a teaching hospital in Jordan.

Main Outcome Measures: 1. Outcomes of pharmaceutical care recommendations during hospitalization. These were measured in term of the number of recommendations accepted and implemented
2. Outcomes of DRPs during hospitalization. These were measured in term of the number of DRPs resolved, prevented and improved
3. Number of DRPs upon discharge in the intervention group compared to the control group.

Results: The average number of the identified DRPs was eight. Ninety-five percent of the submitted recommendations were accepted by physicians. However, only 67% of these recommendations were actually implemented. Tow third of DRPs in the intervention group were either resolved, improved or morbidity prevented, while it was only 14% in the control group ($p < 0.005$).

The mean number of DRPs upon discharge for intervention and control group were 1.61 and 6.25 respectively. This represent a three times decrease in the number of DRPs in the intervention group compared to the control (relative risk reduction).

Conclusions: The number of DRPs in internal medicine hospitalized patients is high. Clinical pharmacists were able to identify these problems and resolve them or decrease the associated morbidity. The high acceptance rate by physicians indicates the importance and high quality of the recommendations and that physicians are starting to accept the role pharmacist as a health care provider in Jordan.

Keywords: Pharmaceutical care, Clinical pharmacy, Internal medicine

PC-179 Medication assessment tool to assess quality of prescribing in chronic cardiovascular disease (MAT-CVD)

Tobias Dreischulte[1], John J. McAnaw[1], Steve A. Hudson[1]

[1]Pharmaceutical Sciences, Strathclyde Institute of Pharmacy and Biomedical Sciences, University of Strathclyde, Glasgow, United Kingdom

Background and Objective: To test a method to quantify adherence of medication use to clinical guideline recommendations in a primary care setting.

Design: Retrospective survey to field-test a 51-item instrument (MAT-CVD) based on earlier studies of quality of medication use in cardiovascular disease (CVD)[1].

Setting: A database of 388 patients [45% male, mean (SD) aged 66 (14) years] coded with circulatory system disease (Read Code 'G*') was drawn from computerised records of all patients receiving care from a single community pharmacist and general medical practitioner (GP) collaboration (n = 1,703). The pharmacist worked as a supplementary prescriber and had remote access to the electronic records of the GP. Patients had diagnoses of diabetes (n = 34), hypertension (HTN; n = 250), ischaemic heart disease (IHD; n = 60), other ischaemic vascular disease (cerebrovascular n = 27; peripheral vascular n = 13), heart failure (HF; n = 12), atrial fibrillation (AF; n = 28), were anticoagulated (warfarin, n = 19) or otherwise identified as potential candidates for primary prevention of CVD (n = 100).

Main Outcome Measures: Adherence (%) to 51 criteria based on guideline recommendations on primary and secondary prevention of CVD, treatment of HTN, IHD, HF, AF and warfarin therapy; overall applicability of criteria and quantification of insufficient data; inter-rater agreement of application of individual MAT-CVD criteria and of the overall tool (Cohen's κ)

Results: A total of 2473 criteria were applicable and for 131(5%) of these there was insufficient data to apply the standard. The guideline adherence (95% CI) overall was 74 (72–76)%. Highest adherence was to 'primary/secondary prevention of CVD' [80 (77–82)% adherence, n = 11 criteria]. Lowest adherence was to 'treatment of AF' [43 (25–61)% adherence, n = 3 criteria]. Non-adherences were found to at least one criterion in 259 (67%) and to ≥4 criteria in 49 (13%) patients. Inter-rater agreement was assessed on the application of the tool to all patients by two independent raters. All six sections and the overall tool were found to have inter-rater agreement $\kappa > 0.8$ and a percentage agreement >90%. Among the 31 (61%) of 51 individual MAT criteria that were applicable to ≥10 patients 24 showed $\kappa > 0.8$. In two of the remaining seven criteria the base-rate problem[2] was responsible for $\kappa < 0.8$ and when taken into account the number of individual criteria with acceptable inter-rater agreement was 26 (84%).

Conclusions: The application of the MAT-CVD to routine primary care records in a Scottish primary care setting is feasible and reliable; the tool has potential use in continuous quality improvement of prescribing in primary care.

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Keywords: Pharmaceutical care, Quality of prescribing, Guideline adherence

PC-205 Self-management of complications in diabetic patients: a pharmaceutical care program in community pharmacies

Ayse Koroglu[1], Asuman Cakiroglu[2], Zehra Almila-Oztosun[3], Ayse Dundar[4], F. Ilkay Alp[5], Alper Okyar[5], Gul Baktir[5]

[1]Rifat Sargýn Pharmacy, [2]Yonca Pharmacy, [3]Capitol Pharmacy, [4]Pelikan Pharmacy, [5]Pharmacology, Istanbul University Faculty of Pharmacy, Istanbul, Turkey

Background and Objective: Diabetes mellitus is a metabolic disorder which causes serious organ damage such as retinopathy, nephropathy and neuropathy chronically. Diabetes mellitus could be managed via appropriate pharmacotherapy and regulation of the life style. The purpose of this study is providing a pharmaceutical care program for diabetic patients which will help them to minimize the complications of diabetes and increase the efficiency of pharmacothreapy.
Design: Pharmacists used a structured questionnaire containing questions concerning demographic data, treatment protocols and characteristics of self monitoring of blood glucose levels to collect information.
Setting: Four community pharmacies in Istanbul.
Main Outcome Measures: Demographic data and diabetes complications of the patients.
Results: One hundred patients were screened for fasting glucose and postprandial glucose levels. Despite of receiving medical treatment a large proportion of patients could not maintain appropriate blood glucose level. According the results of self-monitoring blood glucose level in diabetics they are guided to the specialist to modify the medication regimen. Also, it has been observed that a substantial proportion of the patients are not aware of the serious complications of diabetes.
Conclusions: Community pharmacists could make a useful contribution with a appropriate pharmaceutical care program to control complications of diabetes mellitus and optimize the treatment.

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Keywords: Diabetes mellitus, Diabetes complications, Pharmaceutical care

PC-265 Development of pharmaceutical seamless care in a university hospital and outpatient clinic center in Switzerland

Bertrand Guignard[1], Mapi Fleury[1], Arnaud Widmeier[2], Emmanuèle Guignard[1], OIivier Bugnon[1]

[1]Pharmacy, [2]General Medicine Unit, University Medical Outpatient Clinic, Lausanne, Switzerland

Background and Objective: Seamless care refers to continuity of patient care in the health system across caregivers. The objectives of the present study were (1) to identify barriers to seamless information between a given hospital and an outpatient clinic in Switzerland and (2) to propose tools for improving pharmaceutical seamless care.
Design: This is a retrospective study with a convenient sample of patients for mapping the information flow network. The inclusion criteria were: (1) at least one stay lasting more than 24 hours in the hospital in 2006, (2) regular checkups with a GP in the outpatient clinic and (3) medication delivered by the community pharmacy of the outpatient clinic 6 months prior to 6 months after the hospitalization.
Setting: Both hospital and outpatient clinic are independent and run their own pharmacy. The hospital pharmacy is implied in drug production and distribution without generalized pharmaceutical care activities, and the community pharmacy delivers Rx or OTC medication for outpatients. Geographic and computer proximity between both entities constitutes an ideal setting for seamless care projects.
Main Outcome Measures: (1) To map medical or administrative information between community pharmacy, GP and hospital and (2) to find opportunities to improve pharmaceutical seamless care.
Results: Sixteen patients met inclusion criteria (5 women, 11 men, average 53 years, mean visits/patient/year with GP: 3, and with community pharmacist: 49, i.e. 16-time more with pharmacist than GP). We observed that administrative information is computerized on a common database for both hospital and outpatient clinic. In contrast, clinical information is mainly handwritten and difficult to share between hospital and outpatient clinic caregivers. Patient medication database is managed by a community pharmacy software not linked to medical information. However administrative information flows in one direction from the administrative to the community pharmacy database. We identified 2 potential tools easily available to the community pharmacy to improve pharmaceutical seamless care in the center: (1) an alarm through the administrative database connection if a patient is hospitalized to allow pharmacist to contact hospital physician for medication history and (2) an access to patient discharge letter and lab results to improve Rx validation process.
Conclusions: Clinical information is not easily shared between caregivers of the hospital and the outpatient clinic. If global seamless care still remains a long term goal, initial actual steps promoted by community pharmacists can be easily implemented.
Keywords: Seamless, Information, Community

PK-145 Implementation of a protocol for pharmacokinetic monitoring of high-dose methotrexate

Beatriz Garcia Robredo[1], Maria Amalia Fernandez Feijoo[1], Miguel Angel Calleja Hernandez[1]

[1]Hospital Pharmacy Department, Virgen de las Nieves University Hospital, Granada, Spain

Background and Objective: To quantify the impact of the implementation of a protocol for the pharmacokinetic monitoring of patients receiving high-dose methotrexate.
Design: Prospective experimental study, in which the Hospital Pharmacy Department designed a specific protocol for the pharmacokinetics follow-up of these patients and for gathering the data required for a correct rescue. Results were compared between three months before and three months after implementation of this new protocol.
Setting: 24-hr infusions of methotrexate at a dose of ≥ 1 g/m^2 were evaluated in adult patients admitted to the Oncohaematological Area of a tertiary level hospital.
Main Outcome Measures: Number of infusions started at the correct time, number of missed blood extractions, number of missed leucovorin doses, calculation of the elimination half-life, and measurement of the urinary pH (dichotomous variables). Degree of compliance with the leucovorin rescue dosage protocol was measured on a scale of 0–3 points, with all items carrying the same score (correct loading dose, dosage as function of body surface area, and dosage as function of the concentrations of methotrexate obtained).
Results: The number of infusions started at the correct time increased from 50% to 60%. The number of missed blood extractions fell from 1.6 to 0.4 extractions per course; and missed leucovorin doses dropped from 0.25 to 0 per course. The elimination half-life could be calculated in only 25% of courses in the first study period versus 100% of courses after protocol implementation. Urinary pH changed from not being measured in any cycle to being measured in 100% of cycles. Compliance with rescue dosage protocol was scored with 1.9 points before versus 2.8 points after implementation.

Conclusions: Implementation of a protocol for pharmacokinetics follow-up by the Hospital Pharmacy Department improved the monitoring of patients receiving high doses of methotrexate and ensured that data required for a correct rescue treatment were gathered.
Keywords: Protocol, Pharmacokinetic monitoring, High-dose methotrexate

PEC-71 Risk and pharmacoeconomic analyses to improve the safety of the injectable medication process in the paediatric and neonatal intensive care units

Isabella De Giorgi[1], Béatrice Carredda[2], Valérie Mourer[2], Laurence Cingria[1], Caroline Fonzo-Christe[1], Riccardo Pfister[2], Pascal Bonnabry[1]

[1]Pharmacy, [2]Service of Neonatal and Paediatric Intensive Care Units, University Hospitals of Geneva, Geneva, Switzerland

Background and Objective: To quantitatively evaluate the safety of the current injectables medication process, from prescription to administration, in the paediatric and neonatal intensive care units.
To compare the potential impact of safety measures on the risk.

To classify these measures from a pharmacoeconomic point of view.
Design: Assessment by a prospective risk analysis according to the Failure Modes, Effects and Criticality Analysis (FMECA) method [1] by a multidisciplinary team: one physician, two nurses, three pharmacists. Three drugs chosen as models (gentamicin; morphine; dopamine). Failure modes (FM) defined during brainstorming and criticality indexes calculated on the basis of their likelihood of occurrence, potential severity for the patients and detectability. Impact of ten safety measures on the criticality indexes of the selected three drugs, extrapolation to all drugs injected daily and calculation for each measure of the investment in Euros per year to improve the safety by 1 quali (−1 point of criticality) per day.
Setting: University hospital, fifteen NICU beds and ten PICU beds.
Main Outcome Measures: Mean criticality indexes; gain in qualies per day; cost-efficacy ratios for each safety measure.
Results: In the current situation, the sum of mean criticality indexes of thirty-one identified FM was 4,540 for the selected three drugs. We gain 1,292 qualies (46,500 by extrapolation to all drugs injected daily) with CIVAS (Centralized IntraVenous Additives Services), 1,201 (72,060) with a clinical pharmacist, 996 (59,780) with double check by nurses, 984 (59,040) with CPOE (Computerized Physician Order Entry), 555 (23,296) with in-line filters, 457 (12,348) with vial of dilution, 408 (17,122) with horizontal laminar airflow hood, 170 (4,590) with intermediate dilution, 144 (6,192) with simple additional measures of asepsis and 98 (951) with a drug planer.

The best cost-efficacy ratios were obtained by a clinical pharmacist (1 quali = 0.54 Euros) or by double check by nurses (1 quali = 0.71 Euros) or by CIVAS (1 quali = 0.72 Euros). The highest ratio was obtained with CPOE, due to the very high costs investment (1 quali = 22.47 Euros).
Conclusions: The use of a prospective risk analysis allowed us to quantitatively evaluate the relationship between the medication process of injectables and the paediatric patient safety and to build a strategy for continuous quality improvement, by selecting the most appropriate evolutions. Based on the results of the pharmacoeconomic analysis, development of clinical pharmacy and CIVAS for some drugs will be discussed with the paediatric department

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Keywords: Pediatrics; Risk assessment; Cost-benefit analysis

PT-89 Characteristics and reasons associated with non-acceptance of selective serotonin reuptake inhibitor treatment

Erica CG van Geffen[1], Rolf van Hulten[1], **Marcel L. Bouvy**[2], Antoine C. G. Egberts[1], Eibert R. Heerdink[1]

[1]Department of Pharmacoepidemiology and Pharmacotherapy, Utrecht Institute for Pharmaceutical Sciences, Utrecht, [2]SIR Institute for Pharmacy and Policy, Leiden, Netherlands

Background and Objective: Studies show that up to 38% of patients starting treatment with antidepressants fill only a single prescription at the pharmacy, apparently not accepting treatment. The aim of this study was to determine characteristics and reasons associated with non-acceptance of SSRI treatment.
Design: Retrospective questionnaire study. Patients presenting a GP prescription for a newly started SSRI treatment to a community pharmacy were selected. 'Non-accepters' were defined as those patients filling only a single SSRI prescription, and patients who received at least three prescriptions were defined as 'accepters'.
Setting: 37 community pharmacies in The Netherlands.
Main Outcome Measures: Characteristics evaluated included socio-demographic (e.g. level of education), disease (e.g. reason for use) and treatment (e.g. type of SSRI) characteristics. 'Non-accepters' were also asked for the reason not filling a second prescription.
Results: 57 'non-accepters' and 128 'accepters' were included in the analysis. 'Non-acceptance' was more common among patients with a low level of education (OR 2.6; CI 1.1–5.9) and in patients who reported aspecific symptoms like fatigue, stress and restlessness as the reason for SSRI use (OR 2.7; CI 1.4–5.5). In addition, there was a trend that 'non-acceptance' was more common among patients over 60 years of age (OR 2.5; CI 0.8–7.9). Of all 'non-accepters', 29.8% (n = 17) did not start SSRI use, while 70.2% (n = 40) discontinued SSRI use within two weeks. Fear of side effects and the actual occurrence of side effects are main reasons for not accepting SSRI treatment. In addition, a considerable number of 'non-accepters' indicated that they felt an aversion towards medicine use, were feeling better meanwhile or disagreed the GP's diagnosis. Of the 'non-accepters', 55.0% discontinued treatment without informing the GP.
Conclusions: Acceptance of SSRI treatment is a decisive moment in compliance to treatment initiated by GPs, and deserves more attention. GPs and pharmacists should address issues related to the use of SSRIs especially in groups who are at risk for non-acceptance.
Keywords: Antidepressants, Discontinuation, Nonadherence

EDU-7 Pharmaceutical interventions by pharmacists working within surgery and medicine departments

Julie Prince[1], Stephanie Diallo[1], Eric Grandsire[1], Anne Lecoeur[1], Caroline Fijalkowski[1], Michelle Lebas-Certain[1], Franck Le Mercier[1]

[1]Pharmacy, Ambroise Pare Hospital AP-HP, Boulogne-Billancourt, France

Background and Objective: Since 1995, our pharmacy department set up a nominative daily drug distribution system without computarization. In each pharmaceutical unit localized in clinical departments, the prescriptions are screened daily by a pharmacist, then the drugs are delivered by a technician.
Our objective was to compare the frequency and content of pharmaceutical interventions in surgery and medicine departments.
Design: During four weeks (Jan–Feb 2007), the pharmacists indexed their interventions on forms using the French Society of Clinical Pharmacy (SFPC) codification.

2992 lines of prescription were analysed in surgery and 2899 in medicine.

Setting: Three daily drug distribution units working for six hospitalization departments (92 beds for orthopaedic and vascular surgeries and 102 for internal medicine, pneumology and endocrinology).
Main Outcome Measures: Percentage of interventions and of each type (7) based on analysed lines.
Results

- More interventions in surgery than in medicine: 435 and 190 i.e. 14.10% vs 6.55% ($p < 0.005$).
  Most interventions are substitutions: 60% of all interventions in surgery, 40% in medicine.
- More clinical and biological monitoring in surgery (1.04% vs 0.24%, $p < 0.005$), mainly monitoring for heparin and kaliemia.
- More pharmacokinetics advice in surgery (1.44% vs 0.62%, $p < 0.005$), for example: iron and quinolones.
- More dosage adaptations in surgery (0.50% vs 0.14%, $p < 0.005$), for example: paracetamol and buflomedil overdosages.
- Better acceptance in medicine than in surgery: 70% of all interventions vs 41%.

Conclusions: The presence of a pharmacist in surgical and medical wards is justified by the number and relevance of pharmaceutical interventions, even though the acceptance remains insufficient in surgery because of the problem of surgeons availability.

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Keywords: Pharmaceutical interventions, Daily drug distribution, Evaluation

PC-280 Knowledge assessment and needs for information of nurses regarding in-patient treatments

Magali Adam[1], **Mikael Daouphars**[1], Elisabeth Bertrand[2], Sylvie Violette[3]

[1]Pharmacy, [2]Haematology, [3]Nurses' management, Cancer centre Henri Becquerel, Rouen, France

Background and Objective: While several studies have evaluated the frequency and the consequences of medication errors, few have explored their causes. In particular, knowledge of nurses regarding treatment of their patients has been scarcely studied. This survey has been carried out to determine how nurses master medications prescribed to the patients they care for, and how often they access drugs database.
Design: This work is a prospective study carried out from February to April 2007. We have decided to focus on the clinical audit method, following French health authorities recommendations. A questionnaire has been elaborated and submitted to nurses during semi-structured interviews.
Setting: French cancer centre: 9 nurses from an oncology department and 17 from a Haematology Department.
Main Outcome Measures: Data collected were: nurses' profile (age, length of service, competencies' self-assessment), knowledge on drugs prescribed to their patients (usage, administration, side-effects, drug interactions…), use of existing tools (i.e. drugs database) and possible tools to be developed by the pharmacy ward to help them in their daily practice.
Results: Twenty out of twenty six nurses (mean age: 27, mean length of service: 4 years) consider their medical knowledge as intermediate level. 54% of pharmaceutical classes are quite well known (95% of the indications are known). Only 32% of drugs' INN are given and more than half of the generic drugs' names are not mastered. Administration conditions and conservation are known for respectively 98% and 96% of the products. However, side-effects (48%), contraindications (37%) and drug–drug interactions (18%) are not acquired. In their daily routine, nurses face problems mainly related to: drug administration (20%), drug conservation (24%), and dealing with generic drugs and therapeutic equivalence (28%). 46% of nurses refer to a drug database several times a week when only 4% more than once a day. Pharmacy ward is considered to give information on drugs on a 'regular' basis. Three tools have been identified for their potential to help nurses: summarized data on drugs (card format), drugs administration and conservation tables.
Conclusions: This study has helped to define nurses' difficulties regarding patients' treatment, and their needs for information on drugs. It is also useful for the pharmacy ward to improve its relationships with clinical wards and feedback on treatments. Training sessions will shortly be organised to improve the above results.
Keywords: Medication errors, Clinical audit, Information, Nurses

PT-83 Influence of selected drugs on the development of depression in elderly

Martina Anditsch[1], Gudrun Lang[2], **Rosa Lemmens-Gruber**[2], Majidreza Kamyar[2], Peter Fischer[3]

[1]Hospital Pharmacy, Donauspital, [2]Pharmacology and Toxicology, University of Vienna, [3]Ludwig Boltzmann Institute for Aging Research, Ludwig Boltzmann Gesellschaft, Vienna, Austria

Background and Objective: To evaluate the role of long-term medication with selected drugs on the development of depression in order to allow risk assessment of pharmacotherapy in elderly.
Design: Literature review; basic examination of cognitive status and depression, two re-examinations at 2.5 years intervals (first re-examination completed); 11 drug classes; statistical evaluation (Chi square and exact Fisher test).
Setting: Co-operation of the Ludwig Boltzmann Institute for Aging Research (Vienna, Austria) with the 1000-bed general hospital Donauspital (Vienna, Austria) and the Department of Pharmacology and Toxicology at the University of Vienna.
Main Outcome Measures: Categorisation of drug classes with statistically significant correlation to the development of depression during long-term medication.
Results: The aim of the VITA (Vienna Transdanubia Aging) Study is the early detection of Alzheimer dementia and the discovery of its risk factors. At basic examination, dementia was diagnosed in 21 out of 606 patients (4%) at an age of 75 years. In 89% of these cases dementia was classified as Alzheimer disease. In addition, a clinically relevant depression was diagnosed in 17% of patients at basic examination, but only 32% of them were treated accordingly. The first re-examination after 2.5 years included those patients, who showed no or only mild signs of cognitive disorders at basic examination. 19% of these patients developed dementia within the period of 2.5 years. The first re-examination also revealed a rapid increase of patients with depression (17% vs. 28%). The incidence for the development of dementia was 11% in patients, who have never suffered from depression. However, in patients with the diagnosis depression at basic examination, the risk for dementia was doubled. We aimed to prove whether there is a statistically significant correlation between long-term medication with selected drugs and the development of depression. Eleven classes of drugs were investigated, including calcium channel blockers, beta- and alpha-blockers, corticoids, statines, non-steroidal anti-inflammatory drugs, H2-blockers, neuroleptic drugs, benzodiazepines, levodopa and opiates. Medication was documented from those 285 patients

(122 male, 163 female) without dementia and depression at basic examination, and without dementia at first re-examination. At first re-examination 86 of them were depressive (26% male, 33% female), and 199 had no depression (control group). For each class of drug, patients were divided into 6 groups according to gender and duration of medication. A statistically significant ($P < 0.05$) correlation was found between the treatment with benzodiazepines ($\geq$3 months) as well as beta-blockers ($\geq$30 months) and the development of depression in both male and female.

Conclusions: In elderly long-term therapy with benzodiazepines and beta-blockers can aggravate the development of depression.

Keywords: Dementia, Depression, Pharmacotherapy

PT-4 Fcgamma polymorphism as predictor of complete response to rituximab in non-hodgkin lymphoma

Márcia Paiva[1], Herlander Marques[2], Paula Ferreira[1], Raquel Catarino[1], Rui Medeiros[1]

[1]Unit of Molecular Oncology, [2]Onco-Haematology Department, COV, Instituto Português de Oncologia Francisco Gentil, Porto, Portugal

Background and Objective: Pharmacogenomic studies aim to elucidate the genetic bases for interindividual differences and use such genetic information to predict the efficacy, response rate and safety of a selected drug. To date, the prognostic value of FcγR polymorphisms as markers to predict treatment outcome in NHL is still being studied. Our goal was to determine whether there is any correlation between FcγRIIa polymorphisms and clinical response to rituximab in patients with NHL.

Design: In the present study we analysed FcγRIIa polymorphisms in the genomic DNA isolated from peripheral blood of 64 patients with NHL who have undergone immunotherapy with rituximab. Genotype analysis was based on a polymerase chain reaction (PCR) method followed by a restriction fragment length polymorphism (RFLP) study.

Data were analysed using the computer software SPSS for Windows (Version 13.0) and treatment outcomes of the patients were compared using Chi-square or Fisher's exact test. A cut-off p-value of 0.05 was adopted for all the statistical analysis. Survival estimates were calculated using the Kaplan-Meier method. The curves were examined by the log-rank test.

Setting: Unit of Molecular Oncology of Instituto Português de Oncologia, Porto, Portugal.

Main Outcome Measures: The response to therapeutics with rituximab was evaluated according to physical examination and computed tomography images. Responses were scored according to International Working Group Consensus.

Overall response rate (ORR) was considered as complete response (CR), unconfirmed complete response (CRu) and partial response (PR). Overall survival (OS) duration was defined as the period of time between 1st treatment with rituximab and either death or the last clinical evaluation of the patient. Event-free survival (EFS) was defined as the time interval between 1st treatment with rituximab and the occurrence of an event (recurrence or death) or the time of the last clinical evaluation of the patient.

Results: The ORR for HH genotype was 100% and for R allele was 87% ($p = 0.251$). However, our results demonstrate that all patients carrying the HH genotype had complete responses to rituximab therapy. Complete response rate for HH genotype was 100% and for R allele was 63% ($p = 0.028$).

When comparing the FcγRIIa genotypes, HH genotype or R allele does not have a significant impact on OS at 3-year ($p = 0.338$) or on EFS at 3-year ($p = 0.449$).

Conclusions: This study demonstrates that FcγRIIa polymorphism is predictive of complete response to regimens containing rituximab in NHL patients, but is not predictive of overall or event-free survival. Based on the current observation, rituximab has in some way an FcγRIIa-dependent mechanism of action which is ameliorated in patients with HH genotype. We hypothesize that HH genotype increases affinity of FcγRIIa receptor not only for naturally occurring IgG2, via antibody-dependent cellular cytotoxicity but also ameliorate connection with chimeric IgG1 rituximab.

Keywords: Non-Hodgkin lymphoma, Rituximab, Pharmacogenomics

PT-47 Platinum salts, cancer and renal insufficiency. Sub-group analysis of the IRMA study

Xavier Pourrat[1], Nicolas Janus[2], Stéphane Oudard[3], Isabelle Ray-Coquard[4], Jean-Philippe Spano[5], Jospeh Gligorov[6], Jean-François Morere[7], Philippe Beuzeboc[8], Gilbert Deray[2], Vincent Launay-Vacher[2]

[1]Pharmacy, Hôpital Trousseau, Tours, [2]Nephrology, GH Pitié-Salpêtrière, [3]Medical Oncology, Hôpital Européen Georges Pompidou, Paris, [4]Medical Oncology, Centre Léon Bérard, Lyon, [5]Medical Oncology, GH Pitié-Salpêtrière, [6]Medical Oncology, Hôpital tenon, Paris, [7]Medical Oncology, Hôpital Avicenne, Bobigny, [8]Medical Oncology, Institut Curie, Paris, France

Background and Objective: The IRMA study reported the high prevalence of renal insufficiency (RI) in 4684 solid tumour patients: mean age 58.1, mean weight 67.8 kg (84.2% between 50 and 90 kg), glomerular filtration rate (GFR) < 90 mL/min for 50–60% [1]. We present the results for IRMA patients who received a platinum salt (PS) as part of their chemotherapy.

Design: Data were retrospectively collected for in and outpatients with cancer presenting over two periods in 2004 (February 1st–15th and October 1st–15th).

Setting: 15 anticancer centers in France.

Main Outcome Measures: Subgroup analysis of IRMA patients who received PS. Data collected: sex, age, weight, serum creatinine (SCR), type of tumor and anticancer drugs. The prevalence of SCR > 110 μmol/L was assessed. GFR was estimated with Cockcroft-Gault (CG) [2] and aMDRD [3] formulae. Chi-square test was used to compare the prevalence of RI between patients who received PS and patients who did not.

Results: 990 patients were included: mean age 60.2 and weight 66 kg, 525 men. The prevalence of SCR > 110 μmol/L was 9.5%. GFR < 90 mL/min was 63.1% with CG and 55% with aMDRD. The prevalence of RI was significantly higher in patients who received PS as compared to patients who did not receive PS ($p = 0.0005$). There were 993 prescriptions: 38.1% carboplatin, 31.5% cisplatin and 30.4% oxaliplatin. 69.6% of patients received carboplatin or cisplatin, the two drugs of this class needing dosage adjustment and being nephrotoxic.

Conclusions: RI is highly frequent in cancer patients receiving PS. Appropriate evaluation of renal function necessitates CG or aMDRD calculation. In addition, two third of those patients with pre-existing RI are at risk for iatrogenic acute renal failure still receive nephrotoxic PS. Consequently, appropriate methods for the nephrotoxicity prevention of those drugs should be used as recommended for cisplatin by the ESCP Special Interest Group on Cancer Care [4].

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Keywords: Renal insufficiency, Cancer, Platinum salts

NUTR-21 Stability of antibiotics used in portable pumps: a synthesis for the prescriber

Nicolas Arlicot[1], Déborah Schlecht[1], Jacqueline Grassin[1], Sophie Marchand[2], Daniel Antier[1]

[1]Pharmacy, Trousseau University Hospital, [2]Pediatrics R, Clocheville University Hospital, Tours, France

Background and Objective: Treatment of cystic fibrosis (CF) patients subjected to bronchial superinfection is based on continuous antibiotics infusion performed with portable elastomeric pumps. The purpose of this work was to check out the stability of antibiotics in those portable pumps when no data relative to their stability was available in literature.
Design: Drugs stability study.
Setting: Quality control laboratory – Department of Pharmacy.
Main Outcome Measures: Stability over 72 h in portable pumps stored at 35°C (average temperature measured in real condition) of: i) piperacillin + tazobactam; ii) cefsulodin; iii) ticarcillin + clavulanic acid and; iv) cefepim was checked out according to antibiotic concentrations used in clinical practice. Stability was assessed by pH and drug concentration measurements by High Performance Liquid Chromatography (HPLC) and organoleptic parameters inspection. All parameters were measured at T0; T24; T48 and T72 h.
Results: Piperacillin + tazobactam and ticarcillin + clavulanic acid showed good stability at T24 for all tested concentrations but the highest one for piperacillin (90 mg/ml) with a degradation rate over 15%. At T72, both tazobactam and ticarcillin degradation remained about 10% and 12%, respectively, while clavulanic acid and piperacillin degradation rate reached 20 and 26%, respectively, the drug degradation appearing to be concentration-dependent for both antibiotics. At last, cephalosporins also showed degradation rate over 10% at T24 then reaching 50% at T72.
Conclusions: These results may be useful for clinicians when prescribing continuous antibiotics infusion to ambulatory CF patients through elastomeric portable infusion pump. Collected stability data measured at 35°C allowed us to recommend the use of a cold accumulator to ensure drug stability during infusion over 24 h and more, especially with cephalosporins (cefepime and cefsulodin).

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Keywords: Cystic fibrosis, Portable pumps, Antibiotic, Stability

NUTR-54 Clinical pharmacist interventions in patients on total parenteral nutrition

Jose Luis Sanchez Serrano[1], **Carmen Fraile Clemente**[1], Marta Suarez Gonzalez[1], Itamar Gonzalez Perera[1], Pilar Diaz Ruiz[1], Matilde Chafer Rudilla[1]

[1]Pharmacy, Hospital La Candelaria, Tenerife, Spain

Background and Objective: To describe an quantify the pharmaceutical interventions in patients on total parenteral nutrition (TPN)and the drug related problems (DRP)in patients on this type of nutritional support.

To know the acceptance degree of the interventions and its relevance on patients' care and quality of life.
Design: Prospective longitudinal study for four months (from January 2007 to April 2007). All patients on TPN were included.
The registered data were: patients number, hospital departments, type of interventions and modifications on the TPN.
Setting: The pharmaceutical interventions were classified in: indication, effectiveness, safety and adherence according to the Cipolle and cols methodology in order to identify de DRP related to the TPN and/or to the drugs.
Main Outcome Measures: All interventions were recorded both in the patient medical record and in a excel database in the pharmacy department.
Results: 135 patients were evaluated and 2190 interventions were recorded. That means an average of 16 interventions per patient and a duration average per nutrition of 7.5 ± 5.6 days.

The DRP were: indication 11.6%, safety 12.9%, effectiveness 58% and adherence 17.5%, being the DRP5 the most representative. The DRP were listed in: nutritional assessment (14.2%), monitoring (70.9%) and individualized TPN (14.9%). A total of 89 patients (65.9%) was favoured through some type of pharmaceutical intervention, being the most implicated hospital departments the Neonatology and Digestive Surgery departments.

A 90% of the interventions were focus on monitoring and optimization of nutritional support and 10% on drugs (diuretics, insulin, digoxine, enalaprile, and propofol).

The acceptance degree of the interventions was 95%.
Conclusions: The individual monitoring of the patients with TPN represents an improvement of their clinical outcome and a lower incidence of DRP. Therefore, with this method we contribute to a lower hospital stay and it also may prevent the appearance of new adverse effects.

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Keywords: Nutrition, Interventions, Drug related problems

NUTR-114 Impact of pharmaceutical interventions concerning parental nutrition prescriptions

Helene Richard[1], Cyril Breuker[1], Audrey Castet[1], Anne Jalabert[1], Sylvie Hansel-Esteller[1]

[1]Pharmacy unit, Lapeyronie and Arnaud de Villeuneuve Hospitals, Montpellier, France

Background and Objective: To assess the impact of interventions based on pharmaceutical analysis of parenteral nutrition prescriptions.
Design: Pharmaceutical analysis of prescriptions with the aid of biological results, exhaustive list of interventions and their acceptance for one month, from 5 March 2007 to 6 April 2007.
Setting: Pediatric units: neonatal intensive care, pediatric intensive care, pediatric oncology-hematology unit, gastropediatric unit, and pediatric visceral surgery.

Main Outcome Measures: The number of interventions carried out and accepted, items concerned: regulation problems, nitrogenous and calorie intake, electrolytic intake, prescription omissions and eventually other fields.
Results: Altogether, 569 parenteral nutrition prescriptions were analyzed for one month in five pediatric units.

The pharmaceutical analysis, which consumes 2 hours a day for 2 pharmacists, generated 58 interventions for prescribers: 67% concerned electrolytic intake, more than half of which concerned potassium and sodium, the main dangerous electrolytes; 19% were prescriptions omissions; 7% about nitrogenous and calorie intake; 7% about other fields (weight error, incompatibility of lipids with divalent ions).

Of these 58 interventions, which concern exactly 54 prescriptions, 30 were accepted by prescribers, that is 52%, leading to prescription modifications.
Conclusions: Putting in place a systematic pharmaceutical analysis of parenteral nutrition prescriptions has ensured the detection and the correction of prescription errors. These errors concern mainly non adjustment of electrolytes to the biological results of the child. Pharmaceutical interventions are important for safety of the patient and represent a privileged way to communicate with prescribers and their acceptance is, on the whole, satisfactory.
Keywords: Pharmaceutical interventions, Parenteral nutrition prescriptions, Electrolytes

PC-20 Improving communication with elderly patients in the Bulgarian pharmacy practice

Valentina B. Petkova-Dimitrova[1], **Doroteya Naboko**[2], Zlatka D. Dimitrova[1]

[1]Social Pharmacy, Faculty of Pharmacy, [2]Marketing Department, Sopharma PLC, Sofia, Bulgaria

Background and Objective: The number of elderly intensively increases and the fact that they consume a great amount of POM and OTC drugs makes them a significant group of patients that need pharmacy care. Unfortunately pharmacists often find their interaction with elderly clients very difficult and determined by many factors such as the sensory and physical limitations that accompany the aging process.

To test the readiness of the elderly patients to communicate with the pharmacist, to assess the barriers that hinder the proper communication process and to provide a communication skills training in order to be improved the communication process.
Design: An experimental design involving two stages – assessment and education.
Setting: Setting: The elderly patient center (hospice) and 15 private community pharmacies both situated in the city of Sofia, Bulgaria. Participants: 110 patients aged 65+ (80 community pharmacy patients and 30 patients from the elderly center).
Main Outcome Measures: An initial interview with the patients and questionnaire with the selected pharmacists to assess the level of communication and to clarify the hinders. Communication skills training leaflets provided to the pharmacists. Test of the newly received skills. Final interview with the patients to be assessed the level of their satisfaction.
Results: The trained pharmacists that have passed the education process are more facilitated in providing pharmaceutical care that leads to the elderly patients' satisfaction (about 70%). Additionally, the elderly patients obtained significantly more information from their pharmacists that leads to better care and avoidance of nearly half of the drug-related problems (DRPs) for this age.
Conclusions: Pharmacist communication skills' training appears to be an effective means of enhancing the communication process in the pharmacy.
Keywords: Pharmaceutical care, Elderly, Quality of life, pharmacy, Education

PC-35 Can a clinical pharmacist contribute in the multidisciplinary team at a paediatric ward?

Cathrine Kjeldby[1], Anna A. B. Bjerre[2]

[1]Hospital services, The Hospital Pharmacy at Rikshospitalet University Hospital, [2]Department of Paediatrics, Rikshospitalet University Hospital, Oslo, Norway

Background and Objective: As the hospital has no pharmacists working in the multidisciplinary teams on the wards, we wanted to introduce and evaluate a clinical pharmacy service.
Design: A 14 month prospective pilot study with three aims:

1. Identify drug related problems (DRPs) (data collecting period of eight months).
2. Design drug related information sheets and teach nurses.
3. Evaluate the service by questionnaire.

Suggest cost-effective measures.

Setting: Paediatric ward with 16 beds, National University Hospital.
Main Outcome Measures: The acceptance rate of the DRPs identified and suggested by the pharmacist, the number of drug information sheets introduced and lectures given to nurses. Physicians' and nurses' views on the service.
Results: The pharmacist identified 162 DRPs in 121 (32%) of the 384 charts that was screened. Immediate action was taken in 94 (59%) of the 162 cases, the physician considered 42 (26%) of the suggestion rational but no immediate action was taken due to various reasons, and 26 (16%) of the suggestions were not approved by the physician. The most commented DRP was "dosage" (33%), which included too low or too high dose, non-optimal administration time or inappropriate formulation.

The pharmacist designed six drug information sheets and gave five lectures. Cost-effective measures were suggested for drug handling and specific drugs. Seven out of eight physicians and all nurses ($n = 15$) considered the pharmacist a natural participant in the multidisciplinary team.
Conclusions: Quality assurance of drug treatment may be performed by a clinical pharmacist, not only by the traditional way of identifying DRPs, but also by designing drug information sheets and teaching. The clinical pharmacist is also capable of suggesting cost-effective measures. Physicians and nurses considered the clinical pharmacist a natural participant in the multidisciplinary team. As a result of this project, the clinical service will continue and also be introduced to one of the other paediatric wards.
Keywords: DRP, Paediatrics, Quality assurance

PC-44 Iatrogeny and drug dispensations for outpatients: implication of a hospital pharmacy

Emilie Degris[1], Isabelle Peyranne[1], Anne Laure Sarda[1], Nadine Malric[1], Brigitte Bellon[1]

[1]Pharmacie, Hôpital Paule de Viguier, CHU Toulouse, Toulouse cedex 9, France

Background and Objective: In France, some drugs are not available in community and outpatients have to go to hospital to obtain their treatment. Our objective was to assess the role of the pharmacist in prevention of iatrogeny when dispensing drugs, in particular medication errors at high risk for the patient.
Design: a 6 month retrospective study, from December 2006 to May 2007
Setting: Pharmacy of Paule de Viguier, Teaching hospital of Toulouse, France

Main Outcome Measures: Each error encountered was recorded and analysed. First, we determined the number of errors avoided and the number of errors effective (divided into 2 groups: non avoided and created by pharmacy). Then, we quantified the frequency (1 = once, 2 = from twice to ten times, 3 = more than ten times) and the severity (0 = no risk, 1 = weak, 2 = moderate, 3 = high) of each error. The multiplication of those two parameters gave us the level of the risk of error for the patient (0 = no risk, 1 to 3 = weak risk, 4 and 6 = moderate risk, 9 = high risk). Finally, for each type of error we noted the actors.
Results: We made 6543 dispensations during the period of the study. We recorded 125 errors (1.9%): 92 (14 for 1000 dispensations) were avoided by the evaluation of the pharmacist, 8 were not avoided (1 for 1000 dispensations) and 25 were created (4 for 1000 dispensations). Among the avoided errors, 36 (5.5 for 1000) were at high risk (9), 26 (4 for 1000) at moderate risk (6 or 4), 30 (4.5 for 1000) at weak risk (2 or 3). The actor of 87 of them was the prescriber (mainly lack of information on the prescription like no dosage). Among the 33 effective errors, 24 (3.7 for 1000) were at moderate risk (6 or 4), 5 (0.7 for 1000) at weak risk (1 to 3), 4 (0.6 for 1000) had no risk (0). The actor of 31 of them was the pharmacy.
Conclusions: The errors for the activity "retrocession" are not numerous. The majority of them are stopped by the evaluation of the pharmacist, in particular those at high risk for the patient. We implemented curative and preventive measures to decrease the number of errors made both by prescribers and pharmacy.
Keywords: Iatrogeny, Risk, Retrocession

PC-60 Effectiveness of a pharmacist intervention for asthma control improvement: a randomised controlled trial

Els Mehuys[1], Luc Van Bortel[2], Leen De Bolle[1], Inge Van Tongelen[1], Jean-Paul Remon[1], Lieven Annemans[3], Guy Brusselle[4]

[1]Pharmaceutical Care Unit, [2]Heymans Institute of Pharmacology, [3]Department of Public Health, [4]Department of Respiratoy Diseases, Ghent University, Gent, Belgium

Background and Objective: Despite improved treatments and guidelines, asthma control remains suboptimal. In a recent observational study, we described the Asthma Control Test® (ACT) as an easy tool to measure asthma control of patients presenting at community pharmacies (1). The present randomised controlled trial was set up to study the hypothesis that a pharmacist intervention, focused on optimal use of asthma medication and tailor-made to the patient's current asthma control, would result in improved asthma control in adult patients.
Design: A 6-month randomised controlled trial in 201 asthma patients: 94 patients in the control group (C) and 107 patients in the intervention group (I). Patients in the control group received usual care. Patients in the intervention group received a protocol defined pharmacist intervention, mainly focusing on inhaler technique and adherence to controller medication.
Setting: 66 randomly selected community pharmacies in Flanders (the Dutch speaking part of Belgium).
Main Outcome Measures: Primary outcome was the level of asthma control, as measured by the Asthma Control Test®. Secondary outcomes included rescue medication use, night-time awakenings due to asthma, patients' peak expiratory flow, inhalation technique, adherence to controller medication, quality of life, knowledge on asthma and smoking behaviour.
Results: Mean ACT scores did not change from baseline for both study groups (ACT at baseline for C: 19.3, I: 19.7 – ACT at 6 months for C: 19.7, I: 20.3). However, a predefined subgroup analysis of patients having insufficiently controlled asthma at baseline showed that the intervention significantly increased ACT scores during the course of the study compared with usual care ($p = 0.019$). The intervention also significantly reduced reliever medication use ($p = 0.012$) and the frequency of night-time awakenings due to asthma ($p = 0.044$). Inhalation technique ($p = 0.004$) and adherence to controller medication ($p = 0.016$) were significantly better in the intervention group. These findings suggest that the more effective use of asthma medication is responsible for the improvements in symptom control.

There were no differences between control and intervention group in peak expiratory flow, quality of life, knowledge on asthma and smoking behaviour.
Conclusions: A pharmacist intervention can significantly improve outcomes for asthma patients (ClinicalTrials.gov number NCT00263159).

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Keywords: Asthma, Asthma control, Community pharmacy

PC-65 Pharmacotherapeutic follow-up in older inpatients with hip fracture

Amparo Torres[1], Isabel M. I. Baena[2], Paloma P. C. Fajardo[2], Jose Maria J. M. Araujo[3], Maria José M. J. Faus[3], Ramon R. Antelo[4]

[1]Pharmaceutical Care Research Group, [2]Research Group on Pharmaceutical Care, [3]Pharmaceutical Care Research group, University of Granada, [4]Physician, University Hospital San Celicilio, Granada, Spain

Background and Objective: Patients admitted to surgery departments receive multiple drugs before, during and after surgical procedures. Drug-related problems (DRP) are the most common cause of injury to hospitalized patients. In Pharmacotherapeutic Follow-up (PTF) a pharmacist is responsible for drug-related patient needs by detecting, preventing and solving drug-related problems (DRP) aiming at specific results to improve patient quality of life. DRP are pharmacotherapy negative outcomes leading to failed therapeutic goals or undesirable events. When a DRP appears, it affects not only older hip fracture patient health, but also the effectiveness of hospital health care.

The general objective of this study was to demonstrate that PTF improves the hip fracture assistential process quality, comparing some quality indicators of this process between patients in study group (SG) and control group (CG).
Design: Cuasi-experimental study with control group. PTF was the intervention.
Setting: Two Traumatology wards in a large teaching hospital, "Hospital San Cecilio", Granada, Spain.
The period of study was from January to July 2005 (SG) and the same period but in 2004 (CG).
Main Outcome Measures: Incidence and types of DRP; DRP solved in SG; differences in lengh of stay, six-months mortality and three-months readmissions between study and control groups.
Results: The incidence of DRP was 74% in SG (n = 112) and 53.8% in CG (n = 119). In SG, more than 80% of DRP were resolved. In SG and CG the 53% and 41% of DRP were related to medication need, 26% and 50% to effectiveness, and 21% and 9% to safety, respectively.

Mean length of stay was 15 days in SG and 13.7 in CG. In general, patients with DRP had a significative longer length of stay (15.6 d) than those without DRP (12 6 d); but in SG, patients in which DRP were solved had the same length of stay than those without DRP. Six-months mortality was 7.6% in SG and 11.7% in CG, and readmissions was 1.9% and 7.7% respectively.

Conclusions: Pharmacotherapy follow-up permitted most of the DRP detected in the SG were solved. In this patients group, two of the most important hip fracture care process quality indicators like readmissions and six-months mortality were lower than in CG.
Keywords: Pharmacotherapy follow-up, Hip fracture, Drug related problems

PC-67 Influences of the sanitary education in the diabetes type 2 and oral antidiabetics knowledge by patients of two community pharmacies in Gran Canaria, Spain

Garcia Rosana[1], Paloma P. C. Fajardo[2], Daniel D. Sabater[2], Antonio A. Pintor[2], Maria Isabel M. I. Baena[2], Diego D. Barbero[2], Maria Pilar M. P. Garcia- Delgado[2], Fernando F. Martínez[2]

[1]Pharmaceutical Care Research Group, [2]Pharmaceutical Care Research group, University of Granada, Granada, Spain

Background and Objective: Evaluating knowledge of oral antidiabetics users about their medicines and their health problem before and after a session of sanitary education in two community pharmacies in Gran Canaria, Spain.
Design: Cuaxiexperimental research pre-post intervention. Intervention is defined as a session of oral and written sanitary education distributed by the pharmacist about the medicines that the patient uses and its problem of health. The analysis of the information obtained has been made by a comparison of average for related samples.
Setting: Two community pharmacies with similar characteristics in Las Palmas de Gran Canaria, Spain
Main Outcome Measures: Knowledge of medicines and health problem before and alter the sanitary education.
Results: Sixteen patients were included in the study, where 8 were women. 3 patients did not want to collaborate but they did not show any different characteristics. Regarding the independent variables of participants, the average age was of 68 years (min 40, max 81). 13 of the 16 patients did not have studies or had primary studies. The average of oral antidiabetics taken by patient was of 2. The total number of oral antidiabetics studied was of 25. Before the intervention, the level of knowledge of the oral antidiabetics was as follows: optimal knowledge 17, tolerable knowledge 1 and insufficient knowledge 8. After the session of sanitary education about all the oral antidiabetics studied the knowledge of them became optimal. Concerning the knowledge of the diabetes before the intervention, it was as follows: optimal knowledge for 7 patients, tolerable in 1 patient and 8 patients had an insufficient knowledge. After the sanitary education, 3 patients remained with an insufficient knowledge on the diabetes and all the rest obtained an optimal knowledge.
Conclusions: The sanitary education distributed by the pharmacist improves the knowledge in patients of the oral antidiabetics and of the diabetes itself. Although the study population is not very significant, this research could open a line of investigation in sanitary education and in the knowledge of medicines and health problems.

PC-94 Evaluation of problems with discharge medication on a paediatric ward

Christophe Indevuyst[1], Katrien Cosaert[1], **Ludo Willems**[1]

[1]Pharmacy, University Hospital Leuven, Leuven, Belgium

Background and Objective: A previous study in our hospital revealed discrepancies between a child's medication history and the in-patient drug-chart.[1] This led to a new study to evaluate patients' and parents' knowledge of discharge medication and to identify the main problems in the discharge medication process.
Design: During one month, medication charts of patients to be discharged were compared to information obtained from the discharge letter and a structured interview.
Setting: A paediatric oncology and infectious diseases ward (38 beds) in a 1900-bed university hospital.
Main Outcome Measures: Discrepancies between the intended discharge medication regimen and the medication regimen displayed in the discharge letter, corrected for information obtained from the parents and the patient himself.
Results: 24 patients were interviewed about their medication at discharge, which consisted of a total of 126 drugs. In 87.5% (n = 21/24) of cases, one or both parents were interviewed. In all other ones, we interviewed the patient himself. In 54.2% (n = 13/24) of patients, one or more discrepancies were detected. This result is comparable to other results described in literature (60%)[2]. Omissions accounted for 4.8% (n = 6/126) of errors. Other inconsistencies were related to dose (4%, n = 5/126), frequency (1.6%, n = 2/126) and intake with or without food (3.2%, n = 4/126). The clinical pharmacist was asked to give extra information on various topics of the medication, including indication (13.5%, n = 17/126), drug–nutrient interactions (10.3%, n = 13/126), dosing (4%, n = 5/126) and storage (3.2%, n = 4/126).
Conclusions: A high discrepancy rate was found between actual and intended discharge medication regimens. Our results were comparable to other results published in literature [1]. Strategies for reducing medication discrepancies at discharge should focus on omissions, dosing, frequency and intake with/without food. Patients require extra information on indication, drug–nutrient interactions, dosing and storage.

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Keywords: Discharge, Medication, Paediatrics

PC-115 Pharmaceutical care for type 2 diabetic patients: a randomised controlled trial

Els Mehuys[1], Valerie Loomans[2], Leen De Bolle[1], Luc Van Bortel[3], Lieven Annemans[4], Inge Van Tongelen[1], Jean-Paul Remon[1], Mimi Giri[5]

[1]Pharmaceutical Care Unit, Ghent University, [2]KOVAG, KOVAG, [3]Heymans Institute of Pharmacology, [4]Department of Public Health, [5]Department of Endocrinology, Ghent University, Gent, Belgium

Background and Objective: Type 2 diabetic patients often underestimate the seriousness of their disease and neglect essential aspects of their treatment. For this reason, (inter)national treatment guidelines recommend patient education as an important element of diabetes care. In Belgium (as in other European countries), the majority of type 2 diabetic patients are treated in primary care with the general practitioner as the central caretaker. However, also the community pharmacist could play a valuable role in the education of type 2 diabetic patients, by motivating patients towards correct medication use, better medication adherence and healthy lifestyle.
Design: A 6-month randomised controlled trial in 288 type 2 diabetic patients: 135 patients in the control group (C) and 153 patients in the intervention group (I). Patients in the control group received usual care. Patients in the intervention group received a protocol defined

pharmacist intervention, mainly focusing on correct medication use, medication adherence and healthy lifestyle promotion.
Setting: 66 volunteering community pharmacies in Flanders (the Dutch speaking part of Belgium).
Main Outcome Measures: Primary outcome was glycaemic control, i.e. fasted plasma glucose (FPG) and HbA1c. Secondary outcomes included medication adherence, knowledge on diabetes and level of self-management.
Results: In both study groups, FPG levels were significantly decreased from baseline (C: −8.1 mg/dl, $p = 0.004$; I: −14.1 mg/dl, $p = 0.000$). However, the reduction in the intervention arm was not significantly greater than the reduction in the control arm ($p = 0.193$). The percentage of patients having a FPG between 90 and 130 mg/dl (ADA glycaemic target) was increased significantly more in the intervention group (C: +5.3%; I: +19.8%) ($p = 0.001$). There was also a significant study group-effect on HbA1c ($p = 0.009$): HbA1c was decreased with 0.63% in the intervention group versus a decrease of 0.14% in the control group. Interpreting the results of this study, it is important to note that the pharmacotherapy, i.e. type and daily dose of the oral hypoglycaemic agents, was changed by the general practitioner during the study period in 24.8% of the control group patients and 41.4% of the intervention group patients. This implies that the observed intervention effect on glycaemia could possibly be the result of these pharmacotherapeutic changes. Extra analyses revealed that for patients whose medication had not changed during the study, FPG remained status quo (irrespective of study group). For patients whose medication was changed, FPG decreased significantly more in patients of the intervention group, compared with patients of the control group (I: −32.1 mg/dl; C: −12.8 mg/dl) ($p = 0.022$). These results suggest that a joint action of general practitioner and pharmacist has the largest impact on glycaemia.
Conclusions: Pharmaceutical care can contribute to an improved glycaemic control of type 2 diabetic patients.
Keywords: Type 2 diabetes, Pharmacist, Pharmaceutical care

PC-141 Adherence to a guideline for the management of drug–drug interactions in Dutch community pharmacies

Henk Buurma[1], Tom Schalekamp[2], Toine C. G. Egberts[2], Peter A. G. De Smet[3]

[1]SIR Institute for Pharmacy Practice and Policy, Leiden, [2]Dept. of Pharmacoepidemiology and Pharmacotherapy, Utrecht Institute for Pharmaceutical Sciences, Utrecht University, Utrecht, [3]Scientific Institute of Dutch Pharmacists, (WINAp), The Hague, Netherlands

Background and Objective: Pharmacists contribute to the detection and prevention of certain drug therapy-related problems including drug–drug interactions (DDIs). Little is known about adherence to pharmacy practice guidelines for the management of DDI alerts. The objectives of this study were to measure the adherence of community pharmacists to a Dutch guideline for the management of DDIs and to determine patient-related and prescriber-related determinants for non-adherence.
Design: In a cross-sectional study sixteen clinically relevant DDIs were included in the study based upon certain described criteria. The clinical relevance had to be classified as C or higher, according to the classification system developed and maintained by a working group of the Scientific Institute of Dutch Pharmacists (WINAp) that has been described in detail elsewhere.[1] In other words, all the included DDIs had to have potentially harmful consequences.
Setting: From June to August 2005, Dutch pharmacists ($n = 149$) collected alerts occurring in daily patient care for these interactions as well as information related to the patient, the alert itself, the prescriber and the management of the alert.
Main Outcome Measures: Non-adherence was measured by comparing the management executed by the pharmacy with the national guideline.
Results: The overall adherence to the guideline amounted to 69.3% ($n = 423$) with large differences between the various DDIs. Adjusted for all variables, male gender (OR 2.25; 95%CI 1.52–3.31), the highest age category (>75 yr) (OR 1.97; 95%CI 1.03–3.75) and current use of more than seven medications (OR 2.35; 95%CI 1.46–3.80) were associated with a higher probability for non-adherence to the guideline by pharmacists. Prescriber-related variables had no significant influence on guideline adherence. The degree of adherence varied not only with the nature of the DDI, but also with its management characteristics. Substitution of one of the involved agents, recommended for most of the DDIs, was only executed in a small minority of cases. The outcome of interaction management, such as a substitution, a dose reduction, or a temporary stop of one of the agents, was frequently inconsistent with the guideline.
Conclusions: Non-adherence to a Dutch guideline for the management of DDI alerts is common in community pharmacies. There are several reasons for non-adherence, for instance the ultimate decision made by the prescriber in some instances. Further research into underlying reasons is warranted to guide efforts to improve this situation.

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Keywords: Drug interactions, Guidelines, Implementation

PC-155 Character of drug related problems identified for clinical centre of serbia emergency surgery inpatients

Zorica Boberic-Blazic[1], Svetlana R. S. Ristic[2]

[1]Central Pharmacy, Clinical Centre of Serbia, [2]Pharmacy, Teching hospital for obstetrics ang gynecology Narodni Front, Belgrade, Serbia

Background and Objective: Clinical pharmacy service has been introduced in hospital pharmacy setting in Serbia few years ago. Clinical pharmacist can contribute to better use of medicines by providing safe, rational and evidence based drug therapy. Clinical pharmacist reviews medication order lists and in the context of individual patients data and identify drug related problems (DRPs). The objectives were to: characterize identified DRPs and drugs involved after review of medication order lists in 5-week period; to identify drugs or drug group with a greater potential to cause DRPs.
Design: Prospective observational study of general surgery inpatients medication order lists. DRPs were identified and categorized using Pharmaceutical Care Network Europe 2006 classification and drugs using ATC (WHO 2003) classification.
Setting: Clinical Centre of Serbia Emergency Centre General Surgery Unit, four general surgery wards include 80 inpatients beds and satellite hospital pharmacy.
Main Outcome Measures: Category of DRPs was presented using PCNE V 5.00 classification. Drugs and drug group involved in DRPs was classified using, ATC WHO 2003 classification.
Results: Pharmacist identified one problem in every five patients (143/660). Drug choice problems were the most often involved in DRP (92/143). No clear indication for drug use was identified 29.37% of all DRPs. Drug–drug interactions were often 21/43 (14.69%). We did not identify any adverse drug reactions. The drug most often involved in DRP was ketorolac inj. 16/143 and antibiotics were the

group of drug most often involved in drug choice problems (30/143) and dosing problems (13/143).
Conclusions: The first research of pharmacist's interventions for EC General surgery inpatients in Serbia has shown that DRPs are frequent and that drug choice is the most common problem identified, antibiotics most often involved. Clinical pharmacist should promote responsible, safe and rational drugs use.

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Keywords: Clinical pharmacy, Drug related problems, Hospital pharmacy

PC-156 Validation of policies in a geriatric hospital

Lilian M. Azzopardi[1], Anthony Serracino-Inglott[1], Maurice Zarb Adami[1], Melissa Smith[1]

[1]Department of Pharmacy, University of Malta, Msida, Malta

Background and Objective: Policies provide consistency and basis for standardisation of professional services. The policies should be regularly reviewed to reflect the requirements of the ever changing healthcare settings. The aim was to validate pharmacy policies and identify required amendments.
Design: Four pharmacy policies were identified: Dispensing of Medications for Patients Admitted on the Wards (DMA), Dispensing of Medications for Discharged Patients (DMD), Amendments in Medications (AM) and Checking of the Emergency Trolley (ET). Tools were developed to validate the policies. The investigator used the tools and observed the procedure followed when dispensing medications to patients admitted on the wards, dispensing medications to discharged patients and changing medications to hospitalized patients for thirty times. The procedure followed when checking the emergency trolley was observed for eighteen times. Twenty-eight out of 55 nurses practising at the hospital were interviewed about their knowledge on the ET policy.
Setting: Zammit Clapp Hospital, St Julians, a 60-bed acute geriatric hospital where a unit-dose dispensing system is adopted.
Main Outcome Measures: Pharmacists' compliance with the policies, nurses' compliance with the ET policy, nurses' knowledge on the ET policy.
Results: Pharmacists showed full compliance with the DMD, AM and ET policies. Pharmacists failed to comply with two steps of the DMA policy. The overall compliance achieved with DMA policy was 92%. Pharmacists showed a 67% compliance with the step requiring checking of drug interactions and 93% compliance with the step requiring checking for other drug-related problems. In addition a step that is included in the DMA policy where the doctors contact pharmacists to inform them of the new admission to prepare required drugs showed an 83% non-compliance. From the study it transpired that the steps required to be carried out by nurses for the ET policy were not being followed. The mean nurses' knowledge about the ET policy was 72% with a range of 51–91%. Documentation of the checking of the emergency trolley was missing.
Conclusions: Following this study, the policy on Checking of the Emergency Trolley was amended and implemented. The steps which showed low compliance in the other policies were discussed with the pharmacy personnel to emphasise requirements of the policies.
Keywords: Policies, Validation, Hospital pharmacy

PC-160 Assessment and education of asthmatic patients in proper inhaled drug usage and other aspects of asthma therapy

Erdal Demir[1], Bahadir Cekic[1], Cetin Yilmaz[1], Philip M. Clark[1]

[1]Clinical Pharmacy, School of Pharmacy, Yeditepe University, Istanbul, Turkey

Background and Objective: To investigate asthmatic patients' knowledge of disease state, drug therapy and proper inhalator usage. To provide oral and written education according to meet patients' educational needs.
Design: Case control pilot study using.

- Guided questionnaire
- Assessment of patient inhalor technique
- asthma education: oral education including demonstration of proper inhalator usage; and
- Written education using illustrated brochures explaining asthma, trigger factors, and asthma treatment with an emphasis on the different usage of preventor and relievers; illustrated brochures explaining correct usage of turbohalers, discus and metered dose inhaler

Setting: Asthma Out-patient Clinic; Süreyyapaşa Centre for Respiratory Diseases and Thoracic Surgery, Maltepe-Istanbul
Main Outcome Measures: Questionnaire evaluation; success of patients in optimized guideline for proper inhalator usage
Results: 20% of 30 (n = 6) patients either did not know what the term asthma meant or defined it as a cough.
23.3% of patients (n = 7) are smokers who know cigarettes can and do trigger their asthma attacks; 10% (n = 3) of patients are smokers who claim cigarettes don't trigger their asthma.

13.3% (n = 4) of patients reported an aspirin allergy that triggers their asthma attacks. 26.6% (n = 8) had never used aspirin before and did not know whether they had any sensitivity to aspirin.

6.6% (n = 2) of subjects could correctly describe and distinguish between preventor and releiver drugs. 3.3% (n = 1) confused the terms, while 90.1% (n = 27) had no idea about these terms.

70% (n = 21) of asthmatics had received previous inhaler usage education from a specialist (doctor, nurse or pharmacist). 7 of these 21 patients had ineffective inhalator usage although they had ostensibly received education. The inhaler technique of the remaining 14 who had been previously educated was accepted as successful.

30% (n = 9) of the patients had never received inhaler usage education before a specialist. 2 of these 9 patients demonstrated successful technique but 7 of 9 failed.
Conclusions: The results of this pilot study indicate that some asthmatics are ignorant of their condition. In addition most of them seem to have no comprehension of the concepts of preventor or reliever therapy. Despite prior education about half (n = 14) were unable to demonstrate successful technique. Furthermore cigarette smoking may be a detremental factor to the lives of asthmatic patients.
This results of this study suggest the potential benefit of an innovative pharmacist led patient education service among asthmatic patients in Turkey.

Reference

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Keywords: Asthma, Education, Pharmacist, Inhaler technique

PC-221 Frequency of adverse drug reactions connected to hospital admissions – a project implementing clinical pharmacy

Christina Dueckelmann[1], Jochen Schuler[2], Wolfgang Beindl[1]

[1]Pharmacy Department, Landesapotheke am St. Johanns Spital, [2]Cardiology Department, Salzburger Landeskliniken, Private Paracelsus Medical University, Salzburg, Austria

Background and Objective: According to a recent meta-analysis, drug-related morbidity leads to 3.7% of preventable hospital admissions causing enormous expenditures.1 In Austria, there are only data on the incidence of adverse drug reactions (ADRs) of psychiatric drugs. Clinical pharmacy is not widely practised at hospital ward level.

With this study, we aim to evaluate and document ADRs leading to or occurring during hospital admissions. To improve the co-operation of doctors and pharmacists in an Austrian hospital, to enhance doctors′ sensitivity in detecting drug-related morbidity, to increase patient safety and lower costs by reducing hospital admissions.
Design: Two study nurses especially instructed about typical symptoms of ADRs identify and document these cases prospectively in cooperation with doctors on selected internal wards for a period of three months. These cases are evaluated by a clinical pharmacist by means of a computer tool and data-base specialised on detecting causality and severity of ADRs. Results and outcomes form the basis for structured feedback to doctors.
Setting: University Teaching Hospital.
Main Outcome Measures: Quantity and quality of ADRs connected with hospital admission.
Results: During the first six weeks, 958 patients were screened. Sixty three ADRs (41 female) were identified (6.6% of admissions). More than 50% of ADRs occurred in patients more than 75 years old. Reasons: Polypharmacy (mean number of drugs on admission 8.5) and reduced renal function (mean creatinine clearance 48.6 ml/min). Diuretics, oral anticoagulants, NSAIDs, digoxin and antibiotics were most frequently associated with drug-related problems. Water-electrolyte imbalance, overantigoagulation with or without bleeding, gastrointestinal problems and bradycardia are some of the most common problems. Results concerning the severity of ADRs will be available in September 2007.
Conclusions: ADRs are frequent in Austria. Incidences are comparable to numbers given in the literature. Mainly older patients are affected. The impact on clinical practice is yet unknown.

Reference

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Keywords: Adverse drug reactions, Hospital admissions, Clinical pharmacy

PEPI-272 Patients' report of depressive symptoms in relation with perceptions and adherence. A cross-sectional study among starters of cardiovascular medication

Tanja T. Menckeberg[1], Natascha S. Bechan[1], Rene M. Bergsma[2], Marieke Keuning[3], Alex Sefa[4], Wendy Woei A Sioe[5], Sandra Woudstra[6], Marcel L. Bouvy[7]

[1]Division of Pharmacoepidemiology and Pharmacotherapy, Utrecht Institute for Pharmaceutical Science, Utrecht, [2]Schiphol Apotheek, Pharmacy, Amstelveen, [3]Apotheek Overhees, Pharmacy, Soest, [4]Lloyds Apotheek Middenwaard, Pharmacy, Amstelveen, [5]Doornse Apotheek, Pharmacy, Doorn, [6]Noorder Apotheek, Pharmacy, Bilthoven, [7]Division of Pharmacoepidemiology and Pharmacotherapy, Utrecht Institute for Pharmaceutical Science, SIR Institute for Pharmacy Practice and Policy, Leiden, Netherlands

Background and Objective: Adherence to cardiovascular treatment, particularly in the first year, is low and can result in serious complications. Depression is associated with a 3 fold increased risk of nonadherence with medical treatment. Therefore, our aim was to investigate whether illness and treatment perceptions were associated to depressive symptoms in patients starting treatment for cardiovascular diseases.
Design: Cross-sectional study with mailed questionnaire.
Setting: Patients, who were dispensed at least a first prescription for a cardiovascular disease (anti-thrombotics excluded), were selected from 5 pharmacies in the Netherlands.
Main Outcome Measures: The questionnaire comprised the Illness Perception Questionnaire-Brief (IPQ-B), Beliefs about Medicines Questionnaire (BMQ), the Medication Adherence Report Scale (MARS) and the Centre for Epidemiological Studies Depression Scale (CES-D). Descriptive statistics and associations between depressive symptoms and the other study variables were assessed by bivariate correlations.
Results: Sixty two (37.1%) of 167 eligible patients returned our questionnaire. The mean age was 62.9 yr $\pm$ 11.9 (range 40–90) and 51.6% was female. Patients reported to have hypertension (51.6%), cardiac arrhythmia (21.0%) and hypercholestereamia (38.7%). The mean score on CES-D was 8.15 $\pm$ 6.7 and median self-reported adherence (MARS) was 25.

Reports of depressive symptoms increased with emotional response (IPQ-B Emotional response, $r = 0.51$), the perceived consequences (IPQ-B Consequences, $r = 0.38$) and increased experience of symptoms (IPQ-B Identity, $r = 0.49$) attributed to their cardiovascular disease. Depressive symptoms correlated with concerns about medication (BMQ, $r = 0.39$), but not with self-reported adherence.

Adherence was relatively high, as 65.6% of the sample had the maximum MARS score of 25.
Conclusions: In patients who started cardiovascular treatment, perceptions about cardiovascular disease and concerns about medication are associated with report of depressive symptoms. Depressive symptoms did not correlate with self-reported adherence. The majority of patients reported excellent medication taking behaviour, which might reflect their awareness of the importance of adherence or reluctance to report deviant behaviour rather than their actual behaviour. Further research is needed to clarify this finding.
Keywords: Depressive symptoms, Perception, Adherence, IPQ, BMQ, CES-D

PC-173 Knowledge and practice regarding crushing medication at an otorhinolaryngology ward

Nathalie Moerman[1], **Sarah Mertens**[1], Ludo Willems[1]

[1]Pharmacy, University Hospital Leuven, Leuven, Belgium

Background and Objective: On an otorhinolaryngology ward many patients have swallowing difficulties or require feeding tubes, which can frequently lead to problems related to oral ingestion of solid drugs. Opening capsules or crushing tablets can be necessary. However, certain solid dosage forms should not be crushed because this may alter the intended pharmacokinetics leading to adverse events. Nurses' knowledge about these pharmaceutical aspects of drugs is often limited.
Design: Assessment of nurses' knowledge about certain aspects of crushability by using a 7-question survey, previously validated by a panel of clinical pharmacists.
Setting: Otorhinolaryngology ward, University hospital, Leuven, Belgium.
Main Outcome Measures: Nurses' knowledge and practice regarding crushing and opening of solid oral drugs.

Results: Fifteen nurses completed the questionnaire.

93% of the nurses were aware of the purpose of controlled release formulations. Pharmaceutical codes added to brand names such as UNO, ZOK, LA and OCAS related to prolonged activity were not recognised in 47% of cases. In contrast, RETARD and CR were linked to slow release by 67% of the responders. The purpose of enteric coated (EC) drugs was only known by 26%.

In general, the nursing staff did not pay a lot of attention towards the prevention of drug-nutrient and/or drug–tube interactions. The recommended time interval between administration of enteral feeding and drugs was not respected.

84% of the responders would crush drugs together (in the same mortar) when multiple drugs are prescribed.

Based on the results of the survey, an intervention plan has been developed. This consisted of information rounds, a poster related to the topic and implementation of the use of a website dedicated to crushing medication developed by the Flemish Association of Hospital Pharmacists.1

Conclusions: Knowledge about crushability of solid oral drugs is often limited. Adverse events related to incorrect crushing or opening drugs can be avoided with recognition of the problem as well as improvements in health care provider knowledge.

Reference

1. www.pletmedicatie.be

Keywords: Crushing drugs

PC-176 Drug-related problems with new prescriptions – prevalence, nature and management in community pharmacies

Patrick M. Eichenberger[1], Markus L. Lampert[2], Irene Vogel-Kahmann[3], Seraina Mengiardi[1], J. W. Foppe van Mil[4], Kurt E. Hersberger[1]

[1]Institute of Clinical Pharmacy, University of Basel, [2]Institute of Clinical Pharmacology and Toxicology, University Hospital Basel, Basel, [3]Clinical & Hospital Pharmacy, Kantonsspital Schaffhausen, Schaffhausen, Switzerland, [4]van Mil Consultancy, Margrietlaan 1, Zuidlaren, Netherlands

Background and Objective: The detection and solution of drug-related problems is an important activity within pharmaceutical care. This study focused on drug-related problems (DRPs) detected during dispensing of new prescriptions in community pharmacies and aimed to explore frequency as well as nature and the pharmacist's management of them.

Design: During their pharmacy internships fifth-year pharmacy students collected consecutively 5 hospital discharge and 5 primary care prescriptions. After training, they documented DRPs and interventions on an adapted PCNE classification form. Inclusion criteria were: age over 18, at least one new medication, at least 2 prescribed drugs.

Setting: 64 Swiss community pharmacies affording the opportunity of internships for fifth year pharmacy students.

Main Outcome Measures: Prevalence, nature and management of DRPs in community pharmacies assessed with an adapted PCNE classification form.

Results: The patient's median age was 56 years (IQR 32) and they received a median of 3 (IQR 2; range 2–19) different drugs. Prescriptions of 618 patients (285 (43.9%) discharged from hospital) were analysed. In 129 (20.9%) of all prescriptions at least one DRP was detected. The most frequent DRPs were potential interactions (28.7%), wrong/improper application or time of drug intake (17.1%), inappropriate drug (8.5%) or inappropriate drug form for indication (5.4%), no clear indication for drug use (7.8%) and too high or too low dosage (4.7%).

These DRPs led to a total of 409 interventions (multiple answers): patient counselling (194); request of information from prescriber (56); change of drug (15; there from 1 after consultation with physician), drug form (10), dosage (15), instruction for application (17) or deliverable drug amount (16); drug stopped (7); start with new drug (2); referral to a physician (3); others (74).

Out of all interventions 78.7% could be managed by the pharmacist without any contact to the prescriber. There were no differences between hospital discharge and primary care prescriptions.

Conclusions: In the delivery process of new prescribed drugs DRPs are frequently observed prompting many interventions. Most DRPs can be managed by the pharmacy. Further studies are needed to analyse relevance of the problems and impact of according interventions.

Keywords: Drug-related problems, Community pharmacies, Classification

PC-197 Belgian health authorities and clinical pharmacy projects

Hugo Robays[1], Ludo Willems[2]

[1]Pharmacy, Gent University Hospital, 9000, [2]Pharmacy, Leuven University Hospital, Leuven, Belgium

Background and Objective: Improving rational use of drugs and patient safety in the Belgian Hospitals by clinical pharmacists.

Design: To improve rational use of drugs, a project on clinical pharmacy was launched by the Federal Ministry of Social Affairs and Health Care in Belgium. A total budget of approx. 1,250,000 € is available in order to finance different initiatives on pharmaceutical care.

Setting: Belgian hospitals.

Main Outcome Measures: The main selection criteria were clinical relevancy (patient centred initiatives) reproducibility of clinical and economical outcome, outcome indicators and multidisciplinary approach. An approval by the hospital board and medical council must underline the willingness to integrate the clinical pharmacy in the patient care team.

Results: 80 projects has submitted (on a total of 112 hospitals). A total number of 28 hospitals were selected to receive funding for clinical pharmacy activities. 13 projects were quoted for a full time equivalent and 15 projects for a half time clinical pharmacist.

The projects described different fields or a combination of different aspects of pharmaceutical care like e.g. the transfer of information on medication use on admission and discharge

Conclusions: The funding of the Belgian Health Authorities triggered a very high response rate, which proves the increasing attitude from the Belgian hospitals to the positive impact of clinical pharmacy. The funding was complementary to other national projects to improve overall safety of medical treatment. Also, many hospital administrators took the opportunity to enhance more economical and rational use of drugs.

Financial support by the Belgian authorities of clinical pharmacy and the results of the projects could trigger a further integration of the hospital pharmacies into a patient care team.

Reference

www.mfc-cmp.be

Keywords: Health authoriies, Clinical pharmacy, Project funding

PC-218 Consensus of the community pharmacists' referral criteria for the general practitioners on minor ailments in Spain

Ocaña Ana Maria[1], Pedro Amariles[2], Loreto Sáez-Benito[3], Vicente Baos[4], Maria Isabel Baena[3], María José Faus[3], Federico Plaza[5]

[1]Pharmacist Research Group on Pharmaceutical Care GIAF-UGR, Faculty of Pharmacy, Granada, Spain, [2]Pharmacist. Research Group on Pharmaceutical Care (GIAF-UGR), Proffesor of University of Antioquia, Medellin, Colombia, [3]Pharmacist. Research Group on Pharmaceutical Care (GIAF-UGR), Faculty of Pharmacy, Granada, [4]General practitioner, Spanish Society of Family and Community Medicine (SEMFYC), [5]Pharmacist, Spanish Society of Community Pharmacists (SEFAC), Madrid, Spain

Background and Objective: The task of assisting patients in self-medication practice is an important component of pharmaceutical care in Spain. In order to provide appropriate self-medication counselling pharmacist should be able to distinguish between a minor ailment and one that it is not, and should, consequently, refer patients as necessary to GPs. Nevertheless, there are no criteria for referral to GP in Spain. The objectives were:(1)To identify the most relevant minor ailments, agreeing on the specific criteria for referral to the GP.(2)To select the non-prescription drugs, with evidence of safety and effectiveness, for the treatment of the identified minor ailments
Design: Qualitative study with an expert panel which was made up of 2 primary care physician from SEMFYC and six community pharmacists (two members of SEFAC and four members of GIAF-UGR). The expert panel held two meetings, of five hours each. It was established which minor ailments were considered most relevant within the framework of community pharmacy in Spain. Subsequently, the expert panel, reach an agreement on the general content that should be included in the protocols for the management of each selected minor ailment. Finally, a working team composed of 4 GPs and three community pharmacists prepared the protocols, which were compiled into a guide for self-medication counselling.
Setting: University of Granada, Spain during 2007.
Main Outcome Measures: Identified minor ailments, content of the protocols for each minor ailment, non prescription drugs selected.
Results: It was selected 27 minor ailments, allocated as follows; respiratory (rhinitis, cough, cold, flu), pain (period pains, sore throat, headache, backache, toothache), gastrointestinal (heartburn, diarrhea, constipation, vomiting, hemorrhoids), skin and mucous membrane (aphthae, acne vulgaris, cutaneous wounds, burns, stings, urticaria, herpes labialis, eczema lesions) and others (vaginitis, varicose veins, fever, conjunctivitis, insomnia).

The following sections were specified in each protocol: Banal and serious reasons or conditions that can lead to the symptom (including drugs); referral criteria according to the duration of the symptom and associated signs; drug treatment and non-pharmacologic therapies. It was selected a total of 31 different non prescription drugs.
Conclusions: A total of 27 minor ailments were identified as the most frequently demanded in community pharmacies in Spain. Referral criteria were based mainly in the duration of the symptom and other associated symptoms that are indicative of illness. For the treatment of these minor ailments, 31 different non prescription drugs were selected.
Keywords: Non-prescription drugs, Minor ailment, Community pharmacy services

PC-231 Descriptive analysis of pharmaceutical interventions in surgical inpatients

Mareike Kunkel[1], Matthias Ganso[1], Irene Kraemer[1]

[1]Pharmacy, Johannes-Gutenberg-University Hospital, Mainz, Germany

Background and Objective: In 2004 clinical pharmacy service was implemented in three surgical clinics (inclusive ICU). Drug related problems (DRP) were identified by medication review and discussed with the physicians. From January to June 2005 all pharmaceutical interventions (PI) from pharmacists (2 FTE) were recorded (paper based) and classified according to DRP (with the PI-Doc®-System, which was modified to comply the requirements for hospital use1), intervention type, outcome and clinical relevance. The PIs were documented and evaluated with an Access® database.
Design: Retrospective study of PIs in surgical patients, identification of DRP by medication review.
Setting: Departments of Neurosurgery, Accident Surgery and General/Abdominal Surgery (70, 73 and 71 beds, respectively), university hospital.
Main Outcome Measures: DRP, intervention type, outcome, clinical relevance, drugs and admission diagnoses being at risk for DRPs.
Results: Within six month 3679 patients were admitted. DRPs were identified in 17% (n = 610) of the patients. Patients with DRPs were older (mean = 67 y SD ± 14 vs. 56 y SD ± 19) and had an increased length of stay (mean = 24 d SD ± 18 vs. 10 d SD ± 9). 970 PIs were made. The acceptance by the physicians was 95.8%. 175 PIs were classified to the outcome subcategory patient safety and clinical relevance was estimated as major (n = 6) or moderate (n = 169) by pharmacists.

Further data are based on these 175 PIs.

The most often addressed DRPs categories were overdose (34%), no or insufficient drug monitoring, when necessary (10%), untreated indication (7%) and increased risk of an adverse drug reaction (6%). The type of recommended intervention varied: change dose/time of application (34%), stop drug (26%) and conduct drug monitoring (15%). DRPs related with the outcome patient safety and at least moderate clinical relevance were caused by 185 drugs (100%). The most affected drugs were vancomycin (13%), diclofenac (8%), potassium (4%), acetaminophen (3%), digitoxin (3%), phenytoin (3%) and theophylline (3%).

The incidence of the most frequently admission diagnoses of patients with relevant DRP differed from the incidence of diagnoses of all admitted patients (incidence ICD-10 with DRP vs. all patients): M48.06 Spinal stenosis (5.8% vs. 2.2%), M51.2 Other vertebral disc displacement (5.0% vs. 2.9%), S72.01 Fracture of neck of femur (5.0% vs. 1.1%) and I60.9 Subarachnoid haemorrhage, unspecified (3.6% vs. 0.6%).
Conclusions: Medication review was a useful method for detecting DRPs in surgical patients. Analysis of PI allows the identification of drugs and patients being at risk for DRPs, which might be involved in negative outcome of pharmacotherapy.

Reference

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Keywords: Drug related problem, Pharmaceutical intervention, Inpatient

PEC-23 Clinical pharmacy, a pharmaco-economic benefit in patient care, a literature review

Thomas De Rijdt[1], Ludo Willems[1], Steven Simoens[2]

[1]Pharmacy, University Hospitals Leuven, [2]Research Centre for Pharmaceutical Care and Pharmaco-economics, Katholieke Universiteit Leuven, Leuven, Belgium

Background and Objective: During the last decades clinical pharmacy services developed around the world and evidence of their

(cost-)effectiveness has started to emerge[1]. A literature review was carried out that a) summarized the findings of pharmaco-economic studies; b) evaluated the methodology employed by studies; and c) suggested how future research has to be designed to meet the requirements of a pharmaco-economic analysis.
Design: Studies to be included are identified by searching electronic databases. Due to limited relevance of older studies, the scope is limited to studies published between 1996 and 2006. Mainly three techniques can be used to conduct an economic evaluation: cost-effectiveness analysis, cost-utility analysis and cost-benefit analysis.[2] All studies are reviewed regarding results and methodological quality. Nineteen out of 312 studies met our eligible criteria.
Setting: Clinical pharmacy services provided in a hospital setting.
Main Outcome Measures: Results were analyzed in terms of number of preventable adverse drug events (ADE), length of stay (LOS) and financial savings. Methodological quality was assessed with respect to perspective, scope and measurement of costs and consequences, sources of data on costs and consequences, and application of an incremental analysis.
Results: a) Nearly all studies conclude a financial benefit based on direct cost saving and estimated cost avoidance as a measure of prevented ADE or shortened LOS. b) Methodologically there are a number of shortcomings: e.g. not including the wage of the personnel, lack of control groups, use of expert panels to estimate savings and costs, possible selection bias, no valorization of health effects. c) A methodology for conducting a prospective economic evaluation of an observational study is proposed.
Conclusions: It is not obvious to calculate the net savings of a clinical pharmacy program or to compare different programs because there are no common guidelines for this type of assessment. The ideal protocol is hard to achieve, so best practice will be more realistic. Addition of direct cost saving, labor cost and economic value of prevented ADE and shorter LOS results in a lucrative service. These savings are higher for specific inverventions (like preventing ADE, switch therapy) or disciplines (e.g. intensive care unit versus geriatrics). When a new clinical pharmacy service is started one can influence the results by carefully choosing the units and type of interventions to focus on.

References

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Keywords: Clinical pharmacy, Pharmaco-economic analysis, Review

PEC-125 Valuing hand-foot-syndrome using the time-trade-off and visual analogue scale

Dorothee Güney[1], Susanne Roth[1], Sven Simons[1], Nele Reineking[1], Eva-Susanne Dietrich[2], Ulrich Jaehde[1]

[1]Institute of Pharmacy, Clinical Pharmacy, University of Bonn, Bonn, [2]TK, Scientific Institute for Benefit and Efficiency in Health Care, Hamburg, Germany

Background and Objective: The aim of this study was to obtain utility values for the three different severity grades of hand-foot-syndrome (HFS) which is a dose-limiting adverse effect associated with anticancer drugs such as capecitabine and docetaxel. The clinical symptoms of HFS can vary from numbness and tingling (grade 1) to pain, desquamation, blistering and ulceration (grade 3).
Design: Utility values were derived from face-to-face interviews of randomly chosen subjects using the time-trade-off-method (TTO) and the visual analogue scale (VAS). The participants were informed on the different severity grades of HFS using cards consisting of a clinical definition, citations of patients and pictures showing affected hands and feet. To determine utility values by TTO the interviewed persons were asked to consider two alternatives: living with the particular grade for the next ten years followed by death versus living in perfect health for a shorter period of time which was varied until the respondent became uncertain between the options. The proportion of time in perfect health and ten years in the particular state was defined as TTO value. Using the VAS the subjects were asked to mark a cross on a vertical scale ranging from 0 (worst imaginable health state) to 100 (best imaginable health state).
Setting: The interviews took place in a German community pharmacy.
Main Outcome Measures: Utility values for the different severity grades of HFS.
Results: The interrogation of 53 adults (30 females = 56.6%, 23 males = 43.4%) with a mean age of 50.8 years (median: 49.0 years, SD: 18.5, range: 18–86 years) led to the following mean utility values for the different severity grades: grade 1: TTO = 0.97, VAS = 0.70, grade 2: TTO = 0.72, VAS = 0.37, grade 3: TTO = 0.34, VAS = 0.09. All differences among the grades were statistically significant ($p < 0.001$).
Conclusions: HFS was considered to have major impact on the health state and quality of life of cancer patients, particularly grade 2 and 3. Therefore HFS requires attention and awareness by health care professionals. The health state utility values for HFS assessed in this study may be applied in proximate cost-utility studies.
Keywords: TTO, Utility, Hand-foot-syndrome

PEPI-42 Identification of drug interactions in hospitals – computer screening vs bedside recording

Hege Salvesen Blix[1], Kirsten K. Viktil[2], Tron A. Moger[3], Åsmund Reikvam[4]

[1]Lovisenberg Diakonale hospital and Department of Pharmacotherapeutics, [2]Diakonhjemmet hospital pharmacy and Department of Pharmacotherapeutics, Faculty of Medicine, University of Oslo, [3]Department of Biostatistics, [4]Department of Pharmacotherapeutics, University of Oslo, Oslo, Norway

Background and Objective: Managing drug interactions in hospitalised patients is challenging but important. The objective of the study was to compare two methods for identification of drug interactions (DDIs) – computerised screening and prospective bedside recording – with regard to capability of identifying DDIs.
Design: By bedside evaluation drug-related problems, including DDIs, were prospectively recorded by pharmacists and evaluated in multidisciplinary teams. A computer screening programme was used to identify DDIs retrospectively – dividing DDIs into four classes: A avoid, B avoid/take precautions, C take precautions, D no action needed.
Setting: Patient characteristics were recorded for patients admitted to five hospitals.
Main Outcome Measures: Proportion of patients with DDIs; number and types of DDIs.
Results: Among 827 patients computer screening found DDIs in 544 patients (66%); 351 had DDIs introduced in hospital. The 1513 computer identified DDIs had the following distribution: type A 78; type B 915; type C 38; type D 482. By bedside evaluation, DDIs were found in 73 patients (9%), with a total of 99 DDIs. The proportions of computer recorded DDIs which were also identified bedside were: 5%, 8%, 8%, 2% of DDIs type A, B, C, D, respectively. In 10 patients, DDIs not registered by computer screening were identified bedside. By computer screening, the drugs most frequently involved

in DDIs were acetylsalicylic acid, warfarin, furosemide and digitoxin and by bedside evaluation warfarin, simvastatin, theophylline and carbamazepine.
Conclusions: Despite active prospective bedside search for DDIs, this approach identified only a small proportion – less than one in ten – of the DDIs recorded by computer screening. This also pertained to DDIs reported by the computer screening to be hazardous. Computer screening overestimates considerably when the objective is to identify clinically relevant DDIs.
Keywords: Drug interactions, Drug-related problems, Computer screening

PEPI-49 Developing consensus around the pharmaceutical public health competencies for community pharmacists in Scotland

Lorna W McHattie[1], David E. Pfleger[1], Lesley H. Diack[1], Dorothy J. McCaig[1], Derek C. Stewart[1]

[1]School of Pharmacy, The Robert Gordon University, Aberdeen, United Kingdom

Background and Objective: The contribution of pharmacists to the delivery of public health in Scotland is recognised in national policy1,2. The new community pharmacy contract with its emphasis on public health will provide a new framework in which the contribution of community pharmacy to improving health in Scotland can be delivered.

The Objective was to define the core public health competencies applicable to community pharmacy practise, using the 'Skills for Health Public Health Practice competency framework'3.
Design: A web based Delphi methodology4 was used to achieve consensus on which competencies, from the 'Skills for Health Public Health Practice competency framework', should be met or aspired to by practising community pharmacists using a multidisciplinary group of expert stakeholders. Two rounds took place.
Setting: Primary and secondary healthcare and academia.
Main Outcome Measures: Panel members rated their extent of agreement/disagreement that each community pharmacist should achieve or be striving to achieve that particular competency. Consensus was defined as $\geq$90% rating a competency as strongly agree/agree.
Results: Ten organisations (83% of those invited) and 30 organisation members (88% of those invited) agreed to participate. Responses were received from 25 (83%) individuals in round 1 and 22 (73%) in round 2. Consensus was achieved for 25/68 (37%) competencies in round 1 and a further 8/68 (12%) in round 2. Competencies achieving consensus predominantly focused on health improvement activities at individual and local community levels and ethical management of self, rather than those relating to surveillance and assessment, strategic leadership or research and development.
Conclusions: This research has identified that many of the competencies in the 'Skills for Health' document can be applied to community pharmacy. Research has since been carried out, using focus group and questionnaire methodology, to investigate the views of practising community pharmacists.

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Keywords: Pharmacy, Competencies, Delphi

PEPI-120 Application of evidence-based medicine criteria to paediatric off-label drug utilization

Begoña Feal Cortizas[1], Luis Margusino Framiñan[1], Isabel Martin Herranz[1]

[1]Pharmacy Department, Juan Canalejo Hospital, La Coruña, Spain

Background and Objective: In Spain, off-label drug utilization (non-approved indications, patient population, doses, administration route, association), must be derived to compassionate use, which requires a prior National Health Authorities (NHA) approval and a monitoring plan and follow up information provided to them. Request to NHA includes circumstances of case and patient protection measures, including: physician assessment, informed consent and institutional clearance. The objective of this study is to analyse the strength of recommendation, strength of evidence and clinical efficacy of drugs prescribed outside the terms of product licence (off-label) in paediatric patients of our hospital.
Design: Literature review to evaluate the evidence level: Micromedex Healthcare Series, Cochrane Library, Pub-Med, Embase, expert opinion or consensus. Sample: 100% off-label drugs used in at least 2 paediatric patients (prior Spanish NHA treatment approval required for every patient). 10 years, retrospective observational study (1997–2007).
Setting: Paediatric hospital (300 beds) and Pharmacy Department (1 pharmacist) in a large general teaching hospital (1450 beds, 15 pharmacists).
Main Outcome Measures: Categorisation of evidence-based medicine according to Thomson ratings of recommendation (class I–III), evidence (category A-C) and efficacy (class I–III).
Results: 191 paediatric patients (3% total patients: adults and paediatrics) used 85 off-label drugs (27% total drugs: adults and paediatrics). Out of this 85 off-label drugs, 48% (41/85) only approved for adults, 35% (30/85) outside of license in terms of indication for adults and paediatric patients and 17% (14/85) both causes. 26 off-label drugs for 29 indications were used in at least 2 paediatric patients: 17% anti-infective agents, 14% haematopoietic growth factors, 14% cytokines, 10% hormone therapy, 7% anti-arrhythmics, 38% other 9 therapeutic groups. The categorisation according to evidence-based medicine was: a) strength of recommendation class: 3% I, 24% IIa; 52% IIb, 7% III and 14% indeterminant; b) strength of evidence category: 7% A, 55% B, 28% C and 10% no evidence; c) clinical efficacy class: 2% I, 65% IIa, 21% IIb and 7% indeterminant.
Conclusions: A higher proportion of off-label prescriptions is observed among paediatric patients, most of them related to non-approved indications in this population. There is a broad range of therapeutic groups involved. The evidence of most off-label therapies are based on meta-analyses of randomized controlled trials with conflicting conclusions, small numbers of patients or significant methodological flaws or nonrandomized studies and, although the weight of evidence favors efficacy of the treatment for a specific indication, the therapy may be useful and indicated in some, but not most, cases.
Keywords: Medicine-based evidence, Off-label, Paediatrics

PEPI-181 Role of community pharmacists in health promotion in Khartoum state, Sudan

Abdelmoneim Awad[1], Ezeldein S. Ahmed[2]

[1]Pharmacy Practice, Faculty of Pharmacy, Kuwait, Kuwait, [2]Public and Tropical Health, University of Medical Sciences and Technology, Khartoum, Sudan

Background and Objective: There is an increasing demand towards the involvement of the community pharmacists in health promotion. It has been reported that community pharmacists have a successful role in providing services, which help to improve and promote health with regard to smoking cessation, coronary heart disease, skin cancer prevention, drug misuse, sexual health, immunization, mental health, diabetes, nutrition and physical activity [1]. The aims of this study were to describe the current practice of community pharmacists with regard to their provision of health promotion activities, identify their willingness to participate in health promotion and identify the barriers that may limit their participation.
Design: A descriptive cross sectional study, which included 186 community pharmacies that selected via stratified and systematic random sampling. Data were collected via face-to-face structured interview of the respondents using a pre-tested questionnaire.
Setting: Community pharmacies in Khartoum State.
Main Outcome Measures: The extent of the pharmacists' involvement in counselling patients about health promotion topics, their preparation to counsel patients in health promotion topics, and their success in changing the patients' health behaviour.
Results: The response rate was 88.2%. Seventy five (45.7%) of the study participants were strongly involved in counselling patients on health promotion related to medications, but less involved in counseling them on the other personal health behaviours such as tobacco use (14.0%), alcohol use (9.1%) and exercise habits (7.9%). Seventy two (43.9%) of the respondents perceived themselves as very prepared to counsel patients on taking drugs and less very prepared to counsel them on other personal health behaviours. Fifty two (31.7%) claimed a high level of success in helping patients to change their behaviour with regard to medications, but not in relation to other personal health behaviours. Ninety eight percent of respondents indicated their willingness to participate in continuing education programs to gain more knowledge and skills about health education and promotion. The main barriers facing the community pharmacists' participation in health promotion as perceived by respondents were lack of information and/or training (75.6%) and lack of pharmacists' time (27.9%).
Conclusions: Community pharmacists reported to achieve considerable success in helping patients to change their behaviours in relation to medications, but were less successful of their ability to change personal health behaviours. The majority of the respondents have the interest and willingness to be a prime source of advice and support on health promotion.

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Keywords: Community pharmacists, Health promotion, Khartoum State, Sudan

DI-31 Pregabalin utilization review after its hospital formulary introduction

Damien Galvez[1], Julien Fouque[1], Axèle Reberga[1], Agnès Certain[1], Philippe Arnaud[1]

[1]Pharmacy Unit, AP-HP, Hospital Bichat Claude Bernard, Paris, France

Background and Objective: To describe initial period of clinical use of pregabalin, since its admission in the hospital therapeutic formulary compared with official use recommendations according to clinical trials (Diabetic Neuropathic Pain (DNP) and Post-Herpetic Neuralgia(PHN)).
Design: Literature review. 4 months retrospective and descriptive study: September–December 06. Datas from prescription/dispensation computerized circuits in 8 clinical units. Datas from archived patients files. Study of doses prescribed during 1 month, 10 months after pregabalin admission.
Setting: Clinical units, mainly rheumatology.
Main Outcome Measures: Population characteristics and indications. Prescriptions' adherence to recommended therapeutic strategies. Evolution of doses and titrations.
Results: 56 patients (20 males, 60 +/− 16 yo), 42(75%) issued from rheumatology unit. Pregabalin was prescribed only for neuropathic pain as indication, and only 3 patients were concerned by DNP in Bichat, none by PHN. The mean initiation dose was 150 mg (n = 43 patients, 77%). The maintenance daily dose (>1 week) 150 mg (n = 41/70.59%), 300 mg (n = 13/70.19%), 75 mg(n = 10/70.10%), 600 mg (n = 5/70.7%), 225 mg (n = 2/70.3%), 450 mg and 375 mg (n = 1/70.1%). Every patient could have several maintenance daily dose during treatment. 20 patients required dose adjustments and almost 48% (n = 13/27) of those adjustments didn't follow the recommended titration rules: Augmentation delay too short(n = 3.11%), unrecommended titration's levels(n = 10.37%). Every patient could have several titration' levels during treatment. Only 1 patients out of 4 with impaired renal function had a 75 mg reduction to 50 mg after dizziness complain. VAS(visual analogic scale) was used to assess clinical efficacy but pregabalin was associated most of the time with antalgic polymedication, so its clinical efficacy was difficult to establish. 5 patients (9%) stopped treatment for adverse effects (AE) (4 dizzinesses and 1 cytolytic hepatitis); but incomplete data probably underestimated AEs. Nevertheless, dose reduction since January 07 (initiation and maintenance) consecutive of AEs, was confirmed thanks to 1 month study (May 07)(n = 7/14.50%), less than 150 mg/day when beginning the treatment).
Conclusions: Preliminary data issued from this drug use review demonstrate pregabalin utility and interest. Doses and safety profiles appear quite different from published recommendation. Further dose studies are required to optimize pregabalin dose strategies for neuropathic pain.

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Keywords: Pregabalin, Neuropathic pain, Clinical study

NUTR-66 Compliance with prescription information sheet of trastuzumab prescriptions in a tertiary level Spanish hospital

Jaime Vargas[1], **Beatriz Garcia**[1], Maria Conde[1], Alberto Jimenez[1], Jorge Hernandez[1], Maria A. Fernandez[1]

[1]Pharmacy Service, Virgen de las Nieves University Hospital, Granada, Spain

Background and Objective: To determine the degree of compliance of medical prescriptions of Trastuzumab with conditions of use described in the Prescription Information Sheet (PIS) before its approval in Spain for Early Breast Cancer (EBC).

Design: Prospective study of the utilization of Trastuzumab during a 6-month period (January–June 2006). Data were collected from medical prescriptions after their validation by the pharmacist of the Centralized Cytostatic Unit (CCU). Other data required were gathered from the Clinical Records. Official indications were taken from the PIS: Herceptin should only be used in patients whose tumours have HER2 overexpression at a 3+ level as determined by immunohistochemistry: a) monotherapy in third-line or subsequent treatments, b) in combination with taxanes in first-line treatments. Compliance with PIS was stratified into Grade I (Tumour localization, HER2, intention-to-treat, line and association), Grade II (Tumour localization, HER2, intention-to-treat and line), Grade III (Tumour localization, HER2 and intention-to-treat), Grade IV (Tumour localization and HER2) and Grade V (Tumour localization).
Setting: Patients starting Trastuzumab treatment in the Breast Unit of a tertiary Spanish hospital during the study period.
Main Outcome Measures: Tumour localization, HER2 overexpression, intention-to-treat, line and association.
Results: Fifty-four regimens were analyzed in 33 patients: 10 regimens (18.51%) were assessed as grade 1 compliance, 21 (38.88%) as grade II, 27 (50%) as grade III, and 32 (59.25%) as grade IV, with all regimens (100%) achieving grade V compliance. Grade I results were due to: 40.7% of regimens corresponding to tumours with ++ rather than +++ overexpression of HER2; utilization of 16 non-indicated associations; and 31 regimens in non-approved treatment lines. Trastuzumab was used in 10 cases of EBC (18.5%).
Conclusions: Only 18.51% of regimens met all indications. Trastuzumab was used in EBC before its authorization on the basis of existing evidence. It was used only in breast cancer and, in some cases, without the mandatory criterion of +++ HER2 overexpression.
Keywords: Degree of compliance, Prescription information sheet, Trastuzumab

PK-182 Vancomycin dosage in critically ill patients undergoing venovenous haemodiafiltration

Ana Soler[1], Rosa Farré[1], Antoni Roglan[2], Maria Goretti Lopez-Ramos[1], Maria Antonia Mangues[1]

[1]Pharmacy Department, [2]Intensive Care Unit, Hospital de la Santa Creu i Sant Pau, Barcelona, Spain

Background and Objective: Vancomycin is usually prescribed in intensive care units to treat infections caused by gram positive bacilli. Vancomycin requirements in patients with acute renal failure undergoing continuous venovenous haemodiafiltration (CVVHDF) have shown a large variability.
Objectives:

- To study the pharmacokinetic parameters of vancomycin in critically ill adult patients undergoing CVVHDF.
- To identify vancomycin dosage required to achieve plasma concentrations within the therapeutic range (Cmin 5–15 mg/L).

Design: Retrospective study in critically ill adult patients with acute renal failure undergoing CVVHDF and requiring vancomycin therapy from January 2005 to June 2007. The study included 29 patients (19 men and 10 women). Age ranged from 29 to 83 years (mean 62.5 ± 13.8). Serum levels were determined by Fluorescence Polarization Immunoassay (TDX, Abbott). Individual vancomycin pharmacokinetic parameters were estimated by a Bayesian method (two-compartment model) applying the PKS program (Abbott Base PK System Version 1.10). An individualized dosage schedule was designed according to the pharmacokinetic parameters for each patient.
Setting: Intensive Care Unit and Clinical Pharmacokinetics Section, in a 723-bed tertiary-care university hospital.
Main Outcome Measures: 1. Pharmacokinetic parameters of vancomycin. 2. Vancomycin dosage requirements.
Results: The mean central volume of distribution (Vc, L/Kg) and elimination half-life (h) (X ± SD) were 0.23 ± 0.03 and 33.7 ± 18.5, respectively. The mean daily dose of vancomycin required to reach the specified target concentrations, after dosage individualization, was 8.5 ± 3.3 mg/kg/day. The dosing interval was every 24 h for 18 of 29 patients (62.1%), and every 48 h for 9 of 29 patients (31.0%). The long half-life suggests the appropriateness of a loading dose.
Conclusions: An initial dose of 15 mg/kg, followed by a maintenance dose of 8–10 mg/kg/24 h can achieve levels within the therapeutic range in 2/3 of patients. Therapeutic drug monitoring is also advisable in view of the wide variability in these patients, probably due to daily replacement fluids and residual renal function.
Keywords: Vancomycin, CVVHDF, Pharmacokinetics

PK-203 Effect of co-treatment with valproic acid on carbamazepine elimination in epileptic patients – a population pharmacokinetic study

Katarina Vucicevic[1], **Branislava Miljkovic**[1], Marija Petronijevic[1], Milena Pokrajac[1], Ales Mrhar[2], Iztok Grabnar[2]

[1]Department of Pharmacokinetics, Faculty of Pharmacy, University of Belgrade, Belgrade, Serbia, [2]Department of Pharmacokinetics, Faculty of Pharmacy, University of Ljubljana, Ljubljana, Slovenia

Background and Objective: Many factors contribute to interindividual variability in response to carbamazepine (CBZ) therapy in epileptic patients. There are controversial reports regarding effect of valproic acid (VPA) on CBZ pharmacokinetics. Therefore, the objective of this study was to investigate the possible effect of VPA on CBZ elimination.
Design: In total 379 epileptic outpatients' data were retrospectively collected from routine therapeutic drug monitoring. Patients were on stable dosage regimen for at least 14 days, mono or polytherapy, and 1–2 concentrations per patient were available. In the model building set, 28.3% of patients were co-treated with VPA (average dose 1039 ± 442 mg/day), while model validation set included 17% of patients on VPA co-therapy (average dose 1219 ± 432 mg/day). Pharmacokinetic analysis was performed by a population modelling approach using NONMEM and Visual-NM, assuming one-compartmental model with first-order absorption and elimination. FOCE method was used.
Setting: The study was conducted at the Institute of Mental Health, Belgrade, Faculty of Pharmacy University of Belgrade, Faculty of Pharmacy University of Ljubljana.
Main Outcome Measures: CBZ was best described by one-compartmental model. The model included an estimate of the interindividual variability for CBZ clearance (CL/F).
Results: Observation of the plots of posterior Bayesian estimates of CBZ CL/F obtained by the base model versus VPA daily dose, indicated a step-like increase when VPA dose was greater than 750 mg/day. Therefore, the influence of VPA on CBZ CL/F was tested by the following equation: TVCL = THETA(1)*(THETA(2))**VPA, where VPA is 1 if dose VPA > 750 mg/day or 0 otherwise. Interindividual variability of CBZ CL/F was best described by exponential error model (CV was 36.5(31.6–40.7)%), while additive error model most adequately characterized residual variability in CBZ concentration (1.18(0.98–1.36) microg/mL). The effect of VPA on CBZ CL/F was 1.18(1.03–1.33) in the final multiplicative model.
Conclusions: Since total CBZ concentration was measured, and due to the fact that VPA is highly bound to plasma proteins (90%), this slight increase in CBZ CL/F might be caused by displacement from plasma proteins. In order to support this assumption data on unbound CBZ concentrations is required. Hence, the results in this study showed that during VPA co-therapy CBZ CL/F is increased by 18% if dose VPA > 750 mg/day, and CBZ concentration (unbound fraction,

and its active metabolite) should be monitored in order to evaluate clinical importance of VPA-CBZ interaction.
Keywords: Epilepsy, Carbamazepine, Valproic acid, Pharmacokinetics, NONMEM

PT-34 Clinical pharmacist's intervention to improve the management of potential drug-drug interactions in a department of internal medicine

Priska Vonbach[1], André Dubied[2], Jürg H. Beer[3], Stephan Krähenbühl[4]

[1]Hospital Pharmacy, University Children's Hospital, Zürich, [2]Hospital Pharmacy, [3]Department of Medicine, Cantonal Hospital of Baden, Baden, [4]Clinical Pharmacology and Toxicology, Universitiy Hospital Basel, Basel, Switzerland

Background and Objective: The aim of this study was to improve the clinical management of potential drug-drug interactions (pDDIs) by pharmacist interventions during hospitalization and at hospital discharge.
Design: During the first study period inpatients in three medical wards and during the second study period patients discharged from three medical wards were screened for major and moderate pDDIs using the drug interaction screening program Pharmavista. After assessment for clinical relevance of the detected pDDIs by a pharmacist, written recommendations and information about the pDDIs were sent to the physicians. Feedback from the physicians and their subsequent implementations were analyzed.
Setting: Department of internal medicine at the Cantonal Hospital of Baden.
Main Outcome Measures: Improvement of the clinical management of pDDIs.
Results: During the first study period, 502 inpatients were exposed to 567 major or moderate pDDIs. 419 (74%) of these pDDIs were judged clinically relevant by the pharmacist. 349 recommendations including pDDI information, and 70 simply information leaflets were handed out to the physicians. 80% (278 of 349) of the recommendations were accepted. At hospital discharge, in 78% (47 of 60 reviewed instances, which were accepted) the drug changes due to the recommendations were implemented.

During the second study period, 792 patients at hospital discharge were exposed to 392 major and moderate pDDIs. 258 (66%) pDDIs were assessed as clinically relevant by the pharmacist. 247 recommendations including pDDI information, and 11 simply information leaflets were sent to the physicians. 73% (180 of 247) of the recommendations were accepted. One year after hospital discharge, 11 of 13 drug changes due to recommendations were still existent.

Overall, in 50% and 46%, respectively, of all major and moderate pDDIs detected by Pharmavista, clinical management was adapted accordingly.
Conclusions: The management of clinically relevant pDDIs can be improved by physicians' advice of clinical pharmacists. Changes in medication due to pDDIs were found to persist up to one year after hospital discharge.
Keywords: Potential drug–drug interactions, Intervention study, Clinical management

PT-95 Sunitinib in advanced metastatic renal cell carcinoma

Diana González[1], Gema Casado[1], Ana Sierra[1], Angeles M. Tacoronte[1], Alicia Herrero[1], Pilar Zamora[2], Esperanza Jimenez[1]

[1]Pharmacy, [2]Oncology, La Paz University Hospital, Madrid, Spain

Background and Objective: Current treatment options for metastatic renal cell carcinoma (mRCC) are limited and there is a need to identify novel and effective therapies. Sunitinib is an oral multitargeted tyrosine kinasa inhibitor, which has shown activity in cytokine-refractory metastatic RCC patients. This agent inhibits vascular endothelial grown factor receptor and platelet derived growth factor receptor. The purpose of this study is to analyse the efficacy and safety profile of this agent in patients with mRCC.
Design: Retrospective assessment in seven patients treated with sunitinib as second-line treatment in mRCC. Data were obtained from clinical histories and informatic records from the oncology pharmacy department.
Setting: Oncology and Pharmacy Department. La Paz University Hospital. Madrid. Spain.
Main Outcome Measures: Assessment of clinical response and adverse events.
Results: Seven patients were evaluated (4 men, 3 women), median age was 57 (41–77). Six of them presented bone, lung, brain or liver metastases, all patients were treated with vinblastine and IFN-alpha as first-line therapy. Patients received sunitinib at a starting dose of 50 mg per day in repeated 6-week cycles for 4 consecutive weeks followed by 2 weeks off treatment. They started therapy with sunitinib because of progressive disease in 3 patients and adverse events in 4 patients on previous therapy. Sunitinib was discontinued in four of them, causes were: adverse events (1 patient), volunteered dropout (1 patient) and progressive disease (2 patients). The median progression-free survival was 6.2 months. The median number cycles received was six and 3 of the 7 patients are still in treatment at the time of data analysis.

Dosage was reduced 25 mg daily because of unacceptable toxicity: hand-foot syndrome(1 patient) and hypothyroidism (1 patient). The most common adverse events experienced were: asthenia (6 patients), diarrhea (3 patients), damaged nails(2 patients), insomnia (2 patients), dermatitis (3 patients)and dehydration (2 patients).
Conclusions: In our experience, sunitinib has demonstrated an acceptable efficacy and safety profile as a single agent in second-line therapy for patients with mRCC.

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Keywords: Sunitinib, Carcinoma renal, Metastatic

PT-104 Antibiotic drug monitoring quality assessed by a clinical pharmacist: qualitative study

E. Ampe[1], A. Spinewine[1], Y. Glupczynski[2], B. Delaere[3], J.M. Feron[4], J. Pierart[5], C. Bouland[6], J.D. Hecq[7], P.M. Tulkens[1]

[1]Centre for Clinical Pharmacy, Université catholique de Louvain, Brussels, [2]Laboratoire de Biologie Clinique, [3]Service d'Infectiologie, Cliniques universitaires de Mont-Godinne, Yvoir, [4]Centre universitaire de Médecine Générale, Université catholique de Louvain, Brussels, [5]Unité d'anthropologie et de sociologie, Université catholique de Louvain, Louvain-la-Neuve, [6]Institut Bruxellois de Gestion de l'Environnement, IBGE, Brussels, [7]Pharmacie, Cliniques universitaires de Mont-Godinne, Yvoir, Belgium

Background and Objective: (i) gaining insight in issues causing poor performance of antibiotic therapeutic drug monitoring (TDM) revealed by an observational study (companion abstract) (ii) collecting the perception of health care professionals and laboratory personnel on current TDM practice (iii) exploring approaches for optimizing TDM (collaboration with a clinical pharmacist).
Design: Focus group interviews with independent moderators with: (i) representative sampling of involved health care providers;

(ii) validated questionnaire to guide discussion; (iii) fostering group interaction to generate data; (iv) post-interview analysis of verbatim transcripts with specialized software (QSR Nvivo 1.2 for Windows®), based on the grounded theory approach (classification of emerging themes).
Setting: 3 groups: prescribing physicians (7), nurses (10), and laboratory technicians (6), all involved in antibiotic TDM as performed in orthopaedic surgery, general surgery, neurosurgery, vascular surgery, haematology, and pulmonary wards in a 400 beds teaching hospital.
Main Outcome Measures: (i) issues causing poor antibiotic overall TDM performance, (ii) approaches for optimizing TDM performance supported by group consensus
Results: Key identified Issues: (i) nursing work overload; (ii) insufficient education to pharmacokinetics and lack of specific training; (iii) insufficient information communication and lack of coordination and involvement of all stakeholders; (iv) conflicting guidelines; (v) lack of perception of positive benefit/risk ratio.

Approaches for optimization (consensus): (i) continuous education of all stakeholders; (ii) daily multidisciplinary collaboration with infectious disease physicians and clinical pharmacists; (iii) simplification and uniformization of guidelines and procedures; (iv) implementation of a simpler administration scheme (v) increased staffing.
Conclusions: Correct performance of TDM and its implementation in routine clinical care needs to be critically assessed and appears to be mainly dependent on non laboratory-related parameters.
Keywords: Therapeutic drug monitoring, Qualitative study, Clinical pharmacist

PT-106 Impact of the new scientific evidences in the treatment of the anaemia with erythropoietin

Juan Hidalgo[1], **Juan Abellón**[2], Raquel Mariscal[1], Encarnación Atienza[1], Rocío Gavira[1], Paloma Fajardo[3], Elsa Montilla[4], Isabel Baena[3], Pilar Gómez[1]

[1]Hospital Pharmacy, Hospital General de Jerez de la Frontera, Jerez de la Frontera, [2]Hospital Pharmacy, Hospital Reina Sofía, Córdoba, [3]Pharmaceutical Care Research Group, University of Granada, Granada, [4]Community Pharmacy, Community Pharmacy, Algeciras, Spain

Background and Objective: New data published at the end of 2006 and the beginings of the 2007, suggest not to exceed a haemoglobin level of 12 g/dL to avoid cardiovascular morbility-mortality in patients with anaemia and chronic kidney disease (CKD) treated with recombinant human erythropoietin (rHuEPO). Before these evidences the optimal target haemoglobin levels was greater than 12 g/dL.

Our aim is to evalue if these new published evidences have changed the clinical practice in pre-dialysis CKD patients.
Design: Retrospective observational study. All the pre-dialysis patients who received rHuEPO were including. In order to evaluate the possible changes in clinical practice, we measured the levels of haemoglobin prior to the publication of evidences (March–May of 2006: group 1) and after the publication of these evidences (March–May of 2007: group 2). We made a descriptive analysis of independent data.
Setting: Department of hospital pharmacy.
Main Outcome Measures: The main outcome measures were: age, sex, mean Glomerular Filtration Rate (GFR), mean haemoglobin level, mean haematocrit and type of rHuEPO used.
Results: We studied 196 patients (95 in group 1 and 101 in group 2). Patients age ranging between 23 to 96 years (median = 73 years). The proportion of women was 61.2%. Mean GFR for both years located around 25 ml/min and the most frequent stages of renal injury were 4 and 3. The most rHuEPO used was Darbepoetin alfa (71.4% of patients). Mean haemoglobin level for group 1 was 11.25 g/dL (SD = 1.43) and 11.61 g/dL (SD = 1.43) for group 2. Mean haematocrit was 34.98% (SD = 4.53) and 35.9% (SD = 4.42) for group 1 and 2, respectively.
Conclusions: Our nephrologist are cautious about of prescribing rHuEPO, not only after the publication of the new scientific evidences on this subject, but before this too. It′s worth questioning if clinical practice in ours hospital is different from the published evidences.

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Keywords: Anaemia, Erythropoietin, Chronic kidney disease

PT-112 Retrospective observation of converting cyclosporin to tacrolimus in renal transplant patients at middlemore hospital

Sanja Mirkov[1], Sharad Ratanjee[2], Andrew Knox[2]

[1]Pharmacy Department, [2]Renal Department, Middlemore Hospital, Auckland, New Zealand

Background and Objective: Tacrolimus (TAC)-based immunosuppression is effective in adult renal transplant patients with acute or chronic rejection or cyclosporin (CYA)-related toxicity. The conversion from CYA to TAC resulted in improved cardiovascular risk profile and increased prevalence of post-transplant diabetes mellitus (PTDM)compared with treatment with CYA.

The aim of this study was to review clinical documents for renal transplant patients and assess patients' outcomes.
Design: A retrospective review of clinical data. Excluded from the study were patients converted to TAC less than 3 months post-transplantation.

Statistical analysis (one sample paired 2-tailed t test) was performed using Microsoft Office Excel 2003. The graft survival was analysed with Kaplan-Maier survival curve using XL Stat software.

The study was approved by the Northern Ethics Committee, Auckland, New Zealand.
Setting: Tertiary care setting.
Main Outcome Measures: Mean serum creatinine, incidence of PTDM, mean total cholesterol, HDL cholesterol, LDL cholesterol, Total/HDL cholesterol ratio, mean blood pressure and antihypertensive scores, graft survival censored for death.
Results: Forty-four patients were converted to TAC more than 3 months post-transplantation from 1998 to June 2006.

Mean serum creatinine (SCr) increased in the 3 months prior to conversion from 149 μmol/L (95% CI 143–155) to 167 μmol/L (95% CI 159–174) at 12 months post conversion to TAC (p-value = 0.44). Thirty-four patients were taking CYA for more than 12 months. The mean SCr increased from 143 μmol/L (95%CI 138–148) at the 12 months prior to conversion to 172 μmol/L (95%CI 164–180) at 12 months post conversion (p-value 0.04). If SCr for seven patients who had an acute rejection episode were excluded, the mean SCr did not show any change in slope after conversion and showed a tendency to gradually increase from 148 μmol/L (95%CI 142–153) to 159 μmol/L (95%CI 151–167) 12 months post conversion (p-value 0.32)

Eleven out of 44 patients were affected by diabetes mellitus. Six patients were diabetic pre transplantation and remained diabetic post transplantation and post conversion to TAC. Two patients developed new onset PTDM post transplantation and two became glucose intolerant. After conversion to TAC, glucose intolerance resolved in one patient and one patient (2%) developed new onset PTDM.

In 34 patients converted to TAC more than 12 months post transplantation, mean total cholesterol was reduced from 5.3 to 4.5 mmol/L (p-value 0.02) and mean LDL cholesterol from 2.9 to 2.5 mmol/L (p-value 0.004).

In June 2006, 35/44 patients (79.5%) were taking TAC with a mean SCr of 158 +− 56 μmol/L. Four patients (9%) lost their grafts. Mean graft survival time was 81.2 months. 5-year graft survival was 80.8%.

Conclusions: Conversion from CYA to TAC was beneficial with respect to renal function and cardiovascular risk profile. The conversion had no added benefit on renal function in patients with stable renal function taking CYA more than 12 months post transplantation. The reported incidence of PTDM was found to be low (2%).

Keywords: Renal transplantation, Cyclosporin, Tacrolimus

PT-151 The role of the clinical pharmacist on oncology service: pain management

Divin Sevgen[1], Fikret Vehbi Izzettin[2], Serdar Turhal[3]

[1]Clinical Pharmacy Service, Yeditepe University Hospital, [2]Clinical Pharmacy Department, Marmara University – Faculty of Pharmacy, [3]Oncology Division, Department of Internal Medicine, Marmara University Hospital, Istanbul, Turkey

Background and Objective: Most of the cancer patients suffer from severe pain especially during the terminal phase of the disease. It is essential to monitor these patients to achieve adequate and successive pain management, not just because of the importance of the effects, side effects and overdose problems; but also to improve quality of life. The aim of the study was to evaluate oncology pharmacist interventions on pain management.

Design: Numeric pain scales was conducted prospectively among the 58 cancer patient who were over 18 years old and were selected randomly. Patients were separated into two groups: 29 of the patients was control group, pharmacist had been effectively included to the rest 29 patient's pain management strategies, which was pharmacist intervention group. All of the patients had been evaluated by numeric pain scales (time 0). The patients who were on pharmacist intervention group were monitored by pharmacist on treatment effectiveness and side effect profile every three days during the study. After one month, numeric scales were repeated (time 1). The interventions that pharmacist done were pain evaluation, suggestion on appropriate pain reliever, dose management, patient education and patient monitoring. Our therapy recommendations were made on the basis of the World Health Organization's analgesic ladder following the results of assessments.

Setting: Oncology Outpatient Unit of a university hospital

Main Outcome Measures: The demographic and diagnostic information of the patients were collected. The results of the evaluations via numeric pain scales were calculated by using arithmetic mean value.

Results: The mean of pain intensity was significantly decreased in pharmacist intervention group when compared with control group (2.35 ± 1.85 vs. 4.04 ± 2.10, $p = 0.003$) and between time 0 and time 1 (3.68 ± 1.93 vs. 2.35 ± 1.85, $p = 0.011$). The mean of pain's effect on daily activity was significantly decreased in pharmacist intervention group when compared with control group (3.34 ± 2.79 vs. 6.00 ± 2.57, $p = 0.010$) and between time 0 and time 1 (5.23 ± 3.01 vs. 3.34 ± 2.79, $p = 0.019$). The mean of drug effectiveness was significantly increased in pharmacist intervention group when compared with control group (86.30 ± 16.4 vs. 73.52 ± 26.6, $p = 0.040$) and between time 0 and time 1 (58.45 ± 36.9 vs. 86.30 ± 16.4, $p = 0.001$).

Conclusions: The harmonious working of the pharmacist with the other health care staff working in oncology unit, helped patients to achieve more effective pain management. In this study; pain intensity was decreased, pain interfered less with daily activities was, and the reported effectiveness of drugs was increased in the pharmacist intervention group compared to the control group. All these outcomes show that the clinical pharmacists have an important role in oncology services, especially pain management.

PT-191 A comparative study of prescribing errors requiring contact with the prescriber before dispensing in Norway, Estonia and Sweden

Svein Haavik[1], Daisy Vollmer[2], Anders Ekedahl[3]

[1]Institute for Pharmacy Practice Research, University of Bergen, Bergen, Norway, [2]University of Tarttu, Tarttu, Estonia, [3]Apoteket AB, University of Kalmar, Kalmar, Sweden

Background and Objective: To investigate and compare the frequency and nature of prescrbing errors requiring contact with the prescriber at community pharmacies in Norway, Estonia and Sweden.

Design: A protocol, based on a scheme originally presented by Rupp (1), revised and developed by Kennedy (2) and translated and transformed to the Nordic context by Haavik (3), was used in all three settings. In Norway the protocol was self-completed by the pharmacists; in Sweden and Estonia observers (trained students) recorded and classified the interventions.

Setting: Norway – 9 community pharmacies in southern and western Norway; Estonia – 4 community pharmacies in three cities; Sweden – 6 community pharmacies in 6 Swedish cities and 6 public pharmacies at 6 hospitals in Sweden.

Main Outcome Measures: Prescriptions with errors or ambiguities where the pharmacist decided to contact the prescriber to correct, clarify or complete the information on the prescription.

Results: The total numbers of dispensed prescriptions were: Norway 69,315, Estonia 13,221, Sweden 49,657 (community pharmacies) and 36,840 (public pharmacies at hospitals). The proportion of handwritten prescriptions and prescriptions where pharmacists contacted the prescriber was higher in Estonia than the other countries. Administrative problems – reimbursement issues; prescriber data and distribution and licensing issues – were the reason for more than one third (34–43%) of all contacts with the prescribers in all settings. However, the patterns of prescription problems with potential clinical hazards varied – in Estonia and Norway, errors concerning strength, administration form and number of doses were the most common errors and constituted 31 and 24% of the problems. In Sweden, errors concerning the prescribed dosage were the most common reasons.

Conclusions: The proportion of problem prescriptions requiring a clarifying contact with the prescriber was higher in Estonia compared to Norway and Sweden. The main reason may be that most prescriptions in Estonia were handwritten. Administrative problems (reimbursement and availability of prescribed products) constituted a similar large portion in the three countries. However, prescription problems with potential clinical consequences for the patients, varied.

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Keywords: Prescribing errors, Pharmacists interventions, Community pharmacy

PT-247 Cotrimoxazole induced agranulocytosis in an AIDS patient: a case report

Inge Sluyts[1], Sandrina von Winckelmann[1], Isabel Spriet[1], Ludo Willems[1]

[1]Pharmacy, University Hospital Leuven, Leuven, Belgium

Background and Objective: Cotrimoxazole is a frequently used antibiotic in AIDS patients to treat life-threatening infections, such as toxoplasmosis or Pneumocystis jiroveci pneumonia. The mechanism of action of both trimethoprim and sulfamethoxazole is based on interference with the folic acid pathway of the micro-organism. Rare, severe adverse drug reactions have been associated with cotrimoxazole, including dermatologic and hepatotoxic reactions and agranulocytosis. Our case report describes agranulocytosis related to the administration of a high dose of co-trimoxazole in an AIDS patient.
Design: Case report and literature review.
Setting: Medical intensive care unit, University Hospital Leuven, Belgium.
Main Outcome Measures: Evaluation of cotrimoxazole as a possible cause for agranulocytosis.
Results: A 60-year old man, with a new diagnosis of AIDS (CD4 count 20/mm^3), presenting with Salmonella bacteremia and neurological deterioration due to cerebral toxoplasmosis was admitted to the intensive care unit. He was immediately intubated. To treat toxoplasmosis, cotrimoxazole was started in a dose of 1600 mg SMX/320 mg TMP QD. 6 days later the patient developed leucopenia (absolute wbc count: 1.57 × 109/L, neutrophils: 1.4 × 109/L). Folinic acid 15 mg OD was associated to restore white blood cell count. Neutrophils further dropped to attain its nadir (0.4 × 109/L) on day 8 of cotrimoxazole therapy. Cotrimoxazole was stopped and clindamycin 600 mg TD was used instead. Neutrophil count restored, normalizing on day 2 after stopping cotrimoxazole.

This event was attributed to the administration of cotrimoxazole. The time relation between the administration of cotrimoxazole and the onset of neutropenia as well as the normalisation of neutrophils was clear. Other explanations, such as the contribution of concomitant medication (ranitidin, ceftriaxon, ethambutol, isoniazid, rifampicin, aciclovir, amphotericin B, enoxaparin)could be ruled out. The Naranjo score, which estimates the probability of adverse drug reactions, is 6.

The use of folinic acid as rescue therapy in association with cotrimoxazole is controversial, as it can theoretically antagonise the anti-infective action of cotrimoxazole. Therapeutic failure in AIDS patients, receiving this combination for Pneumocystis jiroveci pneumonia, has been reported. Nevertheless, we decided to start folinic acid to further prevent nosocomial infections in this severe immunocompromised host. We don't know whether folinic acid contributed to quick recovery of neutrophil count in our patient. Further studies are necessary to clarify its role as rescue agent during treatment with folic acid antagonists.
Conclusions: This case report illustrates that cotrimoxazole, frequently used in opportunistic infections, can be associated with agranulocytosis. This dangerous complication in immunocompromised patients with severe infections must be prevented, although the effectiveness of folinic acid as rescue therapy is still a matter of debate.

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Keywords: Cotrimoxazole, Agranulocytosis

DI-70 Eczematous skin reaction of the palm after intravenous immunoglobulin infusion: a case report

Claire Chapuis[1], Nathalie Sylvoz[1], Céline Villier[2], Pierrick Bedouch[1], Gérard Besson[3], Benoît Allenet[1], Jean Calop[1]

[1]Pharmacy, [2]Pharmacovigilance, [3]Neurology, University Hospital, Grenoble, France

Background and Objective: Intravenous immunoglobulin (IVIG) therapy is increasingly used in inflammatory and autoimmune disorders, because of its therapeutic benefit and its good safety profile. Cutaneous adverse events are rare and include prurit, rash, alopecia and eczema. In the literature, about 40 cases of eczematous skin reactions have been reported. Most of the cases were treated for a neurological or neuromuscular disease. Erythematous eruptions on hands and feet have been notably reported after high-dose infusion. In most of the cases, the eruption was progressively extending to involve the entire body. When IVIG were readministered, eruptions were more rapid and more intensive. We report an eczematous skin reaction of the palms after IVIG infusion without extensive eruption, in spite of three administrations.
Design: Case report.
Setting: Neurology ward, University Hospital, Grenoble, France.
Main Outcome Measures: A 57-year-old man was treated with IVIG (Tegeline®, LFB, France) for an inclusion body myositis. He developed a skin reaction, 8 days after the end of a 5 days IVIG infusion (dose of 0.4 g/kg was given daily for 5 consecutive days). The eruption was a non-pruriginous erythematous maculopapulovesicular rash located on the palms. This reaction occurred 8th day after completing the second therapy and did not extend. The lesions regressed progressively with topical application of fatty ointment. Three days after the third infusion, the same lesions reappeared, and regressed the same way.
Results: Clinical Pharmacist with the help of pharmacovigilance experts and Doctor worked collaboratively: because of the chronology of exposure to other treatments, intrinsic imputability and recurrence on reintroduction, we ruled out an adverse drug reaction to any other medication. We decided not to interrupt the infusion. We advised the patient to continue fatty ointment application and to tell the healthcare team if the reaction became more serious.
Conclusions: Dermatologic adverse reactions such as eczematous skin reactions are rare and usually mild. There is no reason to limit the use of IVIG in a case like this one, as long as the treatment is effective. However, a narrow clinical and biological follow-up is required. If necessary, this adverse effect can be prevented by antihistamines or even steroids.
Keywords: Eczema, Intravenous immunoglobulin, Palms

DI-81 Drug herb interactions with oral anticoagulants

Joan Peris[1], Begoña Pascual[2], Laura García[2], Nieves Muro[2], Gemma Surra[1], Teresa Vinuesa[1]

[1]Hematology Department, [2]Pharmacy Department, Municipal Hospital of Badalona, Badalona, Spain

Background and Objective: The vitamin-K antagonists are drugs widely used as thrombosis therapy and its prophylaxis. The use of

anticoagulants must be monitored closely by physicians, because this products have a narrow therapeutic index. Numerous interactions with herbs are documented, either increasing or decreasing the anticoagulant effect.

Our main objective is to identify this interactions in our surgery and if they are clinically significant.

Design: Six months observational study; interviewing patients with their INR alterated about herbs that they were taking at that moment. Literature review.

Setting: The anticoagulant oral treatment surgery.

Main Outcome Measures: The two oral anticoagulant drugs available in Spain are acenocoumarol and warfarin.

The international normalized ratio (INR) is the laboratory test used to measure therapeutic efficacy and safety of vitamin-K antagonists. A control test is done every four weeks and if necessary it can be done earlier.

Results: Among 621 patients with INR > 4, six of them were taking herbs at the same time, and we could relate the increase of the effect of oral anticoagulants to those products.

One of this patients who was taking dandelion (Tarxacum officinale) had a 4 INR. An other one who was taking chamomille (Matricaria capensis) and passion flower (Passiflora incarnata) had a 7.8 INR. All of these products have coumarins compounds.

Two patients who were taking equinacea (Equinacea purpurea, Equinacea angustifolia) also had their INR test altered: one had a 5.2 INR and the other one 4.9. An other one was taking bilberry (Vaccinium myrtillus) and had a 16.16 INR. Both, equinacea and bilberry inhibit different isoenzimes of cytochrome P450.

The last patient was taking garlic oil (Allium sativum) and had a 4 INR. Garlic increases the anticoagulant effect.

Conclusions: It is commonly believed that herbal products are inofensive, that is the reason why mainly of the patients do not take medical advise before starting a treatment with them. However, there can appear interactions with the usual treatment. If we fix on the vitamin-K antagonists the risk resides on the hemorragic or strokes events.

In conclusion, we believe that patients should be educated about the potential risk of using herbal products while being treated with vitamin-K antagonists.

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Keywords: Vitamin-K antagonists, Herbs, Interactions

DI-103 Non fatal aplastic anaemia due to clopidogrel

Nicolas Simon[1], Marc Wetterwald[2], Frédérique Bonnevie[2], Maxime Bemba[2], Marie Beaumont[2], Jean-Michel Pignon[2], Caroline Muller[1], Marie Perrinet[1], Frédérique Barrier-Danicourt[1], Sandrine Horrent[1], Sébastien Hochart[1], Bertrand Décaudin[1], Jean-Pierre Résibois[1], Pascal Odou[1]

[1]Pharmacy Department, [2]Haematology Department, Dunkerque Hospital, DUNKERQUE, France

Background and Objective: Haematological side effects with clopidogrel are considered rare. Three cases of fatal aplastic anaemia (AA) were reported in the literature, We report here the first case of non fatal AA possibly due to clopidogrel,

Design: Case report and analysis based on clinical data and literature review,

Setting: Pharmacy and Haematology departments, Dunkerque Hospital

Main Outcome Measures: clopidogrel side-effect, co-morbidities, pharmacovigilance

Results: A 41 year-old man, treated with clopidogrel after coronary stenting, is hospitalized for AA (Neutrophils: 0G/l (1.7–7G/l); haemoglobin: 10.8 g/dl (12–16 g/dl); platelets: 6G/l (150–450G/l)). His permanent medications were insulin, perindopril, omeprazole, atorvastatine, bisoprolol, and acetylsalicylic acid. Clopidogrel (75 mg/d) was prescribed 3 weeks before AA occurence. Clopidogrel is withdrawn and AA therapy is started, consisting in the sequential association of anti-thymocyte globulin therapy (15 mg/kg) and ciclosporin (5 mg/kg/d) in a filtered-air room. But the severe co-morbidities lead to early stop ciclosporin, then relayed by androgen therapy (norethandrolone). Finally, at 12 weeks from the diagnosis, the evolution ends to a resolution of AA, but with platelet-transfusion dependance.

After the elimination of the other aetiologies, iatrogenic cause is envisaged. To blame clopidogrel is difficult with regard to the other drugs, especially perindopril and omeprazole known to induce bone marrow failures. Four arguments lead to target clopidogrel: (i) the length of treatment by perindopril and omeprazole without complications, (ii) the timing between the onset of AA and the addition of clopidogrel to treatment, (iii) the resolution of AA whereas neither perindopril nor omeprazole were withdrawn, and (iv) the support of the literature.

Conclusions: Clopidogrel seems to be responsible of this side effect. We unfortunately lack in specific biological tests to prove it.

Keywords: Clopidogrel, Side-effects, Pharmacovigilance

DI-141 Pathways of information on antidepressants in flemish psychiatric hospitals: experiences of health care professionals and patients

Franciska Desplenter[1], Gert Laekeman[1], Steven Simoens[1]

[1]Research Centre for Pharmaceutical Care and Pharmaco-economics, Katholieke Universiteit Leuven, Leuven, Belgium

Background and Objective: Informing patients on their medicines is a patient right. What does current information provision on antidepressants to patients with a depression admitted to a psychiatric hospital look like? What is the current practice of health care professionals? What are the experiences of patients? This study aims to explore current practice on drug information provision in psychiatric hospitals.

Design: A qualitative study consisting of semi-structured interviews with separate interview guides for health care professionals and for patients. Interviews were tape recorded, verbatim transcribed and analyzed using NVivo7 software.

Setting: Eight Flemish psychiatric hospitals.

Main Outcome Measures: Identification and evaluation of current approaches to drug information provision on antidepressants from the point of view of health care professionals as well as patients.

Results: Patients get information on antidepressants, firstly, through psychiatrists and, secondly, through nurses. Hospital pharmacists have a supporting role.

The approach in giving information depends on patient characteristics and his/her mental state. Information is provided mainly orally. Leaflets are not frequently distributed to patients. Patients also get information on antidepressants during psycho-educational sessions. On request, patients can read a package insert under supervision of a health care professional.

Health care professionals consider non-verbal cues of patients to verify if information has been understood. Information is repeated when the first instruction was not clear for patients.

There are no systematic interdisciplinary contacts on information interventions.

Patients as well as health care professionals are satisfied with current practice on information provision. Health care professionals reported lack of time and lack of interdisciplinary contacts as negative aspects. Patients indicated that health care professionals take too little initiative to give information about medicines. Positive aspects reported by health care professionals are the hospitals' openness and the opportunity for patients to ask their questions to psychiatrists as well as nurses. Suggestions for improving practice are: providing more medication information to patients, in particular on side-effects; enhancing the availability of easy readable information; and organizing continuing education for nurses on medicines.

Conclusions: Patients are informed about their antidepressants through various pathways. However, there seems to be room for improvement as a number of suggestions were formulated to support these pathways of drug information.

Keywords: Medication information, Antidepressant, Psychiatry

DI-157 Management and prevention of intravenous immunoglobulin adverse effects

Claire Chapuis[1], Christine Chevallier[1], Céline Villier[2], Pierrick Bedouch[1], Benoît Allenet[1], Jean Calop[1], Gérard Besson[3]

[1]Pharmacy, [2]Pharmacovigilance, [3]Neurology, University Hospital, Grenoble, France

Background and Objective: The use of intravenous immunoglobulin (IVIG) is expanding. The risk for adverse effects can be minimized by taking some precautions. There are yet no standardized practice guidelines for prevention and management of adverse effects occurring during the infusion, and there is a need for it. The purpose was to conduct a study of their knowledge among the nurse community and to make a review of the best practices.

Design: We search in Medline and carried out a questionnaire for nurses. We evaluated knowledge and practices of 14 nurses in Neurology, Pneumology and Haematology units, experienced in intravenous immunoglobulins administration, in order to define their role and the prescribers role in ensuring patients safety during therapy. We used all information and synthesized it in a table. For every type of adverse reaction, we indicated mechanism, frequency, seriousness, risk factors, practical guidelines of management and prevention and actor. The guidelines were reviewed by experts (pharmacist in charge of human derivative products, pharmacovigilance experts and neurologists).

Setting: University Hospital, Grenoble, France.

Main Outcome Measures: Formalisation of practical guidelines on prevention and management of intravenous immunoglobulin adverse effects, for prescribers and nurses in the local hospital network and possibly other hospitals.

Results: Nurses always checked the doses before administration (14/14), always prepared the product aseptically (14/14), warmed up the product until it reached room temperature (12/14), but only few recorded the patients tolerability during the infusion (9/14), and very few knew that most adverse events could be minimized first by slowing down the rate of infusion (4/14). All nurses called a doctor as an adverse effect appeared.

Conclusions: Nurses must be involved in the management of adverse effects, even if the prescriber remains the one who makes the prevention by evaluating risk factors, co-medications, dosing and frequency of treatment and the one who makes the decision to interrupt the treatment if an adverse effect occurs. The Clinical Pharmacist in care units works collaboratively with both prescriber and nurse. He plays a central role for preventing drugs' adverse effects while counselling every member of the healthcare team

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Keywords: Adverse effects, Intravenous immunoglobulin, Management, Prevention

DI-175 Fludrocortisone 10–50 μg: elaboration of a patient information leaflet and satisfaction survey

Assia Fseil[1], Lila Khazai[1], Stephanie Weber[1], Yvette Brasseur[2], Marie Pierre Berleur[2], Christian Doreau[1]

[1]Pharmacy Outpatient Unit, [2]Regulation Unit, Agence Générale des Equipements et Produits de Santé AP-HP, Paris, France

Background and Objective: Fludrocortisone tablets 10–50 μg (F) is mainly used in the treatment of adrenocortical insufficiency. It may also be used in treatment of orthostatic hypotension. F is manufactured by AGEPS (public special-order manufacturer) and dispensed to outpatients by hospital pharmacies, as a "hospital preparation".

In order to follow GMP guidelines, a patient information leaflet for F was elaborated in our pharmacy outpatient unit. The leaflet was approved by our Regulation Unit. To evaluate the usefulness of this leaflet and to improve its quality, we performed a patient satisfaction survey.

Design: During 14 days, for every dispensation of F, a leaflet was presented to the patient and an anonymous satisfaction survey was performed.

Setting: Pharmacy Outpatient Unit, Agence Générale des Equipements et Produits de Santé (AGEPS) (AP-HP), Paris, France.

Main Outcome Measures: The questionnaire consisted of three items: general information about patient and its treatment; patient's knowledge of F before reading the leaflet (uses, precautions, adverse events, storage); patient satisfaction of leaflet (general presentation, language simplicity, information volume, utility).

Results: 70 patients answered the questionnaire. The mean age was 47 years (3–88 years). Mean F treatment duration was 17 years (2 months–43 years).

40% of patients were already informed about F: 96% by physicians and 4% by associations and internet. 97% knew the indication (90% adrenocortical insufficiency and 10% orthostatic hypotension).79% knew about precautions, 56% knew about side effects, and 76% knew about storage conditions.

4% of patients did not read the leaflet and had no opinion about satisfaction items. 96% were satisfied of general presentation. Language was understandable for 94%, and non understandable for 2%. Information volume was sufficient for 88%, insufficient for 4%, and too large for 4%. Leaflet was useful for 93% of pts. Patients who found the information insufficient suggested the following items: results of clinical trials, management of acute situations due to disease or F, and contacts of qualified centres in case of serious events.

Conclusions: Nearly half of the patients were informed about F by their physicians, but information is communicated orally without written support. The majority of patients treated by F knew about precautions, side effects, and storage conditions. However, patients were satisfied of our information leaflet and find it useful.

Leaflet appears to be a good tool to communicate information from the pharmacist to the patient when not available in the packaging.

Keywords: Fludrocortisone, Leaflet

DI-184 Effects of pharmaceutical interventions in geriatrics: limitations of prescription software

Véronique Duhalde[1], John Toft[2], Karine Maréchal[2], Marie-claire Farjou[2]

[1]Pharmacy, University Hospital PURPAN, Geriatric Hospital Casselardit, [2]Pharmacy, University Hospital PURPAN, Geriatric Hospital Casselardit, Toulouse, France

Background and Objective: As the Pharmaceutical team of the geriatric unit, we ensure an analysis of the prescriptions with a computer prescription program, optimised by the presence of pharmacy students in the wards, who gather and send us information on the patients. A function included in the software allows us to write down recommendations.
Aim of the study: to evaluate the effect of our interventions and to determine the best vehicle for the transmission of information.
Design: 3 week prospective study. Were analysed: drugs, problems, interventions (coded according to the SFPC*'s pharmaceutical interventions form) and their consideration by the clinicians.
*SFPC: French society of clinical pharmacy.
Setting: Geriatric wards in a large teaching hospital.
Main Outcome Measures: Categorisation into types of pharmaceutical interventions.
Results: 161 pharmaceutical interventions were formulated concerning 98 patients (150-bed hospital), of an average age of 84 +/− 7 years [63–97], and a sex-ratio of 0.53. According to the ATC classification, the main therapeutic classes concerned were: Nervous System (30%), Cardiovascular (19%) and Haematology (16%).
Dosage adaptation (to creatinine clearance) represent 29% of pharmaceutical interventions, drug introductions (14%), withdrawals (16%) and substitutions (14%). 9% of our interventions concerned an inappropriate use of the software.

The prescribing clinicians agreed to: 28 dosage adaptations (out of 47 recommended), 18 substitutions (out of 23), 15 withdrawals (out of 25), 13 introductions (out of 23), 8 treatment optimisations (out of 16), 9 drugs monitoring (out of 14) and 11 recommendations about the use of the computer system (out of 12).

Of these 102 recommendations taken into account (63%), within a period of 2 days for most (n = 84), 53 involved the intervention of a pharmacy student, 33 were given only via the computer software, and 16 via a telephone call.
Conclusions: Computerisation of prescriptions is an indispensable tool in order to make the pharmaceutical distribution circuit safer. However, its use as a vehicle for pharmaceutical interventions is limited, as shown by this study. It is impossible to analyse a non-response of our recommendations: is our advice even red, is it considered as inadequate? A discussion with the clinician (via pharmacy students or on the telephone) allowing a constructive exchange of knowledge, leads to a better transmission of recommendations.
Keywords: Pharmaceutical interventions, Geriatrics

DI-194 Hazardous drugs handling in hospital: a standardized toxicological screening method to evaluate occupational risks

Laure-Zoe Kaestli[1], Caroline Fonzo-Christe[1], Jules Desmeules[2], Pascal Bonnabry[1]

[1]Pharmacy, [2]Clinical Pharmacology and Toxicology, HUG, Geneva, Switzerland

Background and Objective: In hospital setting, employees may be exposed to hazardous drugs. Risks and protective measures needed when handling parenteral cytotoxic drugs are well described, whereas information related to drugs like monoclonal antibodies or antivirals are lacking. We developed a standardized method to evaluate drugs potential toxicity and occupational risks taking into account the pharmaceutical forms of the drugs to balance the risks.
Design: Development of an algorithm for toxicity evaluation using Material Safety Data Sheet (Risk and Safety phrases), International Agency for Cancer Research (IARC) classification and official manufacturers' data.

1. Evaluation of chronic toxicity (mutagenicity, carcinogenicity), acute toxicity (sensitisation or irritation in contact with skin, eyes or by inhalation) and toxicity to reproduction
2. Balancing of toxicity according to the pharmaceutical forms
3. Assessment of protective measures (centralization of drug preparation in the pharmacy, wearing of mask, gloves and/or glasses)

Centralization of drug preparation in the pharmacy is recommended only in case of documented mutagenicity and carcinogenicity and when there is a risk of respiratory or cutaneous exposure related to the pharmaceutical form.
Setting: University Hospital (2000 beds).
Main Outcome Measures:

- Chronic (R45, R46, R49 or IARC group 1, 2A or 2B), acute toxicity (R20–28, 34–38, 41–43; S22–28, 36–39) and toxicity to reproduction (R60–63; cat.D,X)
- Pharmaceutical forms associated with a risk of respiratory (e.g. tablets crushing), cutaneous (e.g. drug in solution) or ocular contact (e.g. inhalation)

Results: Occupational risks of 14 parenteral monoclonal antibodies, 8 oral and 5 parenteral antivirals, 12 oral cytotoxics and 43 other drugs forms were analysed. According to our algorithm, crushing of 36% of the 33 tablets forms should be done in the pharmacy (e.g. valganciclovir). Only 1 parenteral antiviral should be reconstituted at the pharmacy (ganciclovir). Monoclonal antibodies were found not to be at risks of mutagenicity or carcinogenicity and only gloves will be recommended for their manipulation. No "class-effect" has been pointed out (e.g. only a few antivirals were found to be hazardous). 31 products were at risks for pregnant women. Protective measures to be taken by pregnant nurses or those wishing to have a baby will be discussed institutionally.
Conclusions: Toxicity evaluation of hazardous drugs handling in hospital should take the pharmaceutical forms into account as some toxic drugs may not be associated with occupational risks (e.g. coated tablets). Our method allows a standardized way to evaluate whether a drug should be treated as hazardous or not. Results will be discussed institutionally in order to implement applicable policies and procedures.
Keywords: Hazardous drugs, Occupational risks, Toxicology

DI-204 Guidelines for the handling of drugs instilled directly through the bronchoscope into the bronchial tree during flexible bronchoscopy

Julie Scholler[1], Anne A. C. Gairard-Dory[1], Anita A. Molard[1], Romain R. Kessler[1], Leonardo L. Donato[1], Laurence L. Beretz[1]

[1]67, Hôpital Universitaire de Strasbourg, strasbourg, France

Background and Objective: Flexible bronchoscopy in adults and children has become a common procedure in clinical respiratory practice. During the intervention, some drugs are instilled in off-label use, in particular anesthetics, haemostatics and mucolytics. The aim was to provide guidelines for handling those drugs in the different units where bronchoscopies are performed.
Design: Observation of the nurses' practice and literature review
Setting: Department of Pulmonary Medicine and Pediatrics.
Main Outcome Measures: Studies on stability and maximal doses; Good practices for the handling of drugs.

Results: Lidocaine 1% injectable solution is indicated for tracheobronchial anesthesia, via bolus of 20 mg in adults, and 5 to 10 mg in children. The maximal dose is restricted to 9 mg/kg in adults and 5–7 mg/kg in children.

Epinephrine is indicated in hemorrhagic complications occurring during interventions; the solution is diluted to 1 mg/10 ml with NaCl 0.9%; a 200 μg bolus is injected and can be repeated up to 1 mg.

Terlipressine can be used in heavy bleedings; the powder should be reconstituted with NaCl 0.9%, at 1 mg/5 ml; 1 mg is injected, repeated if necessary.

Mesna is used to dissolve mucous plugs, especially in patients with cystic fibrosis. The solution is diluted to 30 mg/ml with NaCl 0.9%; bolus of 10 ml are injected to allow visibility in the lower airways. There are no data available on the maximal dose.

All preparations have to be compounded aseptically and extemporaneously by the nurse when requested by the physician, because of the lack of stability studies in those ranges of concentrations.

Conclusions: These guidelines are intended to standardize flexible bronchoscopy procedures between the different units, in order to minimize the occurrence of medication errors.

Reference

British Thoracic Society guidelines on diagnostic flexible bronchoscopy, Thorax 2001; 56; 1–21

Keywords: Flexible bronchoscopy, Guidelines, Drugs

DI-211 The profile of drug information enquiries of nurses in the last ten years

Ayce Celiker[1], **Gulru Ozkaya**[1], Nergiz Nemutlu[1]

[1]Hacettepe Drug and Poison Information Center, Hacettepe University, Ankara, Turkey

Background and Objective: Pharmacists have linked medical and pharmaceutical literature, growing day by day enormously, to all components of health care team. Thus, the emergence of drug information centers has provided a valuable tool in patient – oriented pharmacy practice. Nurses, also, have asked advice of drug and/or poison information centers in order to get updated information they need. Being a pioneer in Turkey, Hacettepe Drug and Poison Information Center (HIZBIM) is in service for 15 years with 3 pharmacists in working-hour basis.

Objective

To describe and analyze the extent and characteristics of consultations to HIZBIM by nurses.

Design: The enquiries directed from nurses between January 1, 1996 and December 31, 2005 were selected retrospectively and analyzed with SPSS 11.5®.

Setting: Hacettepe Drug and Poison Information Center is affiliated to Hacettepe University, Faculty of Pharmacy.

Main Outcome Measures: Categorization and comparison of data of nurses' calls of HIZBIM during the study period.

Results: The percentage of overall nurse calls' was 5.3 (1044 calls) in the last ten years' drug and poison information enquiries. Annual distribution showed a steady increase beginning from 2002. Calls received mostly (28.4%) between 13:30–15:30 hours. The 83.5% of the calls received from Hacettepe University Hospitals' nurses. Almost half of the enquiries (49.7%) were about stability and incompatibility in intravenous (iv) admixtures. The frequency of these calls was significantly higher than the calls came from other health professionals ($p < 0.05$). The following types of enquiries were about dosage (9.1%) and availability of pharmaceutical products (8.0%). While 76.5% of enquiries were answered by HIZBIM in less than 5 minutes, in 1% of all calls took more than 1 day to gather and tailor which requires more literature search. The mostly (50.0%) used references in retrieving information was general references followed by Micromedex CCIS Inc. with 41.0%.

Conclusions:

- HIZBIM has been consulted by nurses in a rising pattern. This means that this service is of importance for them because of its rapidity, accuracy and currency
- The preparing iv admixtures that has been left to nurses' responsibilities in practice in our country can be reconsidered by pharmacists since this service has been fulfilled by "drug experts", namely pharmacists in many countries.
- Drug information centers can provide not only emergent information for nurses but also education such as seminars and conferences in some topics they need. The establishment of drug information centers in hospital settings will be of use to stimulate the frequency of consultations by nurses and to improve patient care provided by them.

Keywords: Drug information, Nurse, Stability, Incompatibility

DI-269 Standard procedures to answer clinical questions on negative effects to fetus conceived under paternal medication exposure

Ana Ribeiro-Rama[1], Renata Barbosa[1], Ana M. Sobral[1], Miguel Morais[1], Odete Isabel[1], Joana Migueis[2], Jose Zagalo-Cardoso[2], Franscisco Tavares-Silva[2], Ana T. Almeida-Santos[2], Cristina Silva[3], Fernando Fernandez-Llimos[4], Isabel V. Figueiredo[5], **Margarida Caramona**[5]

[1]Pharmacy, [2]Prenatal Diagnosis, University Hospital, Coimbra, [3]Faculty Pharmacy, University, Porto, [4]Faculty Pharmacy, University, Lisbon, [5]Faculty Pharmacy, University, Coimbra, Portugal

Background and Objective: Men's exposure to medications, before/during conception, can induce fetal abnormalities by spermatogenesis. Mechanisms inducing reproductive toxicity: Non-genetic-medication on semen; Genetic-mutation or chromosome abnormality; Epigenetic-effect on gene expression or DNA fragmentation. Evidence literature is sparse and contradictory. Counselling parents is a dilemma. Lack of literature outcomes, justifies reporting, follow evidence-based-practice methods and guidelines for reporting adverse events.

1-Analyze questions to "Medicines-Information-Service". 2-Application of standard operation procedures (SOP) developed to answer questions in pharmaceutical-care.

Design: 1-Evaluation: 9 cases- disease/medications exposure. 2-Study case SOP: Clinical data collection. Integration with Patient/Intervention/Comparison/Outcomes, PICO's methodology. Medline/Pubmed as source of answer, search strategies based on PICO, combining MeSH-terms, subheadings and text-words. Answer and fetal/pregnancy outcomes follow-up.

Setting: Medicines-Information-Service, Pharmaceutical-Department; Prenatal Diagnosis. Coimbra University Hospital. Portugal.

Main Outcome Measures: Answer validity, utility and physician's decision. Pregnancy/neonatal outcomes follow-up.

Results: 1-Hepatitis-C Cases:3/9; Medications: ribavirin/interferon. 2.1-Patient/Population: Mother 11th/weeks pregnancy, medicated: levothyroxine; Fetus: no echographic evidence of malformation at 12;15;18th/weeks; Father at conception: former toxicodependent, negative serology; Hepatitis-C. Intervention: Ribavirin/Interferon last year; Outcomes: Reproductive toxicity; Spermatogenesis alteration; Pregnancy development complications; 2.2-Search strategy exemples: P- MeSH-terms: Paternal exposure-Disease; Embryonic Structures; I-Ribavirin/Interferon; O: Pregnancy Complications; Congenital, Hereditary, and Neonatal Diseases and Abnormalities; Chromosome

Aberrations. Subheadings: abnormalities; adverse effects; chemically induced. Text-words: Oligozoospermia. Study-types found: case-reports; case–control; case-series. 2.3-Expected outcomes contradictory: No arm detected; Disease and antiviral induces spermatic morphologic alterations. 2.4-Answer considered valid, used to support physician's decision. 2.5-Observed outcomes: Born 38th/week; 3700 g; Apgar-9:10:10; hypospadias. No major congenital abnormalities, during 3/days neonatal-period.
Conclusions: These clinical questions are generally complex, with multiple levels. Evidence-based approach to collect good patient history, PICO's methodology to focus and search strategy, must be used to evaluate and follow-up each case, contributing to more supported decisions and to generate evidence.
Keywords: Paternal-exposure, Ribavirin/interferon, Pharmaceutical-care

EDU-30 A comparison of the perceptions of pharmacists and dispensing technicians about the causes of medication error in a community pharmacy

Hannah Hesselgreaves[1], Ailsa Power[1], Murray Lough[2]

[1]Pharmacy, [2]Medicine, NHS Education for Scotland, Glasgow, United Kingdom

Background and Objective: Pharmacy dispensing technicians are invariably overlooked in medication error research. The objective of this research is firstly to explore the perceptions of pharmacists and pharmacy dispensing technicians in Greater Glasgow, about the causes of errors relating to a number of specific drugs known to be commonly involved in errors. Secondly this research will establish either consistency or inconsistency between the staff groups.
Design: Iterative design; review of literature; interviews with pharmacists were content analysed; used themes from interviews ($n = 11$) to survey dispensing staff ($n = 64$). Univariate analysis of survey data using means, standard deviations, and frequencies.
Setting: Community pharmacies within Great Glasgow.
Main Outcome Measures: Categorisation of themes from interviews relating to identified causes of errors.
Results: Themes from interviews with pharmacists were arranged into five thematic categories relating to their perceptions about medication errors: the work environment; learning from errors; tasks performed in the dispensary; attaining information from other health professionals; and participant recommendations for solutions. Pharmacists and dispensing staff agreed that work load, patient interruptions, and unclear GP requests were significant sources of medication error. However, dispensing technicians strongly disagreed about a relaxed atmosphere perceived by pharmacists in the dispensary causing errors. Unfamiliarity with the drugs resulting from generic buying policies was only partially supported by dispensers as a cause of errors. All suggestions from pharmacists about how the causes of errors could be addressed were supported by dispensers, particularly, "reporting quickly after the event" and "marking changed does on prescriptions".
Conclusions: Dispensing technicians, who are invariably overlooked in medication error research, only partially supported pharmacists' perceptions about the causes of medication errors relating to a number of high risk drugs. However, some perceptions were congruent between groups. This highlights some causes that future research may address on a practice level, for example, managing workload and improving GP requests on prescriptions. Other causes that were perceived differently by pharmacists and dispensers highlight profession-specific perceptions about how errors occur in community pharmacy.
Keywords: Medication error, Dispensing technicians, Qualitative

EDU-68 Training pharmacists to implement pharmaceutical care (pc) in pharmacies in community pharmacies

Ester Filinger[1], Andrea Paura[2], Alicia Consolini[3], Horacio de Belaustegui[4], Ana Tambussi[2]

[1]Pharmaceutical Tecnology, Faculty of Pharmacy and Biochemistry. University of Buenos Aires, Buenos Aires, [2]Department of Pharmaceutical Care of the Pharmacy College of the Province of Buenos Aires., Pharmacy College of the Province of Buenos Aires., [3]National University of La Plata, National University of La Plata, [4]Biosphere Foundation, Biosphere Foundation, La Plata, Argentina

Background and Objective: The concept of Pharmaceutical Care (PC) is capturing the attention of a growing number of pharmacists. The strategy followed by us to spread out the implementation of PC in pharmacies involves the utilization of internet tool as an innovation of traditional education.
Design: To do so, we designed an on line PC Course with interactive cases. The specific goals of the course are:

- The enhancement of the pharmacy practice.
- The promotion of practice research.
- The personal and professional development of pharmacists.

Setting: Department of Pharmaceutical Care of the Pharmacy College of the Province of Buenos Aires, the University of Buenos Aires, the National University of La Plata and Biosphere Foundation.
Main Outcome Measures: The course is carried out by tutorial system. It was established a virtual class modality for training pharmacists in the field of PC. The design of the course is of five modules. Every module has a duration of one month and the activity structured in four weeks:
First week: introduction to each module

Second week: a study of real case
Third week: identification of the problem
Fourth week: resolution of real cases.
The issues of the modules are the following:
Module I: introduction to pharmaceutical care.
Module II: adherence to the treatment.
Module III: habits incorporate in the life's style and the influence in pharmacological treatment.
Module IV: drug adverse effect
Module V: drug interaction

Results

The development of on line PC postgraduate course 2002–2005
Total amount of postgraduated registered 664, included 135 foreign postgraduated.
This course was attended by 4 professors and 15 tutors.
Four hundred and ninety-three postgraduated complete the course. Only 9% didn't take the final examination.

Conclusions: This PC course that we developed on line, is an useful tool for training pharmacists in the process of PC and allows the acquisitions of abilities in this area.

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Keywords: Pharmaceutical care, Training pharmacists, Community pharmacy

EDU-69 Implementation of the clinical pharmacy in the National University of La Plata

Andrea Paura[1], Maria J. Petroni[1], Susana Gomez[1]

[1]Department of Biological Sciences, Clinical Pharmacy. Faculty of Exact Sciences. National University of La Plata, La Plata, Argentina

Background and Objective: The Department of Education, Science and Technology of Argentina by Resolution N 566/2004, with agreement of the Council of Universities, introduced in the minimum contents of the career of pharmacy the concept of Clinical Pharmacy. For this reason the universities must modifies the curricula. The new plan of study developed for the Career of Pharmacy in the Faculty of Exact Sciences of the National University of La Plata, included since 2005 the teaching of Clinical Pharmacy in the Department of Biological Sciences.

The objective was to analyse the evolution of the program, whose pedagogical design was based in a process of teaching-learning in the field of the clinical pharmacy and pharmaceutical care that permit the training of the future pharmacists in the use of medicines.
Design: All the classes were designed with practical-theoretical modality including workshops, reading and analysis of the bibliography, discussion of cases and utilization of virtual simulators.
Setting: Clinical Pharmacy. Department of Biological Sciences
Main Outcome Measures: Students evaluation was carried out by tests of the general contents, degree of active participation during the workshops, resolution exposition and discussion of the cases.
Results: The development of Clinical Pharmacy education began in 2005. The students appreciated this experience and the 97% of them are satisfied with the process of teaching-learning employed. This teaching system improved them the adequate and rational use of the medicines. In these two years the 100% of the students has approved the examination.
The students also realized two poster presentations during this period, namely:

1. "Comparative study of the information supplies in the leaflet of tablets of omeprazol 20 mg", in 2005 and 2. "Study of the information supplied by the pharmaceutical laboratories in the television media" in 2006.

Conclusions: We consider the importance of the incorporation of Clinical Pharmacy in the new pharmacy curricula, because the students have major task about the practical education involvement patients and related to their professional future.

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Keywords: Pharmacy education, Clinical pharmacy, Pharmacy practice

EDU-98 Prescription errors and dispensing errors in clinical trials

Nathalie Do-Van-Lanh[1], Julie Pouzoulet[1], Emmanuel Jaccoulet[1], Amine Lalhou[1], Nathalie Ortiz[1], Alain Astier[1], Muriel Paul[1]

[1]Pharmacy Department, University Hospital, Creteil, France

Background and Objective: Clinical Trials' managing and dispensation is one of the obligatory missions of a hospital pharmacy. The respect of good clinical practices is necessary to ensure proper trial performance and to be aware of errors in prescription and in drugs dispensation. The aim of our study was to analyse the nonconformities in the steps of prescription and dispensation and to evaluate their severity.
Design: The pharmacy department manages 240 clinical trials for all clinical wards with a pharmacist and a technician who change every four months. There is no specific computerized system but an excel software for data filing. We realized a retrospective study of ongoing 67 clinical trials. All the prescriptions were reviewed and we focussed on all the items required for the prescription (e.g., identification of the protocol, the patient, the investigator, the dosage) and for the dispensation (e.g., identification of the drug, the quantity dispensed, batch number, expiry date)
Setting: A French acute university hospital of 950 beds.
Main Outcome Measures: Prescription and dispensation errors, checked by our pharmacy department, were defined according to a potential clinical severity scale elaborate by the pharmacist of the clinical trials unit. This scale defined 4 groups of severity according to the clinical risk for the patient and to the protocol's set of rules: with the group A (severe errors with the possibility of the exclusion of the patient), group B (potentially serious errors), group C (potentially significant errors), and the group D, with missing information on the prescription without consequence for the patient and the compliance of the study protocol.
Results: 2312 orders were analysed concerning 67 ongoing clinical trials. We found one error per order on average (2315/2312) and the most frequent errors were name omission 44% (1011/2315), signature omission 15% (355/2315) and the wrong prescription-writing 11%.(264/2315). On the prescriptor part, 0.37 (856/2312) errors per order were detected and 1% of them (12/856) would have severe consequences (group A), mainly related to the wrong treatment number or the wrong protocol. Concerning the dispensing part, 0.63 (1459/2312) errors per order were detected and 0.54% (8/1459) of them were classified in group A. Those errors were mainly related to the wrong treatment dispensing to the patient in a blink study or missing dispensing drug.
Conclusions: Among these errors, 0.8% would cause the exclusion of the patient. Even if the majority of these errors (67.8%) have no consequences (group D), such as biased results, most of them are avoidable with a regular information of the investigators meeting prior to trial start. Regular evaluation of internships and technicians and specific computerized software could also improve the working clinical practices for an optimal organization in conducting clinical trials.
Keywords: Clinical trials, Prescription, Dispensation

EDU-107 The role of the university of khartoum towards the implementation of pharmaceutical care practice in Sudan

Sumia Sir Elkhatim Mohamed[1]

[1]Department of Pharmaceutics, Faculty of Pharmacy, University of Khartoum, Khartoum, Sudan

Background and Objective: Sudan, the largest country in Africa, has 12 Faculties of Pharmacy (4 governmental and 8 private). The awareness of the new role of the pharmacist; pharmaceutical care practice (PCP) was investigated. This new role, which is different from the traditional current role of dispensing is not yet implemented in Sudan. The University of Khartoum, the oldest and largest University in the country, assumed responsibility of changing this. The aim is: a) To describe the attempts of the Faculty of Pharmacy, University of Khartoum in paving the way for patient-focused teaching and training. b) To show the efforts exerted towards the transition in pharmacy practice that must occur to establish PC in both community and hospital settings in Sudan.

Design: A descriptive study using Face to Face interviews, Structured questionnaires and Steering Committees and experts' views and opinions to provide data on current situation of pharmacy teaching and practice in Sudan and possible future changes.
Setting: University of Khartoum, Soba Hospital and community pharmacies in Khartoum.
Main Outcome Measures: Public and pharmacists awareness of PCP, assessment of current pharmacy undergraduate curriculum, the efforts and means provided to change to Patient-centered teaching and training and to raise the attention of the authorities towards the implementation of PCP in Sudan.
Results: Public awareness of PCP is very low. While awareness among pharmacists is high, they lack appropriate training on use of their knowledge, skills and attitudes. Number of pharmacy hours taught in 4 years is 3960; 1680 hours theory (42.4%) and 2280 hours practical (57.6%). Although some sporadic clinical aspects are taught, the teaching and practical training are mainly product-focused. Development of the curriculum has been recommended to provide an educational programme that will appropriately address contemporary and foreseeable future changes in the practice of pharmacy. This needs appropriate trainers and modern pharmacies. The Faculty of Pharmacy established a two years postgraduate degree in clinical pharmacy by courses in 2004 and started the refurbishment of the Pharmacy at Soba Hospital to pave the way for implementation of clinical pharmacy teaching and training and the introduction of clinical pharmacy services at hospital setting and in-service training. Master and PhD degrees by research are currently in progress investigating the possibility of implementing PCP at community setting using different models. Plans for future collaboration with regulatory authorities and the role of Leadership were envisaged.
Conclusions: Pharmacy curricula need to be revised to accommodate the concepts of clinical pharmacy. The intention is to provide means to inform the authorities and debate in the process of establishing acceptable standards for PCP in Sudan. The role of the regularity authorities and the leadership must be activated.
Keywords: Clinical pharmacy, Pharmaceutical care practice, Sudan

EDU-121 To modify the behaviour: who does it matter?

Daniela Scala[1], Santolo S. C. Cozzolino[1], Antonio A. M. Mancini[1], Laura L. Z. Zeuli[1], Barbara B. A. Andria[1], Rosaria R. O. Orsini[1], Ornella O. G. Gallinaro[1], Maria M. D. D'Avino[2], Giuseppe G. C. Caruso[2], Alessandra A. I. Izzo[2], Domenico D. C. Caruso[2]

[1]Centre of Biotechnologies, [2]Centre for the Diagnosis and Treatment of Hypertension, Cardarelli Hospital, Naples, Italy

Background and Objective: Patients are often asked to modify lifestyle and adopt healthier behaviour for disease prevention and long-term disease management. Many people find it difficult because it means deep and wide life change. But how patients can modify lifestyle if health care professionals don't modify first their attitude towards patients? The Hypertension Working Group of Cardarelli Hospital of Naples, Italy in the view of "transferring" "Dieciannidivitainpiù" (life ten years longer) from the hospital to the community, made a survey whose aim was to determine the meaning that General Practitioners (GPs) ascribe to the patient-centred approach and to identify the important concepts and issues inherent to this approach. "Dieciannidivitainpiù" is an educational programme aimed at reducing blood pressure (BP) in patients with hypertension through a lifestyle modification, and it has got its preliminary positive results.
Design: qualitative survey.
Setting: General Practitioners' cooperatives of Benevento's community.
Main Outcome Measures: GPs opinion on the main concepts of a patient-centred approach assessed by a six question five-point Likert scale questionnaire. Simple descriptive statistics, median and inter-quartile range (IQR) were performed using SPSS version 10.0.
Results: 57 GPs participated to the survey. They agreed (median = 4, IQR = 5–4) that the following concepts are crucial in a patient-centred approach: the need of a specific training in counselling in under and post graduate education; the necessity of working with patients to develop mutually agreed-upon goals; the role of information in the decision making process, the ability to understand patients readiness to make change, and to identify barriers to change, the importance to recognize that patients are the experts when it comes to their own behaviour related issues. For only one item (time dedicated to the consultation) IQR changed (IQR = 4–2) indicating some difficulty in implementing this aspect in practice.
Conclusions: For Benevento community GPs, a patient-centred approach is a useful way to help change and promote behaviour. Knowing how to support it is an important skill for all care professionals, but education is needed to shift from theory to practice.

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Keywords: Patient centred care, Health behaviour, Patient education

EDU-146 Investigation on assessment and treatment of painful neuropathy in diabetic patient

Emilie Prevost[1], Anne Claire Buire[1], Anne Laure Lepetit[1], Catherine Mennesson[1], Jean Caron[2], Bertrand Gourdier[1]

[1]Pharmacy, [2]Diabetology/Endocrinology, Reims University Hospital, Reims, France

Background and Objective: Diabetes is frequently associated to complications such as diabetic neuropathy, characterized by neuropathic pain. There is no consensus for this type of pain management and those are difficult to diagnose.
The aim of this study was to :

– diagnose a neuropathic pain among diabetic patients
– assess the proportion of diabetic patient with neuropathic pain
– analyse the treatments received by these patients

Design: This prospective study took place over a two-months period (from March to April 2007).
All diabetic patient hospitalised in two units of the diabetology/endocrinology department have been examined and interrogated by the physicians according to a questionnaire, based on a new diagnosis instrument: DN4 questionnaire (1). We retrospectively searched in the patient's file if they were treated for their pain. Questionnaire results and treatments have been discussed with the physician.
Setting: 2 medicine wards of 19 and 22 beds each in Reims University Hospital.
Main Outcome Measures: pain characteristics; DN4 questionnaire score; treatment strategies and tolerability.
Results: 87 diabetic patients have been interrogated: 65 type I, 16 type II and 6 gestationnal diabetes. The average age was 60 years and for the half of these patients, the pathology developed since more than

10 years. 27 patients were painful and 14 patients presented a positive score to DN4 questionnaire. Symptoms frequently observed were: pins and needles, prickles, and numbness.

Among these 14 patients, 9 were treated by antidepressants (amytriptiline) or antiepileptics (clonazepam, gabapentine, tegretol, carbamazepine or pregabaline) or both. The average number of molecules received by patients was 2.44. The average number of lines of treatment was: 2.44. First intention treatment insisted of an anti-epileptic monotherapy in 7 patients. Second line treatment involved the introduction of another anti-epileptic or an anti-depressant drug. The drugs have been well tolerated except a respiratory depression under clonazepam.

Among the 5 not-treated patients, only one benefitted from a treatment initiation.

Conclusions: Patients are treated by "old" molecules with a large prescription of clonazepam but their efficacy is very variable.
The physicians have been sensibilised to DN4 questionnaire and they concluded that it is easy to use.

However there is a lack of physician's informations about the management of neuropathic pain; besides they are hesitant to initiate a treatment. The relationship between pharmacists and physicians and the development of clinical pharmacy seems important to optimize the management of this pain.

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Keywords: Neuropathic pain, DN4 questionnaire, Diabetic patient

EDU–171 Pharmaceutical care and clinical pharmacy in undergraduate education at University of Buenos Aires

Ester Filinger[1], Patricia Kanenguiser[1], Estela Izquierdo[2]

[1]Clinical Pharmacy, [2]Pharmaceutical Technology, Faculty of Pharmacy and Biochemistry. University of Buenos Aires, Buenos Aires, Argentina

Background and Objective: Pharmacy education in the Faculty of Pharmacy and Biochemistry of the University of Buenos Aires is taught as a product-oriented profession with a focus on the basic sciences. However in 1997 Pharmaceutical Care and Clinical Pharmacy was integrated as an optional course into the pharmacy curriculum by resolution CD 707/97.

The object of the emphasis was on the students' ability to provide Clinical Pharmacy and Pharmaceutical Care upon graduation. Hence, therapeutic plays a significant role in building students' knowledge and skills in preparation for clinical practice.

Design: Theoretical education and program for students and collaborative implication in the hospital activity or in the community pharmacy. The development of the program is carried out in two phases. In the first phase the clinical activities of the pharmacists, the unidose drug distribution, the role of the drug information centers, pharmacoepidemiology and surveillance studies are explained. In the second phase the concept of Pharmaceutical Care is introduced and its implementation in different pathologies is developed.

An active approach of the patient and contact with the treating physician was considered as tool in a strong learning environment.

Setting: Undergraduate pharmacy students at University of Buenos Aires.

Main Outcome Measures: The students find them abilities to identify drug related problems and to assess patient care and follow-up.

Results: More than 300 students have attended Pharmaceutical Care and Clinical Pharmacy to: 97% passed and 3% failed. Students option was that the strongest aspect are the case discussion and the weakest the very few number of hours not enough to discuss other important illnesses. They also say that many topics should be taught sooner in the career and it was not considered an emphasis an the clinical and patient oriented-aspects of the profession.

Conclusions: An approach to clinical pharmacy education in which the integration of teaching and learning are collaborative creates an atmosphere that is conducive to effective student learning. Moreover the Clinical Pharmacy is a valued and important tool of the general practice team regarding quality improvement in drug therapy.

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Keywords: Clinical pharmacy, Pharmaceutical care, Undergraduate education

EDU-229 Counselling on patient's adherence to tuberculosis therapy in Depok, Indonesia

Retnosari Andrajati[1], Wati Husnawati[1], H Harianto[1]

[1]Pharmacy, University of Indonesia, Jakarta, Indonesia

Background and Objective: Tuberculosis is an important health problem in Indonesia. Adequate and effective treatment is essential, both clinically for patients and to control the spread of tuberculosis. The objective of this study was to evaluate the influence of counselling on patient's adherence.

Design: This study was quasi experiment design (non randomized control group pretest–posttest design). The study subjects were fifty two people with tuberculosis who took antituberculosis medicines from February–May 2007. Subjects were divided into intervention and control group. Both of groups were given questionnaire. Counselling were given to intervention group. A month later both of groups were given a similar questionnaire. Data was statistically analyse.

Setting: Depok, West Java, Indonesia.

Main Outcome Measures: Profile of subjects, antituberculosis drugs, the influence of counselling.

Results: Most of subjects were men, low education, unemployee and at the productive age. The tuberculosis drug use were isoniazid, Rifampycin, pirazinamid, and ethambutol. There was significant difference of adherence to tuberculosis therapy between intervention and control group (p value = 0.007).

Conclusions: There was influence of counselling on patient's adherence to tuberculosis therapy.

Keywords: Counselling, Tuberculosis therapy adherence, Depok Indonesia

EDU-233 Development of a tool to support continuous professional development in community pharmacy

Ailsa Power[1], Susan McKellar[2], Muna Al Juma[2], Steve A. Hudson[2]

[1]Pharmacy, NHS Education for Scotland, [2]Institute of Pharmacy and Biomedical Sciences, University of Strathclyde, Glasgow, United Kingdom

Background and Objective: To investigate the use of a competency based continuous professional development (CPD) workbook as part of a CPD support package.

Design: 6 month prospective study; Quantitative collation of workbook entries; Qualitative one to one interviews.
Setting: 27 community pharmacists. The workbook is composed of 5 competence categories.1 Within those categories is a total of 46 associated pharmacy activities, established from previous research.2
Main Outcome Measures: Collation of the number of each competency and associated pharmacy activity identified as a CPD need. Pharmacists expressions of priorities in identifying competencies.
Results: 13 (48.1%) chose to use the CPD workbook. The mean (SD) number of pharmacy activities with identified CPD needs was 17.4 (9.3).

All of the most popular CPD linked pharmacy activities were from the competency- 'Participation as a member of the multidisciplinary team'. Telephone interview findings showed pharmacists cited 'priority for their service development' as the principle reason for CPD identification.

No pharmacist identified a CPD need for: 'Supporting patient/family motivation'; 'ecording problems in blood glucose control requiring balancing food intake and insulin dose'; 'Sharing reflections of where your performance leaves room for improvement within a pharmacists group' and 'Taking part in a local multi-disciplinary mentoring group.'
Conclusions: Currently CPD workbooks appear not to be widely used within the pharmacy profession in the UK3 although there are examples of successful use of reflective portfolio.4,5 Almost half of the participants chose the workbook as a means of support leading to a substantial number of identified CPD issues. For community pharmacists to deliver high quality care for diabetes, more attention is required to forms of training and to both uniprofessional and multiprofessional peer support.

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Keywords: Diabetes, Continual professional development, Community pharmacy

EDU-241 Usage and level of relevance of intravenous immunoglobulin prescriptions in a French university hospital – Chu Bordeaux

Bénédicte Lahille[1], S. Pédeboscq[1], M. Saliège[1], M. Delacre[2], M. Longy-Boursier[2], J.P. Pometan[1]

[1]Pharmacy, [2]Infectious disease, Saint-André, Bordeaux, France

Background and Objective: Consumption of intravenous immunoglobulins (IVIG) has increased in Saint-André Hospital (CHU Bordeaux) since the last 2 years. This increase seems to be related to the extension of the possible indications. Within the contract of good use of medications, we evaluated the pattern of usage of IVIG in the goal to estimate the respect of the guidelines.
Design: Retrospective data were collected at the hospital pharmacy between January 2006 and March 2007.
Setting: We retrospectively reviewed all prescriptions of IVIG issued from three infectious disease departments (50 beds) in a French 500-bed university hospital.
Main Outcome Measures: For each IVIG prescription, the following data were collected: patient identification, name of IVIG product, quantity of IVIG issued, date of IVIG release, indication for treatment and level of relevance. These levels are determined as follows. Level 1: indications approved by health authorities or for which comprehensive guidelines have been published (high level of proof). Level 2: relevant indications based on scientific publications. Level 3: off-label indications more difficult to prove on a scientific basis (few or no high quality randomized controlled clinical trials).
Results: During the studied period, 25 715 grams of IVIG were administered for a total of 68 patients and 296 prescriptions. 88.9% IVIG used saccharose as a stabilizing agent, other products contain either glucose (10.4%), or maltose (0.8%). 1.6% of IVIG delivered was deprived of IgA. The total cost reached 856,760 €.
Level 1: 52 patients (76.5%), 224 prescriptions (75.7%).

Level 2: 12 patients (17.6%), 58 prescriptions (19.6%) including 43% of Still's disease, 27.5% of ANCA-associated vascularitis, 15.5% of autoimmune hemolytic anemia and 10.3% of cortico-resistant polymyositis.

Levels 1 and 2 represent more than 95% of the prescriptions.

Level 3: 4 patients (5.9%), 14 prescriptions (4.7%) including 50% of uveitis and 36% of Hashimoto's encephalopathy.
Conclusions: Despite a huge increase of IVIG consumption, we observed that 95% of prescriptions respect the criteria of published guidelines or high quality clinical trials.
Meanwhile, 25% of prescriptions corresponded to level 2 or 3. Consequently, the pharmacist has to be watchful concerning the scientific relevance of these off-label indications which, moreover represents a non negligible cost.
Keywords: Intravenous immunoglobulin, Level of relevance, Prescription

EDU-260 evaluation of a hypertension/diabetes screening campaign

Esperanca Silva[1], Margarida Caramona[2], Tiago Maricoto[3], Vera Cruz e Silva[3], Rita Rocha[3], Emanuel Costa[3], Barbara Oliveiros[4], Emanuel Ponciano[4]

[1]Community Pharmacy, Farmacia Rocha, [2]Pharmacology, Faculty of Pharmacy, [3]Medicine, [4]Ibili, Faculty of Medicine, Coimbra, Portugal

Background and Objective: The risk of developing Diabetes type 2 increases with family history of diabetes, age, obesity and lack of physical activity. Risk factors of cardiovascular diseases must be screened in adults. Smoking, obesity, hypertension and high cholesterol increase the risk of developing cardiovascular diseases.

The purpose of this study is to produce an evaluation focus on the risk profile and counselling activities concerning therapeutic and lifestyle change.
Design: Descriptive study. Individual measurements were recorded by pre graduation students on a standardized datasheet. Blood pressure was measured using a digital wrist device. Blood glucose monitoring systems of two different brands were used.
Setting: The screening was made in the street using passer-by volunteers. In the course of a single day in May 2007, a total of 293 subjects (48.8% males and 52.2% females, mean age 62.37 years, SD = 15.62) had glycaemia and blood pressure measured.
Main Outcome Measures: Age, gender, medication taken, cigarette smoking, body mass index (BMI), blood pressure, capillary blood glucose
Results: 70.31% of the sample presented BMI > 25Kg/m. 53.24% had elevated systolic blood pressure values and 13.99% elevated

diastolic blood pressure values. 11.95% had elevated occasional blood glucose. 12.30% are cigarette smokers.

Systolic ($t = -1.97$; $p = .05$) and diastolic ($t = -2.09$; $p = .04$) blood pressure values were significantly higher in smokers than in non-smokers.

Concerning patients taking diabetes medication, fewer patients with blood glucose controled and more patients blood glucose uncontrolled were found than those expected, suggesting either low compliance or lack of efficiency of medication ($\chi^2 = 31.74$; $p < .001$).

Concerning the hypertension medication, similar results were found. More patients under therapy with blood pressure uncontrolled were found than expected.

The concordance within the two measures of the blood glucose with different monitorizing system was found to be strong and significant ($k = .86$; $p < .001$).

Positive and significant correlation between BMI and diastolic blood pressure was found. However, no significant correlation between BMI and systolic blood pressure was found.

Conclusions: Events such as this screening improves the quality of education, as well as develops the interests and opinions of students. As well as it shows face to face were can be apply their knowledge of clinical pharmacy

Furthermore, events such as these are found by the students to be invaluable in acquiring training in similar-to-professional setting and expertise in field work.

Keywords: Students, Screening, Hypertension, Blood glucose monitoring systems

EDU-275 Evaluation of an educational package for pharmacists working in palliative care

Anne Watson[1], Annamarie McGregor[2], Janet Trundle[3], Alison MacRobbie[3], Aileen Scott-Aiton[3], Helen Moulsdale[3], Joe Harrison[3]

[1]Pharmacy Directorate, NHS Education for Scotland, Glasgow, [2]Pharmacy Directorate, Scottish Executive Health Department, Edinburgh, [3]Pharmacy Directorate, Scottish Palliative Care Pharmacists' Association, Scotland, United Kingdom

Background and Objective: NHS Education for Scotland (NES) has worked with the Scottish Executive Health Department (SEHD) to develop training packages to support the use of validated Needs Assessment Tools (NAT) for several longterm conditions. Consequently a specific training package was then developed to support and standardise needs assessment and pharmaceutical care delivery by Palliative Care pharmacists in the local networks set up in Scotland. Additional support materials (trainers package) was developed for representatives from the Scottish Palliative Care Pharmacists' Association to deliver the training to their local network pharmacists in a consistent manner.

Design: Development and evaluation of a training package and course for palliative care pharmacists.

Evaluation of the outcomes from using a NAT for delivery of care.

Setting: NHS Scotland

Main Outcome Measures

1. Development and evaluation of a standard training package for palliative care pharmacists
2. Development and evaluation of a standard training course for palliative care pharmacists
3. Outcomes from the use of a standard NAT on palliative care patients in community pharmacies

Results: NHS Boards involved 15; pharmacists involved 200; Quality 97%; Relevance 97%.

Comments: Pre-reading comprehensive, informative and not too much; These packs are excellent!; CDROM of the presentation allowed you to go back over bits difficult to understand; Resources useful.

NHS Boards involved 14; pharmacists involved 180; Quality 93%; Relevance 98%; Objectives met 90%

Comments: Good organisation and appropriate time for each session; Excellent, very interesting and informative lecture; cases relevant and found NAT easy to use.

Identification of issues 100%; Relevance of questions 100%; Time to complete NAT 10–20 mins; barrier – time; benefits – care issues identified by NAT; Care issues – counselling and compliance issues, side-effects identified (nausea, dry mouth, constipation), pain relief not adequate.

Conclusions: NES are proactively supporting national policy and practice through a process of identifying and meeting the educational needs through direct and self-directed learning for Continuing Professional Development (CPD). The needs of Palliative care patients are seen as an appropriate target group for pharmaceutical care. The evaluation and feedback from the courses, training pack and outcomes from the use of the NAT in practice have been very positive and amendments will be made for further implementation in Scotland.

Keywords: Education, Palliative, Pharmaceutical care needs

EDU-284 Fourth-grade pharmacy students prefer kinesthetic learning

Sule Apikoglu Rabus[1], Fikret V. Izzettin[1]

[1]Clinical Pharmacy Department, Marmara University Faculty of Pharmacy, Istanbul, Turkey

Background and Objective: Pharmacy students represent a broad spectrum of learning preferences and styles. This diversity presents a responsibility for the lecturers and instructors to meet the educational needs of all students. In order to develop appropriate learning approaches the instructors need to know the students learning preferences. Therefore, the aim of this study was to identify the learning preferences of pharmacy students.

Design: The visual, auditory, reading/writing, kinesthetic (VARK) questionnaire identifies student's preferences for particular modes of information presentation. The VARK questionnaire is freeware that can be completed online. However, we administered the VARK questionnaire as a hard copy at the end of the 'clinical pharmacy practices' final exam to the fourth-grade pharmacy students.

Setting: Marmara University – Faculty of Pharmacy.

Main Outcome Measures: The frequency of students' preference for modes of information presentation.

Results: We administered the VARK questionnaire to 108 students and 106 (98%) returned the completed questionnaire. Almost half of the students (48.1%) preferred a single mode of information presentation. Among these students, 2% preferred visual (learning from graphs, charts, and flow diagrams), 19.6% preferred auditory (learning from speech), and 29.4% preferred printed words (learning from reading and writing), and 49% preferred using all their senses (kinesthetics: learning from touch, hearing, smell, taste, and sight). The other half (51.9%) preferred multiple modes [2 modes (44.3%), 3 modes (4.8%), or 4 modes (2.8%)] of information presentation. A total of 63 (59.4%) students preferred 'kinesthetic' learning solely or in a multimodal combination.

Conclusions: The students represented a variety of learning styles. Student motivation and performance improves when instruction is adapted to student learning preferences and styles; so, it is the responsibility of the instructor to address this diversity of learning styles and develop optimum learning approaches.

EDU-285 Prescriptions of antidepressants: analysis in a psychiatric department

Olivier Galvez[1], Patrick P. Gentes[1], Dominique D. Vallet[2], Olivier O. Bourdon[3]

[1]Pharmacy Department, [2]Psychiatric, HIA Val de Grâce, [3]Clinical Pharmacy, Université Paris Descartes, Paris, France

Background and Objective: To carry out in a psychiatric department a descriptive analysis of antidepressant use. To estimate the appropriateness of guidelines[1,2,3] of therapeutic strategies and to optimize in the future the medicinal treatment with decision-making tools.
Design: Retrospective study applied to the prescription of antidepressants in psychiatry. The data were collected in a retrospective way during three months.
Setting: Psychiatric department, pharmacy department.
Main Outcome Measures: The prescriptions and patient files of 47 patients were analyzed: therapeutic strategies, posology, taking plan, dosage adjustment, duration before increasing the doses and drug interactions.
Results: The average age of the individuals in the group was 46 years old. The men represented 57% of the population, the women 43%. Venlafaxine represented the most used antidepressant (47%), followed by citalopram, paroxetine and sertraline (15% each). Escitalopram, fluoxetine and mirtazapine were rarely prescribed.

The posology and taking plan were generally respected. However, some improvements in terms of treatment optimization could have been brought. They could have lead to 32 actions of clinical pharmacy within the framework of prospective study: 9 posology optimizations and 23 taking plan optimizations. Nineteen patients (40%) had an adjustment in their antidepressant treatment: nature and dosage. For all the antidepressants, a sufficient duration was respected before increasing the doses. An average number of interactions by prescription were 4.8 but none was clinically significant.
Conclusions: Therapeutic strategies corresponded to guidelines recommendations. The Dosage adjustments and duration before increasing the doses respected the indication of antidepressants.

In the future, to optimize the medicinal treatment, decision-making tools carried out could facilitate psychiatrists' prescriptions. The pharmaceutical validation of prescriptions will be facilitated by complying with them within the framework of clinical pharmacy activity.

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Keywords: Antidepressant, Therapeutic strategy, Treatment optimization, Evaluation practices.

EDU-286 Oncology pharmacy training program in Al-Amal Hospital in Qatar

Manal Zaidan[1]

[1]Pharmacy, Al-Amal Hospital, Hamad Medical Corporation, Doha, Qatar

Background and Objective: Al-Amal Hospital is a 51 bed oncology/hematology hospital.

Al-Amal hospital is now the first hospital in Qatar to be accredited by the Joint Commission International (JCI), the worldwide leader in improving the quality of healthcare.

The objective is to implement clinical pharmacy services in Al-Amal Hospital in the state of Qatar by training the pharmacists about clinical pharmacy services.

Design: A pharmacist designed the training program and took the initiative and responsibility for training other pharmacists in AAH about clinical pharmacy. The department of Medical Oncology/Hematology, the hospital administration and the pharmacy department agreed that the pharmacists should have central responsibility for antineoplastic agents and other drugs related problems. Pharmacists for the program were selected from the existing staff. The Healthcare team is consisting of two pharmacists rotating every 2 months. Each pharmacist join 2 teams consisting of a pharmacists, a consultant, a specialist, a resident, a rotating resident, 2 nurses, a dietitian, physiotherapist, social worker and a psychologist. We used to have 3 oncology teams and 1 hematology team. Both pharmacists participate in the medical rounds and morning report 3 days per week. The pharmacists provide clinical pharmacy services including chart review, pharmacy patient profile review, laboratory tests, therapeutic drug monitoring, antibiotics monitoring, interviews with patients and/or relatives. Drug related problems were identified, resulting in interventions.
Setting: In patient wards, Al-Amal Hospital, Qatar.
Main Outcome Measures: To identify Drug Related Problems, which well result in interventions and to help the medical team and the patients to reach their treatment goals. Patient outcomes were evaluated by follow up with the medical team or by patient interview. We refer patients to the dietitian, physicians, the clinical psychologist as needed.
Results: More time is needed to evaluate the clinical pharmacy services provided by the pharmacists as the program was just started. Patient and physicians were satisfied by starting the training program.
Conclusions: Hematology/Oncology setting provides an excellent opportunity to involve pharmacists.

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Keywords: Clinical pharmacy, Al-Amal Hospital

NUTR-19 Dietetary management of acute metabolic decompensation in leucinosis: implication of the pharmacy

Céline Mechin[1], Christelle Landy[1], Pierre Dechelotte[2], Aude Coquard[1], Bernard Dieu[1]

[1]Pharmacy, [2]Nutrition, Hospital Charles Nicolle CHU ROUEN, Rouen, France

Background and Objective: Maple Syrup Urine Disease (M.S.U.D.) or leucinosis is an autosomal recessive disorder caused by an enzyme defect in the catabolic pathway of branched-chain amino acids (B.C.A.A.): leucine, isoleucine and valine. Accumulation of these 3 A.A. leads to encephalopathy and progressive neurodegeneration in the infant who is not treated. Early diagnosis and dietary management can prevent complications and may allow for normal intellectual development. However, neurologic function may deteriorate rapidly at any age because of acute metabolic decompensation. These severe episodes are caused by catabolism of endogenous protein, which may be provoked by physiological stress (infections, post-surgery). During

these crisis, the patient must have immediately intravenous glucose infusion and enteral nutrition free of B.C.A.A.
Design: Case report.
Setting: Department of Pharmacy, Hospital Charles Nicolle, Rouen.
Main Outcome Measures: Case report
Results: One patient with classical M.S.U.D. is followed in our establishment since many years. His disease has been diagnosed in neonatal period. A diet free of B.C.A.A. has been instaured. This diet is successful, now this patient is 34 years old and had a normal development except myalgia and hypoesthesy of the left leg. However, when the diet is not well followed or when he's infected, acute episode occurs (on average 3 or 4 times per years). As the crises starts, the patient is sleepy and confused. In order to be able to treat him very quickly, the medical staff decided to set up an emergency protocol, which include an adapted enteral nutrition formulation. The pharmacy is implicated in this protocol to prepare the mixture. The formula includes: M.S.U.D mix, dextrin maltose, oligoelements, ions, lipids (sunflower oil), vitamins and water. The pharmacy must be able to carried out the preparation at any time and the components must be always available.
Conclusions: Because M.S.U.D is an unherited disease, published report of treatment are rare and they are no consensus for the treatment of acute decompensation. Since 6 years, this protocol is successful: B.C.A.A. levels decrease between 2 to 4 days after the setting-up and the patient always recovered rapidly. This formula is administrated by nasogastric tube and avoid the use of hemodialysis which is the last solution to remove B.C.A.A. This is an example that a personnal follow-up program (with plan for clinical and metabolic evaluations) during common intercurrent illnesses can have optimal outcomes.
Keywords: Leucinosis, Metabolic decompensation, Adapted enteral nutrition

NUTR-46 Ensuring phosphorus adequacy of human-milk-fed preterm babies

Canadell Laura[1], Cañete Carmen[1], **Pardo Rocio**[1], Albujar Mar[2], Valldeperez Cinta[2], Carretero Juan[2], Gallart M Jesus[1], Closa Ricardo[2]

[1]Pharmacy service, [2]Neonatology, Hospital Universitari Joan XXIII, Tarragona, Spain

Background and Objective: Human milk is the feed of choice for preterm infants both for nutritional and non-nutritional reasons. Phosphorus levels in human milk are insufficient for most premature infants. This deficit is the major cause of osteopenia in prematurity. Fortification with a commercial multinutrient product should only be considered after 2 weeks of mother's milk feeding, however, phosphorus supplement must be given initially.

To describe a standardized scheme for early nutritional support with phosphorus of very preterm infants (<1250–1500 g)and describe the phosphorous oral solution we use as a supplement is the aim of this study.
Design: Clinically relevant reports were reviewed to establish a standardized scheme for early nutritional support with phosphorus of the very preterm infants.

A standardized formula of oral phosphorous was established to diminish the medical errors when the addition of this mineral is required.
Setting: Pharmacy service and Neonatology Unit of a third level hospital.
Main Outcome Measures: To describe the scheme of adding phosphorous to human milk as well as the standardized formula we use, "phosphorous oral solution" (10 mg P/100 mL).
Results: Phosphorous oral solution procedure: composition, stability and the scheme of addition to human milk to ensure the requirements for bone substrate needs in preterm infants to avoid osteopenia of prematurity.
Conclusions: Various methods have been tested to decide when additional supplements must be given. Individual adjustment is not possible due to the delay of laboratory results on milk analysis and the fast changes in infants' requirements. Therefore, it is necessary to make a standard adjustment scheme on the dose of the fortifier that needs to be added.
Keywords: Phosphorous oral solution, Osteopenia of prematurity

NUTR-192 Jejunal feeding tolerance in pancreatic carcinoma

Cristina Vazquez[1], Juliana J. Alvarez[1], Jose Manuel J. M. Sierra[2], Maria M. Noguerol[3], Eva E. Campelo[1], Maria Teresa M. T. Inaraja[1]

[1]Pharmacy, [2]Endocrine, Hospital Meixoeiro, Vigo, [3]Pharmacy, Hospital Leon, Leon, Spain

Background and Objective: Evaluation of nutritional management of a patient undergoing cephalic pancreaticoduodenectomy for adenocarcinoma of the head of the pancreas.
Design: Case report, evaluation and discussion based on clinical data and literature review
Setting: Pharmacy Department and general teaching hospital, Spain
Main Outcome Measures: Detection and correction of complications associated to jejunal feeding and to improve nutritional parameters
Results: Male, age 47, weight 86 kg and BMI 28. Daily energy requirements (using adjusted weight): 1978 kcal/d, 14.5 gr N2. Hydric needs: 2250–2625 mL.

Shortly to the pancreaticduodenectomy, total parenteral nutrition (TPN) was started (1500 kcal in progress until reaching his energy requirements). In addition to parenteral nutrition, supplementation enteral nutrition was delivered via jejunostomy along four postoperative days. On post day 8, transition to a complete enteral formula was achieved (standard formula, 1 mL = 1 kcal: 2000 kcal/d). On day 12, patient complained of colic pain in upper hemiabdomen. An emergency TC revealed presence of liquid in the abdominal cavity from anastomosis pancreatogastric. With the suspect of a leak from jejunostomy, the catheter was removed. TPN was reintroduced and kept as the only way of nutrition until 15 later when oral tolerance was started.

During hospital stay (37 days) periodic blood controls were performed. Main methabolic complication was high blood sugar, needing the administration of insuline. From day 2 to 28, mean plasma levels of albumin (2.4 vs 3.1 g/dL), total proteins (4.4 vs 6.2 g/dL), total serum cholesterol (88 vs 106 mg/dL), total lymphocite count (6.9 vs 12.9%) and prealbumin (10.5 vs 16.1 mg/dL) increased significantly
Conclusions: The leak of artificial nutrition to the abdominal space in patients with jejunal feeding is a frequent complication of NE. Its incidence is probably related to the length of the tube inserted into the lumen. Protocols are need to prevent complications like tube displacement and to encourage early enteral nutrition.

Increase in plasma concentrations of nutritional parameters suggests effective uptake

NUTR-236 What place for standardized formulations of parenteral nutrition prescriptions in our neonatal intensive care unit?

Aurelie Gresser[1], Aurore Steinmetz[1], Anne Cecile Michallat[1], Pierre Kuhn[2], Dominique Astruc[2], Laurence Beretz[1]

[1]Pharmacy, [2]Pediatric Intensive Care Unit, University Hospital of Strasbourg, Strasbourg, France

Background and Objective: Parenteral nutrition (PN) is often used in newborns who are unable to tolerate sufficient enteral feeding.

Admixtures might be either prescribed and made "a la carte" according to the newborn's needs or provided by pharmaceutical companies as standard formulations. The aim of the study is to review individual PN prescriptions in a neonatology care unit in order to assess the potential for using standardized PN instead.
Design: Prospective study one day per week during 8 weeks.
Setting: Neonatal intensive care unit, Strasbourg University Hospital.
Main Outcome Measures: the major criteria for the comparison are carbohydrate concentration and then amino acid intake.
Results: 57 prescriptions were analysed and compared with a standardized formulation, Pediaven® (Fresenius Kabi). The first point of comparison based on carbohydrate concentration resulted in an exclusion of 65% (37/57) of the total prescriptions because their carbohydrate concentration was less than 8 g/100 ml or more than 12 g/100 ml (Pediaven® glucose concentration, 10 g/10 ml). Among the 20 prescriptions retained, only prescriptions whose amino acid concentration was less than 0.25 g/100 ml were included (Pediaven®: 0.2 g/100 ml). The other nutrient intakes were similar between PN prescriptions and standardized formulation. Finally, only 3.5% PN prescriptions (2/57) were similar to the standardized formulation and could have been substituted without adding extra aminoacids.
Conclusions: This standardized formulation doesn't fit the needs of our newborns in terms of carbohydrate and amino acid intakes, unless excessive fluid and/or extra aminoacids are provided. Currently, PN "a la carte" remain the preferential alternative for the physicians in our hospital for the newborns on unstable metabolic condition.
Keywords: Newborn standardized or individualised parenteral nutrition

PC-5 Evaluation of the medical service provided to outpatient clinics with hypertension in two different healthcare systems in Egypt

Manal El-Hamamsy[1]

[1]Clinical Pharmacy, Faculty of Pharmacy, Cairo, Egypt

Background and Objective: Hypertension represents a major public health concern. Large benefits, in terms of avoided cardiovascular diseases, are expected from the treatment of hypertension.
Objective:

The aim was to asses and compares the effectiveness of treating hypertension in two healthcare systems.
Design: 1. design of questionnaire, 2. administration of questionnaire, 3. data analysis
Setting: Medical out patient's clinic located in Ain Shams University Hospitals and different National Health Insurance Hospitals in Cairo, Egypt. from April 2006 to Dec. 2006.
Main Outcome Measures: 1. counseling about life style modification, 2. number of drugs used for the treatment of hypertension, 3. frequency of follow up, 4. rate of side effects, 5. compliance rate, 6. emergency room visits relating to hypertension, 7. complications rate from hypertension.
Results: The following results were obtained:
Regarding to the medical services provided to out patient clinics with hypertension in:

Ain Shams University Hospitals the following remarks were noticed:

- More care about life style modifications,
- More respect is concerned to patient desire and their opinion about medication regimen and dosage form,
- Little care about patient history or compliance
- Most of physicians did not use thiazides as the first line of treatment

National Health Insurance Hospitals the following remarks were noticed:

- The advantage of health insurance; it is free
- The disadvantages of health insurance are; routine, inefficient examination of the patient, little or no counseling at all, the unavailability of most drugs
- Little care about patient history or compliance.
- Most of physicians did not use thiazides as the first line of treatment

Conclusions: Regarding to the medical services provided to out patient clinics with hypertension in: Ain Shams University Hospitals the following remarks were noticed: More respect is concerned to patient desire and their opinion about medication regimen and dosage form, Little care about patient history or compliance. National Health Insurance Hospitals are: routine, inefficient examination of the patient, little or no counseling at all, the unavailability of most drugs. Little care about patient history or compliance. Most of physicians did not use thiazides as the first line of treatment

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Keywords: Hypertention, Heathcare system, Outpatient clinics, Clinical pharmacy

PC-9 Effect of propofol on myocardial protection after regional ischemic-reperfusion injury at in vivo rat heart model

Ilwoo Shin[1], Heon Keun Lee[1], Ju Tae Sohn[1], Young Kyun Chung[1]

[1]Department of Anesthesiology, Gyeongsang National University Hospital, Jinju, South Korea

Background and Objective: It is known that propofol protect myocardial tissue against global myocardial ischemic-reperfusion injury in the isolated rat heart model. The aim of this study was to investigate whether propofol, at a clinically relevant concentration infused during both preischemia and reperfusion (peri-ischemic) period, also provide protective effect against regional myocardial ischemic-reperfusion injury in vivo.
Design: Mail SD rats weighing between 230 and 270 g were anesthetized with 50 mg/kg of Ketamine and 3 mg/kg of Xylazine. A haparinized 24 G catheter was placed in the left femoral vein. The trachea was intubated and then mechanically ventilated with room air using a volume-controlled rodent ventilator. A left thoracotomy was performed, and the pericardium was opened. For the ischemia-reperfusion experiments, a snare was passed around a left anterior coronary artery territory to induce regional myocardial ischemia. Coronary occlusion was produced by pulling the snare and clamping it with a mosquito hemostat. Reperfusion was produced by releasing the clamp.
Setting: Rats were subjected to 25 minutes of coronary artery occlusion followed by 24 hours of reperfusion. Propofol or intralipid was administrated during 35 minutes starting 5 minutes before the onset of ischemia until 5 minutes after the onset of reperfusion.
Main Outcome Measures: The micro-manometer catheter was advanced into the left ventricle via right internal carotid artery and hemodynamic function was checked after 24 hours of reperfusion. Infarct size was determined by triphenyltetrazolium staining after 24 hours of reperfusion.
Results: Propofol administration during both preischemia and reperfusion (peri-ischemic) period showed protective effects on

myocardial function and infarct reduction. In the control group, the peak rate of ventricular pressure rise (+dP/dtmax) and the peak rate of intraventricular pressure decline (-dP/dtmin) significantly decreased than sham group. In the propofol group, the +dP/dtmax and -dP/dtmin significantly improved than conrol group. Infarct size was 50.6% of the area at risk in control group, and was reduced markedly by administration of propofol during peri-ischemic period to 20.4% in the propofol group ($P < 0.001$). Infarct size of intralipid group was 43.8% of the area at risk, intralipid had no effect on infarct size compared with the control group.
Conclusions: Propofol, at a clinically relevant concentration infused during peri-ischemic period, provided protective effect after regional myocardial ischemic-reperfusion injury at in vivo rat heart model.

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Keywords: Ischemic-reperfusion injury, Myocardial protection, Propofol

PC-11 Barriers to the implementation of clinical pharmacy in psychiatry hospital in K.S.A

Khalaf Aljumaah[1], Jawza J. S. Alsabhan,[2], Zeinab Z. J. Jaglit[2]

[1]Pharmacy, AlAmal Complex for Mental Health Care, Riyadh, [2]Pharmacy, Alamal Complex for Mental Health, Riyadh, Saudi Arabia

Background and Objective: Background:
The application of clinical services in psychiatric hospital is difficult due to many cause which are not be assessed in previous studies
Objective:
To study the barriers of clinical services for Saudi pharmacist who working in psychiatric hospital
Design: Method:
The information collecting from all pharmacists working in ministry of health psychiatric hospital through our designed Arabic questioner that composed of 7 sections. Section 1 gathered demographic information, section 2 to 6 respectively asked likert-type questions about resources barriers, attitude and opinions barriers, skills barriers, education barriers, environment barriers, and culture barriers. The questioners were distributed to the pharmacists in all the Kingdom of Saudi Arabia by the fax-machine.
Setting: all Psychiatric hospital in the Kingdom of Saudi Arabia.
Main Outcome Measures: questioners.
Results: Result:
Eighty-five pharmacists participated in our survey. The majority of pharmacists 88% agreed or strongly agreed with the statement that lack of clinical information for mentally patients, followed by 85% of pharmacist agreed or strongly agreed with the statement that lack of financial support are the most resources barrier. The attitude of pharmacist toward psychiatric patients in implementing pharmaceutical care was 60%. Half of the pharmacist participated in our survey agreed that lack of communication skills and lack of documentation can affect the performance during the application of pharmaceutical care. The most educational barriers were lack of education in psychopharmacology and lack of education in psychiatric disorder (78–72%). Several environmental factors were associated with barriers to providing pharmaceutical care for psychiatric patients. 80% pharmacist agree that patients culuter, stigmatization and language difficulty associated with the barriers for efficient practice during application of pharmaceutical care.
Conclusions: Pharmacists expressed positive attitudes toward both psychiatric patients and the providing pharmaceutical care to psychiatric patients.

PC-16 Intravenous immunoglobulin utilization in a tertiary care teaching hospital in Saudi Arabia

Abdullah Alangari[1], **Mohammed Abutaleb**[2], Ahmad Albarraq[3], Abdullatif Al-Dhowailie[2]

[1]Department of Pediatrics, College of Medicine, King Saud University, [2]Clinical Pharmacy Department, College of Pharmacy, King Saud University, [3]Pharmaceutical Services Department, King Khalid University Hospital, KSU, Riyadh, Saudi Arabia

Background and Objective: Background: Intravenous immunoglobulin (IVIG) is a plasma product that has many important therapeutic uses. There are only 6 FDA approved indications for IVIG use. However, it is used to treat a wide variety of other clinical conditions. Many studies showed high rate of off-label IVIG utilization.
Objectives: To evaluate IVIG utilization at King Khalid University Hospital, an 850 bed tertiary care academic center, over 3 years period.
Design: Methods: Patients who received IVIG in the period from January 2003 to December 2005 were identified retrospectively using the hospital computer system. Their charts were subsequently reviewed. We collected data about patients demographics, indication of IVIG, dose regimen and physician specialty. Based on recent evidence, indications were categorized into 4 different categories: FDA-labeled; off-label recommended as first line; off-label recommended as alternative; and not recommended.
Setting: King Khalid University Hospital.
Main Outcome Measures: inappropriate uses of IVIG and its costs.
Results: Results: A total of 305 patients were identified. IVIG was given to 109 (35.7%) patients for FDA-labeled indications, 29 (9.5%) patients for off-label recommended as first line indications, 97 (31.8%) for off-label recommended as alternative indications, and 70 (23%) for not recommended indications. The amount of IVIG consumed during the study period was 43.65 Kgs with an estimated cost of $1.75 million, 24.4% of which was considered inappropriate use. In terms of the prescribing physician, hematologists were the most frequent prescribers followed by neurologists.
Conclusions: Conclusions: Significant amount of IVIG was prescribed for inappropriate indications. This had a large financial burden on an already strained hospital budget.

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Keywords: Intravenous immunoglobulin, IVIG, Immunoglobulin intravenous, IGIV, Utilization, Cost

PC-28 Compliance with treatment guideline targets in an academic hemodialysis center

Simin Dashti-Khavidaki[1], Hossein Khalili[1], Seyedeh-Maryam Vahedi[1]

[1]Clinical Pharmacy, Tehran University of Medical Sciences, Tehran, Iran (Islamic Republic of)

Background and Objective: Patients with chronic renal disease (CRD) suffer several complications including metabolic disorder (hyperphosphatemia, hyperkalemia…), anemia and so on. There are several reports from various countries that show suboptimal metabolic and hypertension control in CRD patients. This study was designed to assess the achivement of treatment guidelines targets in controlling the complications of CRD in an academic hemodialysis center in IRAN.
Design: During a cross-sectional study in the hemodialysis (HD) center of Imam Referral Hospital affiliated to Tehran University (Medical Sciences), 94 patients on routine maintenance HD for three sessions per week and four hours in each session were evaluated for metabolic (calcium (Ca), phosphorus (P), albumin (Alb)), anemia and secondary hyperparathyroidism control according to National Kidney Foundation-Kidney Disease Outcomes Quality Initiative (K/DOQI) guidelines.
Setting: Hemodialysis (HD) center of Imam Referral Hospital affiliated to Tehran University (Medical Sciences).
Main Outcome Measures: metabolic (calcium (Ca), phosphorus (P), albumin (Alb)), anemia and serum parathyroid hormone control according to National Kidney Foundation-Kidney Disease Outcomes Quality Initiative (K/DOQI) guidelines.
Results: The results showed hemoglobin level of less than 10 g/dL in 52.2% of the subjects, transferrin saturation (TSAT) of less than 20% in 77.2% of the HD patients, TSAT $< 20\%$ and ferritin < 100 ng/mL in 7.6% of the patients, serum Alb level of less than 4 g/dL in 37% of the patients, serum P level of more than 5.5 mg/dL in 57.6% of the subjects, Ca $\times$ P product of more than 55 in 38% of the patients, Parathyroid hormone (PTH) < 150 pg/mL (adynamic bone disease) in 23.9% of the subjects and serum PTH concentration of more than 300 pg/mL (uncontrolled secondary hyperparathyroidism) in 48.9% of the subjects.
Conclusions: The results showed that more than half of the HD patients need erythropoietin and ferrous dose adjustment or follow up for resistant anemia, more than half of the subjects need phosphate binders dose adjustment or replacement and about 20% of he patients need rocaltrol dose adjustment.

We are planning to compare these results with the findings following the participation of a clinical pharmacist in this HD center rounds and monitoring of HD patients.

Since enough management of complications of CRD patients and their drugs monitoring are necessary to improve quality of life of HD patients, clinical pharmacist may have a major role in HD centers.

Reference

www.kidney.org/proffesionals/kdoqi/guidelines

Keywords: Hemodialysis, Anemia, Treatment targets

PC-29 Action of a working group depending on our drug commission for the use of a computerized physician order entry (CPOE)

Catherine Bouiri[1], Frédérique Bouchand[1], Coralie Lepage[1], Violette Pincemail[1], Annie Merlin[1], Djillali Annane[2], Maryvonne Villart[1]

[1]Pharmacy, [2]Intensive Care Unit, Hopital Raymond Poincaré, AP-HP, Garches, France

Background and Objective: Computerization of our drug circuit has been deployed gradually to every hospitalisation units of our hospital since 2003. Pharmacists coordinated the extension, the installation and the support for starting. They were the first interlocutors to analyze dysfunctions and to help solving them. Difficulties encountered by nurses were often notified to head nurses and transmitted to pharmacists. The objective was to study as a whole difficulties of users and to bring a workable solution to their problems.
Design: A working subgroup depending on the drug commission was created. It was composed with 12 nurses from different departments (intensive care, infectious, pediatric and rehabilitation departments), 4 head nurses and 2 pharmacists. Several meetings, organized between October and December 2006, made it possible to the participants to announce their difficulties. Reports were written and diffused for validation.
Setting: Pharmacy and hospitalization units of Raymond Poincaré university hospital, AP-HP, Garches, France.
Main Outcome Measures: Correct knowledge and appropriate use of the CPOE nurse module were analysed thanks to questions and remarks of the members of the working group.
Results: It appeared that uncorrect use of the CPOE nurse module caused dysfunctions. Because some dysfunctions repeated several times (uncorrect ordering support, uncorrect reading of dosage units, registration of infusion settings…), it appeared necessary to compile a document named "Good practices for the use of CPOE nurse module". This document pointed out several stages to be respected from prescription of a treatment to validation of its administration: 11 points, including, amongst others, checking of the ordering support documents, dosage units, methods of administration, … were then diffused to each head nurse of computerized units.
Conclusions: This working method made it possible to highlight the central role of our drug commission and the transverse role of its working groups, the exhaustiveness of analysis in collecting difficulties of use of a common software. The created document succeeded in helping nurses to solve the main dysfunctions.
Additional working subgroups could be created to analyse each other stage of the drug circuit (orders, protocols, safeguards, patient files, etc…), to carry out the study of its development and to take part in its appraisal.
Keywords: Drug commission, Drug circuit, CPOE, Good practices

PC-40 Analysis of the activity in a dispensing unit aimed to external patients

Elvira Gea[1], Maria Dolores García[1], Esperanza Gil[1], Nuria Barral[1]

[1]Pharmacy Department, Nostra Senyora de Meritxell, Escaldes-Engordany, Andorra

Background and Objective: Analyse the evolution of the supporting activity and the economic impact of the dispensed medicines in a unit of pharmaceutical attention to external patients (UPAEP).
Design: Observational and retrospective study during three years (2004–2006) carried out in a UPAEP.
Setting: UPAEP. 200 bedded hospital that covers all the country's population (84.000 inhabitants).
Main Outcome Measures:

- The measurement unit for the supporting activity is: number of patients assisted. The descriptive study has been carried out by pathology and per year.
- The economic impact has been worked out based on the medicines consumption of each treated pathology applying the retail price. This has been related to the total consumption of the unit per year.

Results: Number total of patients in 2004:165, 2005:208, 2006:207. Classification by pathology and per year:

2004: Chronic Kidney Failure (CKF): 44 patients (26.6%), others: 32 (19.4%), Human Immunodeficiency Virus (HIV): 27 (16.4%),

Rheumatic Illness (RI): 27 (16.4%), Multiple Sclerosis (MS): 21 (12.7%), Hepatitis C (HC): 14 (8.5%).
2005: CFK: 57 (27.4%), Others: 51 (24.5%), RI: 37 (17.8%), HIV: 27 (13.0%), MS: 22 (10.6%), HC: 14 (6.74%).
2006: CFK: 52 (25.2%), RI: 47 (22.7%), Others: 39 (18.8%), HIV: 27 (13.0%), MS: 23 (11.1%). HC: 19 (9.2%).

Classification by economic impact and per year:

2004: RI: 247,105 € (26.7%), MS: 243,184 € (26.2%), HIV: 230,076 € (24.8%), HC: 89,760 € (9.7), Others: 63,657 € (6.9%), CFK: 52,618 € (5.7%). Total economic impact (TEI): 926,399 €.
2005: RI: 398,264 € (31.7%), HIV: 263,625 € (20.9%), MS: 233,593 € (18.6%), HC: 167,499 € (13.3%), Others: 107,837 € (8.6%), CFK: 86,509 € (6.9%). TEI: 1,257,328 €.
2006: RI: 401,833 € (33.5%), HIV: 230,621 € (19.3%), MS: 222,770 € (18.6%), HC: 156,461 € (13.1%), Others: 94,197 € (7.9%). CFK: 91,764 € (7.6%). TEI: 1.197,647 €.

Conclusions

- The UPAEP undergoes a growth (25%) in total supporting activity in 2005 which stables in 2006.
- The growth in the supporting activity of RI and CKF is paralleled to the growth in the economic cost.
- Decrease the economic cost in MS because of a decrease in medicines' retail prices.
- The economic variations occurred in HIV is due to the treatment changes.

Keywords: External patients, Economic impact, Activity impact

PC-50 The patient–pharmacist communication in a community pharmacy chain in Romania

Diana Simona Negru[1], Ana Maria Petculescu[2], Aurelia Nicoleta Cristea[1]

[1]Pharmacology and Clinical Pharmacy, University of Medicine and Pharmacy, [2]Marketing, SC SIEPCOFAR SA, Bucharest, Romania

Background and Objective
To evaluate the pharmacist – patient communication and the level of counseling for OTC and prescription drugs dispense;

to improve the professional relationship between the patient and the community pharmacist;

to assess the effect of clinical pharmacist intervention over those parameters.
Design: interventional study (visits done by clinical pharmacists, especially employed for), repeated after 2 weeks and again after 6 months.
Setting: 37 chain pharmacies from Bucharest, Romania.
Main Outcome Measures: The investigation was conducted using a multiple sections protocol. The assessed parameters were: pharmacist's attitude toward the patients, his/her availability to communication and the level of counseling when OTC or prescription medication is released.
Results: During the first visit, in sixteen pharmacies only (43%) the pharmacists greet the patients. Two weeks later after the intervention, this number increased to 28 (75%), although after six moths it decreased to 23 pharmacies (62%).

In more than 60% of the chain pharmacies, the professionals had a positive attitude toward the patients. As an example, an empathic approach has been encountered initially in 25 pharmacies (68%), then in 28 pharmacies (75%) and finally raised up to 30 pharmacies (81%) after 6 months.

Although the clinical pharmacist's intervention (therapeutic counseling) had positive impact, the extent of minimal counseling at OTC or prescription drugs dispensing was found to be low at the first visit, since it increased from 7 to 12 pharmacies (20 to 32%) only, during the study period.
Conclusions: The processed data showed a very low level of minimal counseling (32% at the end of surveillance period). By considering the patients benefits (quality of life, better control and management of chronic diseases, reduction of medication costs), the pharmacist interventions are imperatively needed in Bucharest chain community pharmacies.
Keywords: community pharmacy, Counseling, Communication

PC-51 Pharmaceutical care level in Romania community pharmacies

Diana Simona Negru[1], Ioana Delia Cosma[2], Ana Maria Petculescu[3], Aurelia Nicoleta Cristea[1]

[1]Pharmacology and Clinical Pharmacy, University of Medicine and Pharmacy, Bucharest, [2]Community Pharmacy, SC ALDEDRA SRL, Cluj Napoca, [3]Marketing, SC SIEPCOFAR SA, Bucharest, Romania

Background and Objective: to compare the level of minimal consultation services in chain community pharmacies located in city center or district of Bucharest (capital city) vs. independent pharmacy in a country town (Cluj-Napoca).
Design: prospective, 3 months, multicenter study.
Setting: 5 pharmacies accepted to fill in the study protocols. Both shifts were covered, Monday to Friday (week-end days not included).
Main Outcome Measures: The investigation was conducted using a multiple sections protocol. The assessed parameters were: the level of minimal consultation when OTC and prescription medications are dispensed and the extent of chronic medication release without a medical prescription. At the end of trial period, the results were centralized on weekly and monthly protocols. The interpretation of the collected data was done using percentile calculations.
Results: To evaluate the minimal consultation, the percentage of counseled patients from the monthly total was calculated, separately for OTC and for prescription drugs dispense. The period of the study (from June 2006 to January 2007) was divided in various slices of 3 consecutive months, when certain pharmacies were compared.

The level of OTC medication counseling in the five studied pharmacies is different and varies from 25 to 70% (maximum level reached in the country town pharmacy). The counseling level for medication on prescription varied from 40 to 100%.

By counting separately, the percentage of patients who requested chronic medication without presenting a prescription is as high as up to 30%.
Conclusions: The level of counseling, especially for OTC drugs (recommended or auto-medication), was generally low in the studied pharmacies and may threat the health state of the patients, due to improper administration. As a third of patients come in pharmacy and request chronic medication without a physician's prescription, this commonly leads to complications which aren't discovered and treated in time.
Keywords: Minimal consultation, Counseling

PC-61 Medication administration in nursing homes: can pharmacists contribute to error prevention?

Charlotte Verrue[1], Nele Verhaeghe[1], Annemie Somers[2], Mirko Petrovic[3], Els Mehuys[1]

[1]Pharmaceutical Care Unit, Faculty of Pharmaceutical Sciences – Ghent University, [2]Department of Pharmacy, [3]Department of Geriatrics, Ghent University Hospital, Gent, Belgium

Background and Objective: The quality of medication use in nursing homes (NHs) is subject to growing concern. Focus should not only be on appropriateness of prescribing, but also on correct

administration of the medication. The aim of this study was to investigate 1) the type and frequency of medication administration errors in NHs, 2) their clinical relevance and 3) whether a training session by a pharmacist on good medication administration practices can contribute to the prevention of the detected errors.

Design: The study had a pre-post design. During the first phase (pre), medication administration was observed during 5 days per ward by 2 pharmacists (Barker method). Phase 2 (intervention) consisted of a general information session on good medication administration principles provided by the 2 pharmacists to the nursing staff. Moreover, the observed errors were discussed with the head nurse of each ward. Phase 3 (post) took part one month after the intervention and consisted again of a 5-day observation on each ward. Finally, in the last phase (phase 4), the clinical relevance of the detected errors was scored by an expert panel (geriatrician and clinical pharmacist).

Setting: 2 volunteering NHs with different medication distribution systems. In total, medication administration was observed for 122 residents.

Main Outcome Measures

Results: The number of detected errors was considerably lower in NH2 than in NH1. However, the type of errors did not differ. Besides the unnecessary or forgotten preparation of medication, most problems occurred during the administration stage. 23.6% of crushed medications indeed were not suitable for crushing. The same applied to 43.5% of the opened capsules. Moreover, the crushing hygiene was problematic: all medications for one resident were crushed together and the crushing device was not cleaned between different residents. Inhalation techniques were inadequate in almost all cases (insufficient inhalation by the resident, coordination problems or expiration in the device). Furthermore, specific administration moments were not taken into account. For example, the administration of alendronate (Fosamax®) was observed in a horizontal position after breakfast, while it should be administered 30 minutes prior to breakfast in a vertical position. The nursing staff experienced the training course by the pharmacists as very interesting. 53.6% of the attendants found that the discussed topics were not sufficiently covered during their education. Preliminary results of phase 3 showed a considerable diminution of detected errors in NH2, as well as on 1 ward of NH1. The clinical relevance of the observed errors still has to be scored. These results are expected by September 2007.

Conclusions: The quality of medication administration in nursing homes is potentially problematic, independently of the distribution system. Pharmacists can possibly contribute to the prevention of medication administration errors, but the impact of such intervention highly depends on the goodwill of the nursing staff.

Keywords: Nursing homes, Medication administration, Error prevention

PC-63 Assessment of the off-label use of intravitreal bevacizumab therapy for macular edema

Yolanda Castellanos[1], Rafael Carpio[2], Mario García[1], Ana Ontañón[1], Beatriz Candel[1], Francisco J. Farfán[1]

[1]Pharmacy Department, [2]Ophthalmology Department, Fuenlabrada University Hospital, Madrid, Spain

Background and Objective: The off-label use of intravitreal injection of bevacizumab (IIB) for the treatment of macular edema (ME) requires the approval of its use by Health authorities. Pharmacy Department (PD) participates in that process, assessing each treatment request and preparing a sterile syringe for intravitreal administration. Our aim is to evaluate the short term anatomic and visual acuity (VA) response after IIB in patients affected of ME due to diabetic retinopathy or retinal vein thrombosis.

Design: Retrospective study of patients treated with IIB during a period of 7 months (December 2006–June 2007).

Setting: Ophthalmology Department and PD in a general hospital.

Main Outcome Measures: VA and central retinal thickness (CRT).

Results: Of 13 eyes of 13 patients with ME who where treated with IIB 1.25 mg, we excluded 7 eyes of the study due to: 5 eyes had a VA that could not be measured by decimal scale (patients were unable to read the letter chart at any distance and they had to be tested using counting fingers and hand motion) and the other 2 eyes had suffered other ophthalmologic interventions at the time they received IIB. Therefore, only 6 patients were included. All eyes received one IIB, except one eye that received two. Most of the eyes had undergone previous treatments, such as laser therapy (50%), vitrectomy (33%) and intravitreal triamcinolone (50%). At baseline, mean VA of the eyes which received one IIB was 0.25 (range, 0.15–0.4) and one week after IIB increased to 0.48 (range, 0.2–0.8), excluding one patient who has a VA = 0.05 which decreased and had to be tested using counting fingers. Considering mean CRT of the previous 5 yes, it decreased from 373.8 μm (range, 267–703 μm) to 233.4 μm (range, 148–431 μm). Regarding to the eye which received two IIB, VA increased from 0.3 to 0.5 and CRT decreased from 650 to 596 μm.

Conclusions

- IIB resulted in a decrease in CRT, therefore, a decrease in ME, and in an improvement in VA, except in one patient who had a reduced VA before the treatment.
- Although the number of patients included in the study and the follow-up period were too short to provide specific treatment recommendations, the results are hopeful and encourage further studies considering a longer follow-up.

Keywords: Intravitreal bevacizumab therapy, Macular Edema

PC-64 Implementation of a clinical helpline service in the entire hospital

Sara Bink[1], Elke De Troy[1], Caroline Devolder[1], Jaak Damiaans[1]

[1]Pharmacy, Virga Jesseziekenhuis, Hasselt, Belgium

Background and Objective: The objective of this project is to spread clinical pharmacy services over the entire hospital without having a clinical pharmacist on every ward. At this moment we have three pharmacists for four wards. The clinical helpline should be easy and simple to contact by e-mail.

Design: The questions are collected on a central e-mail address: klinischefarmacie@virgajesse.be.

Three pharmacists take care of answering the questions day by day, on a continuous base.

The aim is to give an answer within 24 hours.

Setting: All three pharmacists are working in the Virga Jesse Hospital, a large peripheral hospital of 600 beds in Belgium.

Main Outcome Measures: Implementation of the clinical helpline in the entire hospital. To make sure clinical pharmacy services are known by every physician and nurse and are easy to contact.

Results: We made an e-mail address and a schedule, so every day another clinical pharmacist is responsible for answering the questions. To let the physicians and nurses on the ward know we exist, we made flyers with the address and the explanation of the service. On a patient safety congress in the hospital, the clinical pharmacists presented a lecture concerning the advantages of clinical pharmacy services.

The main aim is to explore other ways of delivering clinical pharmacy services. In Belgium, the hospitals don't have a tradition of clinical pharmacy and there is no governmental support for this pharmaceutical function. With the clinical helpline we try to spread our services without having a clinical pharmacist on every ward.

In the pharmacy we prepare the question thoroughly on paper. The clinical pharmacist has computerized access to all necessary medical information and pharmaceutical data. Afterwards the pharmacist goes to the ward, to see the patient and to have a discussion with the physician. The physician can decide if he agrees with the given pharmaceutical advice or not. The clinical pharmacist has only an advisory function and doesn't do any therapeutic changes in the prescription.

By collaboration of several caregivers, the patient receives a more complete and optimal therapy in our hospital.

Conclusions: By implementation of a clinical helpline, by an e-mail address, it is possible to spread our clinical pharmacy services over the entire hospital, without having a clinical pharmacist on every ward. The aim is to make an advice and go to the ward to discuss it with the doctor.

Not only physicians can use this e-mail address, also nurses can ask their questions. In this way we reach every caregiver.

Keywords: Helpline, Pharmaceutical advice, e-mail Address

PC-74 Frequency and nature of drug related problems in psychiatry: 10 years later

Akram Barrak[1], Isabelle De Beauchamp[1], Marie-Christine Alberto[1]

[1]Pharmacy, Saint Egrève Hospital Center, Saint Egrève, France

Background and Objective: In hospital, medication of psychiatric pathology is very complex, because comorbidities and risk factors in one hand and therapy resistance in the other hand. That leads to potential drug related problems (DRP) increasing the role of pharmacist in order to improve medication appropriateness.

Design: During 3 months, we undertook a retrospectif review of pharmacist's interventions (PI). Then, we classified it according to standardized classification suggested by the SFPC (French society of Clinical Pharmacy).

Setting: A review of prescriptions after PI was made in order to evaluate the impact of our interventions.

Main Outcome Measures: To identify frequency and nature of DRP and the impact of PI on patient's medications.

Results: 5269 prescriptions were analysed by pharmacists. The rate of PI was 4%.

67% of these PI was followed by modification of the prescription few days later.

This study showed that 47% of the opinions were related to psychotropic drug overdose (often confirmed by psychiatrists after PI), especially neuroleptics, the most prescribed therapeutic class on the establishment.

21.1% of the PI was related to inappropriateness to available guidelines. We note an important proportion of no respect of correct use recommendations of long-Acting rispéridone injection: no respect of posological equivalence, patients not stabilized by oral way, insufficient period of co-administration oral/IM during the initialization of treatment…

2.16% of PI was guiding to drug management and to clinical and biological monitoring.

Drug related problems still under estimated without clinical and biological data accessible to pharmacists.

However, PI may identify the risks related to therapeutic, to prevent potential problems, to reinforce the clinical and biological monitoring.

Comparison with a similar retrospectif study in 1998 shows that the number of prescriptions was increased (4030 in 1998 Vs 5269), and number of PI doubled.

However, nature and type of PI are virtually the same.

Conclusions: In order to reduce DRP of overdose (the most frequent problem), an information strategy targeted to psychiatrists was developed and a updated list of maximal psychotrops posology was diffused and put on line.

Our study doesn't include problem of second –generation atypical antipsychotics association, this association still increasing despite fewer evidence and lucid guidelines;

A second study will be soon conducted to identify PI having a significant clinical impact.

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Keywords: Drug related problems, Pharmacist's interventions, Clinical pharmacy

PC-75 Information fact sheet: Is it the best tool to spread information? Study about intravenous acetaminophen (IVA) administration

Afroun Amina[1], Benameur N. B. Neila[1], Menneglier B. M. Beatrice[1], Nguyen-Kim L. N. Luc[1], Casimir N. C. Nadine[1], Antignac M. A. Marie[1], Farinotti R. F. Robert[1]

[1]Pharmacy, Hospital pitié salpetriere, Paris, France

Background and Objective: Serious episodes of air embolism (with death cases) were recorded due to intravenous acetaminophen administration (IVA) in a central catheter without electric syringe (linked to the glass packaging).

Results of a previous study performed in 2005 showed that guidelines set up by Drug Regulatory Agency (AFSSAPS) about IVA weren't known and followed by clinical units. Information fact sheet was sent to all physicians about guideline's recall. In 2006 a second prospective study was designed with aim to evaluate the impact of this information fact sheet.

Design: The Acetaminophen IV consumption expressed on days of treatment was studied. Questionnaire was designed to record data on patient to which IVA was prescribed. Items were: Clinical indication, opportunity of an oral route, criteria of choice for the route of injection, prevalence of peripheral route in comparison to central administration, presence of an electric syringe if central route is chosen. Pharmacy students were asked to fulfil the questionnaire during two weeks.

Setting: Sixteen clinical units in a large teaching hospital (2000 beds) were prospected.

Main Outcome Measures: Prescriptions of Acetaminophen IV: number, oral intake opportunity.

Results: 46 prescriptions were analyzed and 145 administrations were recorded. No decrease of Acetaminophen IV consumption values were observed in comparison to 2005 study. In 65% of IVA prescriptions, oral route was possible vs 44% in 2005. 20% of cases were in clinical trials. The main reason to choose IV administration was the presence of another infusion prescription (33% vs 48%). Only 13% of infusion intake switched to oral intake before the end of treatment. No electric syringe was used when central administration was chosen (5 cases).

Conclusions: This study showed that clinical practices don't change even after reminding guidelines. Information by fact sheet is not the best tool to spread guidelines. Study's results will be submitted to an interactive presentation in medical staff, and clinical trials with IVA are discussed and changed with Acetaminophen oral route.

Reference

Guidelines set up by the Drug Regulatory French Agency (AFSSAPS) about IVA

Keywords: Acetaminophen, Guidelines afssaps, Information, Prescriptions

PC-76 Activity assessment and patient survey by outpatient pharmaceutical care unit

Gonzalo Rodriguez Torne[1], Maria Carmen Iranzu Aperte[1], Beatriz Gonzalez Joga[1], Maria Antonia Berrocal Javato[1], Milagros Gomez-Serranillos Reus[1]

[1]Pharmacy Service, Hospital Nuestra Senora del Prado, Talavera de la Reina, Spain

Background and Objective: To assess quantity and quality of care by an outpatient pharmaceutical care unit from patient satisfaction regarding the unit's activities.
Design: 5 months transversal study using a patient survey. Analyses of the Pharmaceutical care using activities register data. Literature review.
Setting: Outpatient pharmaceutical care unit. Pharmacy Service.
Main Outcome Measures: The pharmaceutical care was evaluated regarding six points that were registered in a database: drug interaction, adverse reaction, drug information, daily dose and frequency, psychological support and drug manipulation. Patient satisfactions were obtained using a patient survey according to eight points: communication, interaction with professionals, unit location, waiting time, intimacy of the unit, timetable, information delivered and overall satisfaction.
Results: 970 activities of pharmaceutical care were realized, of which 231 (23.81%) were daily dose and frequency, 306 (31.54%) adverse reaction, 133 (13.71%) drug information, 14 (1.44%) psychological support and 66 (6.80%) drug interaction. 278 surveys (74% of patient) were provided. Best assessment included communication (4.68 points over 5), overall satisfaction (4.44 points) and, intimacy of the unit (4.46 points). Worst assessment included timetable (3.93 points) and information delivered (4.41 points). Mean values and standard deviation in this study were 4.02 ± 0.79, whereas median were 4.40 points.
Conclusions: A high number of patients needs explanation of dose and frequency as well as warning of possible adverse reactions. The high scores suggest us a good benefit of pharmaceutical care in this kind of patient. Bad assessments were very useful to identify areas of improvement.

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Keywords: Pharmaceutical care, Patients' satisfaction, Outpatient

PC-78 Implementation of an intervention to reduce long-term benzodiazepine use in Dutch community pharmacies

Caroline van de Steeg-van Gompel[1], Michel J. P. Wensing[1], Peter A. G. M. de Smet[2]

[1]Centre for Quality of Care Research WOK, [2]Department of Clinical Pharmacy, Radboud University Nijmegen Medical Centre, Nijmegen, Netherlands

Background and Objective: Although guidelines recommend limited prescription of benzodiazepines, long-term use still is a problem. An informative letter is effective in reducing it. It is not known which implementation strategy is efficient in implementing this intervention in community pharmacies. The aim of this study was, to compare two strategies for implementing the intervention.
Design: A cluster randomized trial. Control group pharmacies received an educational manual and electronic version of the letter. Supplementary, the intervention group had an educational meeting and at least one telephone call by an individual coach.
Setting: 90 community pharmacies participated in the study: 43 in the control, 47 in the intervention group. Patients were selected if they had at least 4 prescriptions for benzodiazepines for at least 91 dose units in total in the previous year, and for at least 60 dose units in the previous three months ($n = 25.673$). The general practitioner (GP) reviewed the patient selection for patient exclusion.
Main Outcome Measures: The proportion of GP's that received, reviewed and returned the patient selection to the pharmacist, and the proportion of long-term users that received the informative letter.
Results: Substantially more pharmacists in the intervention (77%) than in the control group (51%) handed over the patient selection to their GP's. 52% resp. 36% of the GP's received (n.s.), and 38% resp. 30% of the GP's reviewed and returned the list (n.s.). Substantially more pharmacies in the intervention group got back any lists (70% vs 49%) and sent any letters (66% vs 40%). 20% and 13% of all long-term users received the informative letter in the intervention resp. control groep (n.s.).
Conclusions: The maximal implementation strategy was effective in getting the pharmacists started. The main outcome measures were not significantly different in both groups, though the realized effect on a large scale was relevant in practice.

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Keywords: Implementation study, Community, Pharmacy services, Benzodiazepines, Therapeutic use

PC-84 Awareness and knowledge of the pharmacists about pharmacovigilance in Turkey: a descriptive pilot study

Aygin Bayraktar[1], Pinar T. Kocagul[1], Nihan E. Mistepe[1], Kutay Demirkan[1]

[1]Faculty of Pharmacy, Hacettepe University, Ankara, Turkey

Background and Objective: To identify pharmacists' awareness, knowledge and their attitudes towards 'pharmacovigilance', which is a new term for Turkish pharmacists in reporting adverse drug reactions (ADRs), after the National Regulations comes into force by the Turkish Ministry of Health in June 2005.
Design: Descriptive pilot study, comparison of the questionnaire results at the different time periods.

Setting: Randomly selected academician, community and hospital pharmacists in Ankara/Turkey.
Main Outcome Measures: Awareness of pharmacists about pharmacovigilance.
Results: The questionnaire was undertaken during a week, both in October 2004 (period-1) and in October 2006 (period-2) and a total of sixty pharmacists participated (30 pharmacists in each time period) in the study. The pharmacists were randomly selected and 10 pharmacists from each pharmacy profession (hospital, community and academia) were interviewed at the each time period.

Of the participants, total of 6.7% has heard of the term 'pharmacovigilance' in the period-1, which is entirely the academicians, while it is increased to 66.7% in the period-2 (chi-square test with Yates correction, $p < 0.05$), which are mainly expressed by the hospital (33.3%) and academician (23.3%) pharmacists.

During the period-1, only 20% of the participants know where to report any ADRs (13.3% academicians and 6.7% hospital pharmacists), whereas during the period-2, this figure is increased to 40% (13.3% academicians, 20% hospital and 6.7% community pharmacists) ($p > 0.05$).

The participants preferred to report any ADRs mainly by the internet (66.7% vs 50%) and by the telephone (30% vs 46.7%) at the period-1 and the period-2, respectively ($p > 0.05$).

In terms of having reported any ADRs among the participants, it is indicated that none of the pharmacists reported ADRs at the period-1, but only three hospital pharmacists reported an ADR at the period-2.
Conclusions: By the National Regulations for pharmacovigilance, the pharmacists are entitled to report any ADRs to the Turkish Pharmacovigilance Centre. Although this study is limited by the small number of pharmacists and location, it shows that there is an increased awareness and knowledge about pharmacovigilance. By the provision of pharmaceutical care, pharmacists' involvement in detecting and reporting ADRs will improve, mainly in hospital and in community settings.
Keywords: Pharmacovigilance, Pharmaceutical care

PC-86 Global versus individual drug dispensing: clinical impact of the intercepted dispensing errors

Déborah Schlecht[1], Céline C. F. Flattet[1], Sebastien S. B. Bauer[1], Xavier X. P. Pourrat[1], Jacqueline J. G. Grassin[1]

[1]Pharmacy, University hospital of tours, TOURS, France

Background and Objective: In France, global drug dispensing (GDD) is the common way to dispense drug inpatient. After an experience of implementation of individual drug dispensing (IDD) the objective of the department of pharmacy was to prove the benefit offered by this system in comparing the clinical impact of the intercepted dispensing errors of both dispensing system.
Design: Thirty days prospective study.
Setting: Orthopaedic surgical care unit; department of pharmacy.
Main Outcome Measures: Data related to drug preparation were collected by two pharm D students over a 30 days period and analysed. Identified preparation errors were classified in four groups: discordance between prescription and drug administration, exceeding or missing treatment and, unidentified delivered drugs. Then errors were classified in potential or effective errors. At last, pharmacist and prescriber have quote this errors. Preparation errors were classified according to their clinical impact from 0 (no clinical impact) to 3 (life threatening).
Results: 1 631 drugs units were prepared with GDD vs 1 446 with IDD. Eighty effectives errors (4.90%) were observed with GDD and 11 (0.76%) with IDD. Clinical impact were 0 (34%), 1 (36%), 2 (30%) for GDD and 0 (90%), 1 (10%) and 2 (0%) for IDD. A Khi 2 test highlight a difference between the 2 dispensing system for clinical impact 0 and 2 ($p < 0.05$). Moreover, the mean value of weighting was about 0.95 with GDD vs 0.09 with IDD ($p < 0.001$).
Conclusions: This study shows the major benefit offered by IDD versus GDD. Errors weighting represent a relevant parameter for physicians. The results provided by this study highlight the role of the pharmacy staff, to reduce the incidence of medication errors and to promote a rational use of medicines. This work was the second step of our quality medication process; the next step will be the development of IDD in several care unit by use and test automated process for preparing doses.
Keywords: Individual drug dispensing, Preparation errors

PC-88 Evaluation of drugs prepared by nurses in pediatric care units

Marie-Odile Duzanski[1], Anne-Cécile Michallat[1], Juliette Kern[1], Anne A. C. Gairard-Dory[1], Laurence Beretz[1]

[1]Pharmacy, University Hospital of Strasbourg, Strasbourg, France

Background and Objective: Lack of pediatric drug formulations can cause medication mistakes.
The main issue of our study was to assess the difficulties faced by nursing staff in preparation, administration of pediatric medications and to propose adapted solutions.
Design: We conducted a prospective study to assess how drugs are prepared and administrated by nurses.
Setting: Pediatric Department of Strasbourg University Hospital.
Main Outcome Measures: Review of prescriptions from five care units (101 beds) every morning for a 3-week period from December 2006 to January 2007. For each prescription we collected information about the patient, the prescribed drug, the steps involved in its preparation and its administration.
Results: We collected 279 prescriptions (126 different drugs) concerning 77 children (average age: 6 years). Sixty-two percent of medications were oral forms: 49% liquids, 25% tablets, 19% capsules. Thirty-two percent of the tablets were cut; only 30% of those were authorized. Due to the age, 44% of the tablets were crushed to facilitate administration whereas grinding was allowed in only 31% of the cases. Most of the capsules were opened (71%) and 6% fractionated for an adapted dose. Opening of capsules was possible in 92% of the cases. Intravenous drugs represented 29%, the average injection was 71.5% of the vial; in 14%, less than a quarter was given.
Conclusions: About 20% of pediatric preparations were inappropriate. The results of this study highlight the need to provide drugs adapted to pediatric care, which is one of the main tasks of the pharmacy. We are thus developing more appropriate pharmaceutical formulations for children, such as oral suspensions. A comparative statement of solubilization rates in liquid of crushed tablets or capsules after opening has to be established. Moreover if a pharmacist is present in the care units, most medication error will be avoided.
Keywords: Drugs, Preparation, Paediatry

PC-109 Implementation of dadér methodology for pharmacotherapy follow-up in hospitalized geriatric patients

Nadine Ribeiro[1], **Patricia Cavaco**[1], Fatima Falcao[2]

[1]Pharmacy Department, Hospital de Sao Francisco Xavier, CHLO, [2]Faculty of Pharmacy of Lisbon University, Pharmacy Department of CHLO, Lisbon, Portugal

Background and Objective: The world's population is aging. The elderly have many chronic disorders and consequently use more drugs than any other age group. Safe, effective pharmacotherapy is one of the

greatest challenges in clinical geriatrics. Among the many assessment tools that combined structured review criteria and implicit judgment that appeared with the advance of pharmaceutical care, Dáder Method is a tool designed for pharmacotherapeutic follow-up. This methodology consists in identifying, preventing and resolving Drug Related Problems (DRP) in a continuous, systematic and documented approach, considering three scaled domains to measure inappropriate prescribing: necessity, efficacy and safety. In order to optimize the elderly hospitalized patients pharmacotherapy, our Pharmacy Department applied Dadér methodology to review their prescriptions.

Design: Eight months retrospective study of pharmacotherapy follow-up by Dáder method.

Setting: Internal Medicine Ward of S. Francisco Xavier Hospital, CHLO (general hospital).

Main Outcome Measures: Evaluation of Health Problems (HP), pharmacotherapy reviews, identification of DRP and clinical outcomes from the pharmacist's interventions.

Results: Analysed patients have a mean age of 71.9 years, and an average of 4.8 HP and 18.5 drugs/patient. Application of Dáder's criteria found that 18.3% of the 698 elderly patients evaluated have at least one serious health problems related to their pharmacotherapy, presenting an average 1.15 of DRP that needed the pharmacist intervention (total of 143 DRPs). 52% of those DRPs were safety related, 39% were about necessity and 7% about efficacy. In relation to the degree of acceptance upon the pharmacist's interventions, from the 143 interventions made, 80 were accepted and 63 refused by the doctor. Nevertheless, 88% of the detected real or potential HP were resolved or never happened.

Conclusions: Elderly are a very needed patient's group for pharmaceutical care: they have multiple chronic diseases, are polimedicated and are especially vulnerable to the adverse effects of medications. With Dáder Methodology for pharmacotherapy follow-up, clinical pharmacists can provide valuable services to the elderly, achieving maximum affectivity from their pharmacotherapy, decreasing the rate of preventable ADRs, improving compliance, simplifying drug regimens, and producing direct cost savings. The final purpose is to achieve definite patient outcomes by promoting rational use of drugs, as it happened in the elderly patients analysed.

Keywords: Pharmacotherapy follow-up, Dáder, Geriatrics

PC-111 Analyze antibiotherapy in a surgical intensive care unit

Christelle Landy[1], Isabelle Tiret[1], Céline Méchin[1], Benoit Weber[2], Bernard Dieu[1]

[1]Pharmacy, [2]Surgical intensive care, University Hospital Rouen, Rouen, France

Background and Objective: In spite of the multiplication of recommendations, the over consumption of antibiotics and their misuse lead to the emergence of resistances while new antibiotics get rare. The objective of the study is to analyze the prescription of antibiotics in the surgical intensive care unit of Rouen hospital.

Design: An analysis of all patients entering in the unit and receiving antibiotics was conducted over 2 months (from November to December 2006). The required informations about the antibiotics prescribed (indication, posology, duration, monitoring) were collected in files (report of hospitalization, biological and bacteriological results).

Setting: Surgical intensive care unit in Rouen hospital

Main Outcome Measures: We determined the number of prophylactic, probabilistic and curative treatments, their duration and the molecules prescribed, in connection with the germs responsible for the treated infections.

Results: Fifty patients received antibiotics according to several schemes.

Nineteen patients received prophylactic treatments during 3.3 days on average. The employed molecules were mostly part of beta-lactams' family (84.2%) including 87.5% of Co-amoxiclav. The prophylactic treatment seemed to be effective in 73.7% of case because it wasn't followed by other treatment.

Thirty-one patients received probabilistic treatment: 19.3% of them received quadruple therapies, 22.6% received triple therapies, 35.5% bitherapies, and 22.5% monotherapies (only beta-lactams). The average duration of the probabilistic treatment was 3 days.

Twenty-three patients got curative treatment. Compared with the probabilistic treatment or with the treatment at the entry, the curative treatment corresponded to a reduction of the spectrum in 75% of cases with mainly an arrest of the vancomycin (55%). Monotherapy was the most prescribed (69.6%) and especially beta-lactams (68.2%). Then came bitherapies (27.3%) and triple therapies (4.3%). The most frequent isolated germs were Escherichia Coli (12 cases), Staphylococcus aureus (5 cases), Pseudomonas aeruginosa (4 cases) and Pneumococcus sp. (3 cases) alone or associated, including 8.7% of multiple-drugs-resistant bacterias.

The monitoring of aminosids and vancomycin was globally well carried out. Only 17.6% of vancomycin's dosages and 22.2% of aminosides' dosages were not done.

Thirty-two patients increased their transaminases and/or their creatininemy. These increases were often physiopathological, related to multiviscérales failures or to septic shocks. The antibiotics could be clearly blamed in only one case.

Conclusions: In the surgical intensive care unit, antibioprophylaxy is longer than in recommendations. The probabilistic treatments used often associate active molecules on multiple-drugs-resistant bacterias. This can be explained by the gravity of infections, and the increased risk of bacteriologic resistances due to former treatments. Moreover, bacteriological tests are systematically done, so antibiotics can quickly be adapt to the germs' resistances.

Keywords: Used of antibiotics, Surgical intensive unit

PC-113 Comparative study and optimisation of the mode of administration of proton pump inhibitors by paediatric nasogastric tubes

Marie-Pierre Ponrouch[1], **Valérie Sautou-Miranda**[2], Anne Grand-Boyer[2], Jean Chopineau[2]

[1]Pharmacy, G Montpied Hospital, Clermont-Ferrand, [2]Laboratory of clinical pharmacy, Faculty of pharmacy, Clermont-Ferrand, France

Background and Objective: Most of proton pump inhibitors (PPIs) do not have legal mention for a paediatric use. However these drugs are largely prescribed to children. One disadvantage resides in the absence of liquid form which causes problems for their administration in nasogastric tubes. Indeed, the absence of use recommendations involves many misuses responsible for inefficiency and/or tube obstruction. We tried to evaluate if PPIs can be administered through paediatric nasogastric tubes.

Design: To quantify the transit of different PPIs through paediatric nasogastric tubes and to optimise their modes of administration.

Setting: Laboratory of Clinical Pharmacy and Biotechnics. Faculty of Pharmacy.

Main Outcome Measures: We administered four PPIs (Mopral®, Ogast®, Inexium®, Ogastoro®) through nasogastric tubes by respecting their positioning in a child in a 30° elevation. For each PPI a study plan was drawn up to assess the influence of different variables: the volume of water to dissolve or put in suspension the PPIs (2 or 5 ml), the rinse volume (2.5 or 10 ml), the length (50 or 125 cm) and the diameter (6 or 8 French) of the polyurethane tubes. For every tests ($n = 134$) we carried out an analysis of each active ingredient at the tube outlet by UV spectrometry.

Results: All 6 F tubes were obstructed by PPIs. Through 8 F tubes, we observed a mean recovery of active ingredient of 86% for Ogastoro®,

36.9% for Inexium® but only 7.1% for Ogast® and 3.9% for Mopral®. The length of the tubes had no significant influence on the loss of PPI at the outlet of the tube. A water volume of 5 ml instead of 2 ml increased only the final concentration of Inexium® (+26%). A rinse volume of 10 ml improved significantly the transit of Mopral®, Ogast® and Ogastoro® (+4.8%, +2.7%, +19.5% respectively). This rinse volume allowed to obtain a 94.5% recovery of lanzoprazole for Ogastoro® whatever the water volume employed for its administration.
Conclusions: The most satisfactory results were obtained with Ogastoro®: an administration volume of 5 ml and a rinse volume of 10 ml allowed a near-complete transit of lanzoprazole. Under these conditions only 45% of Inexium® was recovered. It is disadvised using Mopral® and Ogast® through 8F nasogastric tubes because no condition ensure the transit of an efficient concentration of active ingredient.
Keywords: Nasogastric tubes, Proton pump inhibitors, Children

PC-116 Do products used to unblock nasogastric tubes alter the inner surface of them?

Pierre-Adelin Rucart[1], Anne Boyer-Grand[2], **Valérie Sautou-Miranda**[2], Corinne Bouteloup[3], Claire-Lise Pastre[1], Jean Chopineau[2]

[1]Pharmacy, G. Montpied Hospital, [2]Laboratory of clinical pharmacy, Faculty of pharmacy, [3]Gastroentereology, Hôtel Dieu Hospital, Clermont-Ferrand, France

Background and Objective: Feeding tube occlusion is a frequent problem. Practices to make the clogging off are very varied and are not the subject of any consensus. No study have assessed the impact of the different products on the inner surface of the tubes. In this context, it seams to be important to evaluate if these products are safe in order to rationalize the practices.
Design: To study the inner surface of nasogastric feeding tubes after contact with various products used to unblock them.
Setting: Laboratory of Clinical Pharmacy and Biotechnics. Faculty of Pharmacy.
Main Outcome Measures: we have put in contact 12 F nasogastric tubes made of silicone or polyurethane with the following products: water, 1.4% sodium bicarbonate, orange juice, pineapple juice, cola, papain syrup, pancreatic enzymes. An analysis of the inner surface of the tubes was carried out after 7, 15 and 30 days by scanning electron microscopy (SEM). Photos of unexposed tubes were used as negative controls. Photos of tubes exposed to heat, ether or sodium hydroxide were used as positive controls.
Results: The analysis by SEM shows that the silicone tubes are not altered by the different products tested. On the other hand, the surface of polyurethane tubes is modified in the presence of 1.4% sodium bicarbonate and pancreatic enzymes. The papain syrup seems to settle on the surface of the tubes without altering it. Water, fruit juices and cola do not modify the biomaterial whatever the exposure time.
Conclusions: 1.4% sodium bicarbonate, pancreatic enzymes and even papain syrup should not be used in practice to unblock the feeding tubes. The orange and pineapple juices as well as cola can be recommended because of their harmlessness with biomaterials.
Keywords: Nasogastric feeding tubes, Occlusion, Scanning electron microscopy

PC-118 Assessment of administration practices of extemporaneous formulation pediatric capsule preparations

Helene Richard[1], Anne Jalabert[1], Sylvie Hansel-Esteller[1]

[1]Pharmacy unit, Lapeyronie and Arnaud de Villeuneuve Hospitals, Montpellier, France

Background and Objective: To assess administration practices of pediatric capsules made as an extemporaneous formulation preparation by the laboratory of the pharmacy unit, in pediatric units.
Design: A questionnaire was designed and filled in by asking questions directly to nurses about their administration practices, from February to April 2007.
Setting: Altogether, six pediatric units were consulted, corresponding to the units for which the laboratory carries out the most pediatric extemporaneous formulation preparations.
Main Outcome Measures: The questionnaire concerned the ten most made up pediatric preparations, which are: amiodarone, warfarine, captopril, propranolol, ursodesoxycholic acid, omeprazole, fludrocortisone, spironolactone, hydrocortisone and calcium carbonate. Items filled in were: hygiene rules, the existence of administration procedures in units, preparation conservation, and practical administration details.
Results: In 3 months, 40 questionnaires were filled in. Concerning hygiene rules, nurses wash their hands before every manipulation, 21% wear gloves, 10% wear a mask or a mobcap. No administration procedures were available in units and more than 80% of nurses would like to have one. In every unit, preparations were conserved at room temperature, in a dry place, and 87% in a light-free place.

For amiodarone, propranolol, fludrocortisone, spironolactone and hydrocortisone capsules, nurses use sweetened water (G5%) to dilute capsule contents, sometimes milk (especially in newborns units). For the other drugs, the vehicules the most used were: sweetened water (55%), solid vehicules like yogurt, apple sauce, jam (17%), fruit juice or syrup (15%), milk (14%), and coca-cola (7%).

The vehicule volume used fluctuates between 1 ml and 2 cl. Nurses administer capsules by syringue into the mouth (38%), per os (33%), or by enteral nutrition (29%).
Conclusions: Most of the administration practices of pediatric preparations are homogeneous in the different units (except the vehicule volume used). In the absence of administration procedures, the administration of preparations is more adapted to the child than to the drug. The aim of this study is to provide pediatric units with guidelines about good use of extemporaneous formulation pediatric preparations.
Keywords: Extemporaneous formulation preparations, Pediatric capsules, Administration practices

PC-128 Patients' expectations and their satisfaction with outpatient pharmacy services in a Nigerian hospital

Uche M. Ochei[1], Azuka C. Oparah[1], Rose N. Mafiana[1]

[1]Clinical Pharmacy and Pharmacy Practice, Faculty of Pharmacy, Benin City, Nigeria

Background and Objective: An introduction of novel services may derive from patients' reported outcomes including patient expectation of services and their satisfaction with existing services in the absence of novel ones. Pharmaceutical care is a novel practice that merits priority consideration in all settings.

The objectives to assess patients' expectations of pharmaceutical care and their satisfaction with existing services compared to a pharmaceutical care model.
Design: Cross-sectional observational study. Respondents completed 12-item expectations and 22-item satisfaction Likert-type questionnaires. Descriptive statistics on sample characteristics including means and frequency distribution was computed. Principal component analysis employed Varimax rotation with Kaiser normalization. Inferential statistics was performed using Students' t-test and one-way ANOVA.
Setting: A Nigerian city public hospital
Main Outcome Measures: Patients' reported expectations of pharmaceutical care and their satisfaction with the existing pharmacy

services compared to a pharmaceutical care model. Items pertaining to pharmacists' communication with the patient and the physician as well as the pharmacists potential to manage drug therapy were assessed.

Results: Of the 1000 patients approached, 720 (72%) response rate was achieved. Cronbach's alpha = 0.7084 (expectations) and 0.950 (satisfaction). Females were 367 (51%), married (75%) and 52% had post-secondary education. Some 83% expect accurate dispensing of their medications, 78% expect pharmacists to simplify their medications and 52% expect the pharmacist to spend as much time as possible with them. Expectations were resolved into 3 components: humaneness, friendly attitude and professional competence. Only 51% were satisfied with the professional appearance of the pharmacy, the rest of the items received dissatisfaction rating. Two principal components of satisfaction were identified as humaneness and professional competence. Marital status and level of education were associated with satisfaction scores.

Conclusions: Patients' expectations of pharmaceutical care services were high but the satisfaction with current services compared to pharmaceutical care was below average. Professional competence and humaneness were important dimensions of both patient expectations and satisfaction. There is a need to introduce pharmaceutical care.

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Keywords: Expectations, Patients, Satisfaction, Patients, Pharmaceutical care

PC-131 Anemia management in chronic renal failure in an haemodialysis unit: clinical audit

Anne-Laure Lepetit[1], Emilie Prevost[1], Nathalie Herment[1], Catherine Mennesson[1], Bertrand Gourdier[1], Sylvie Lavaud[2], Philippe Rieu[2]

[1]Pharmacy, [2]Nephrology, Reims Teaching Hospital, Reims, France

Background and Objective: The primary cause of anemia for patients with End-Stage Renal Disease (ESRD) is insufficient production of erythropoetin by the kidneys.

Recombinant human erythropoetin is the standard therapy for anemia for ESRD patients. Moreover, intravenous iron has been shown in the increase of the haemoglobin response to erythropoetin.

The objective of this study was to compare anemia management in an haemodialysis unit with the European Renal Association and the AFFSSAPS guidelines.

Design: Clinical audit. All patients receiving their first haemodialysis between October, 1st, 2005 and April, 1st, 2006 were included. Dead or transplanted patients were excluded. The end of the study was December, 31st 2006.

Setting: Haemodialysis centre in a teaching hospital.

Main Outcome Measures: For each patient included, a series of data was studied: hemoglobin concentration, iron status (ferritin, transferrin saturation, injection of intravenous iron), monitoring of hemoglobin levels and rate of increase in hemoglobin levels during correction phase and maintenance phase, erythropoetin dose and its adjustement, erythropoetin injection tracability.

Results: Fourteen criteria were defined. A yes, no or not applicable answer has been given to each criterion according to the guidelines. Drawing lots have been realised to set up a representative sample of twenty patients among those included in the study: six males, fourteen females, average age: 74.9 years old.

Two patients are below the average. The average mark of the patients is 56.3%.

Hemoglobin level of 40% patients is inferior to the targeted hemoglobin level (11 g/dl) at the end of the study.

Six criteria obtain a score superior or equal to 80%. Five criteria obtain a score under 50%.

The three criteria which obtain the best results concern the monitoring of the hemoglobin levels during correction phase and maintenance phase, and the maximum weekly dose of erythropoetin.

The three criteria which obtain the lowest results concern the assessment of iron status before erythropoetin therapy starts (0%), the rate of increase in hemoglobin levels which should be 1–2 g/dl per month (25%) and the adjustment of total weekly erythropoetin dose.

Conclusions: The average grade obtained by the patients highlights the deviation from the guidelines. This indicates the needs of improving the anemia management in our haemodialysis unit.

So it is necessary to make another time the team of doctors and nurses aware of the problem and to reinforce the pharmaceutic implication into the haemodialysis unit.

A re-evaluation of practices (in the guise of clinical audit) must be planned in order to estimate the impact of the setting up of correctional measures.

Keywords: Anemia, Erythropoetin, Audit

PC-137 Implementation of clinical pharmacy in intesive care unit

Kutay Demirkan[1]

[1]Faculty of Pharmacy, Hacettepe University, Ankara, Turkey

Background and Objective: To determine the role of a clinical pharmacist in the intensive care unit (ICU), where clinical pharmacy practices have been implemented first time at the hospital. Since only few clinical pharmacists are available and clinical pharmacy practices are not routinely performed in hospitals in Turkey, most of the physicians are not familiar with clinical pharmacy practices.

Design: Descriptive study for clinical pharmacist's activities in ICU during the period of December 2001 and May 2002 (89 working days). Data were recorded daily about the clinical pharmacist's interventions and the questions from other health care professionals answered during the ward round. The clinical pharmacist visited ICU almost all week-days and was available on call when needed.

Setting: Nine-bed medical intensive care unit at the Hacettepe University Hospital in Ankara, Turkey.

Main Outcome Measures: Number of the clinical pharmacist's interventions accepted by the physicians and types of drug related problems that requires clinical pharmacist's interventions were the main outcomes.

Results: Total of 297 interventions were made and a total of 40 questions were answered by the clinical pharmacist. Only 36 (%12) of the interventions were not accepted by physicians. Majority of the interventions were related with therapeutic drug level monitoring (44.4%) and dosage adjustment in renal failure (22.6%). Furthermore, the clinical pharmacist provided three educational seminars on therapeutic drug monitoring (TDM) to the physicians during study period.

Conclusions: ICU patients routinely receive more therapies than the patients on a general medical or surgical ward, so it will be a good place to start for the implementation of the clinical pharmacy in hospital setting. Clinical pharmacist could have a significant impact in improving patient care and providing optimum therapy in ICU by

implementation of clinical pharmacy services and being active member of the health care team.
Keywords: Clinical pharmacy, Intensive care unit

PC-140 Study of conformity of prescriptions and their retranscriptions

Anne-Claire Buire[1], Emilie Prevost[1], Corinne The[1], Bertrand Gourdier[1], Roland Jaussaud[2]

[1]Pharmacy, [2]Infectiology, Reims Teaching Hospital, REIMS, France

Background and Objective: Medication errors most commonly occur at the prescribing stage. Prescriptions are often not written according to the regulations. The retranscriptions of the original prescriptions by nurses are also source of errors. The aim of the study was to access the conformity of prescriptions and their retranscriptions.
Design: A retrospective study was conducted in 3 wards, one day given in May 2006.
Setting: 3 wards (internal medicine, infectiology and week hospital) with 70 beds in Reims University hospital.
Main Outcome Measures: In the one hand, we have assessed if all regulation's variables were present on prescriptions. These variables were related to the prescribers (name, signature quality), the prescriptions (date, hour, ward), the patients (name, surname, age, weight and height) and drugs (readable, International Non-proprietary Name (INN), dosage, pharmaceutical form, dosage of unit, administration route and hour). In the second hand, we have compared the retranscriptions with the original prescriptions (statement of the variations). Inclusion criteria were: oral and injectable drugs' prescriptions concerning patients who were present in the ward since more than 24 hours.
Results: 27 medical records were analyzed. Patient age varied from 51 to 74 years old and the average duration of the hospitalisation from 4.5 to 13 days. Omitted variables were: patient's weight in all cases, prescriber's quality in 93% of cases, prescription's hour in 63% and prescriber's signature in 59.3%. For each patient, all drugs prescribed since the beginning of the hospitalization in the unit was studied i.e. 334 lines of drugs. We have noted the INN was absent in 90% of the cases, pharmaceutical form in 74% and administration route in 57%. Only one prescription had all variables. Thus, the global rate of prescription conformity was 0%. In the 3 wards, nurses write the original prescriptions on a card-index (CI). Then, drugs administrations are written on a temperature chart (TC) and on pharmacy's book (PB) for drugs order. We have compared documents one by one, for each drug. Conformity rates are 60.5% (prescription/CI), 70.4% (CI/TC) and 0% (CI/PB). The noted differences are multiple(modification of the administration or hour route, increase or dicrease of dosage…). The clinical relevance of non conformity was not studied.
Conclusions: From this study, it can be concluded that many prescriptions do not comply to the regulation and many retranscriptions are not identical to original prescriptions. It constitutes of course a potential iatrogenic impact. The development of Computerized Physician Order Entry (CPOE) in our hospital should be a corrective measure. The next stage will consist of realizing this study with CPOE and compared the 2 studies.
Keywords: Conformity, Prescription, Retranscription errors

PC-142 Assessment of antibacterial prescriptions for bronchopulmonary infections in a pneumology department

Anne-Claire Buire[1], Emilie Prevost[1], François Lebargy[2], Bertrand Gourdier[1]

[1]Pharmacy, [2]Pneumology, Reims Teaching Hospital, Reims, France

Background and Objective: Assessment of antibacterial prescriptions regarding community-acquired lower respiratory tract infections and comparison with national guidelines.
Design: Patients treated with antibiotics were included each day, during the analysis of the computerized prescriptions in the pharmacy. Then, a report sheet was indicated in the unit with the prescribers for each patients with pneumonia or exacerbation of chronic obstructive lung disease. One month prospective study (in April 2007) included all patients hospitalised for pneumonia or exacerbation of chronic obstructive pulmonary disease (ECOPD) in a unit of the Pneumology Department and treated with antibiotics.
Setting: Pneumology Department – Reims University Hospital.
Main Outcome Measures: For each patient the following data were assessed: age, hospitalization duration, diagnosis, severity factors, co-morbidities and antibiotic prescriptions were analyzed. Treatments were thought consistent when following the national guidelines [1; 2].
Results: 63 new patients were hospitalized during this month. 44 (70%) were treated with antibiotics: 4 with no pulmonary pathology and 40 with pulmonary infection (19 patients with pneumonia, 4 with ECOPD, 5 with pleurisy, 4 with exacerbation of asthma, 4 with chest secondary infection, 2 with acute respiratory infection, 2 with thoracic pain and 1 with cough).

Then, the study focused on 23 patients: 19 pneumonia and 4 ECOPD (M/F = 13/10, mean age: 61 years old). Hospitalization duration was about 10 days. 18 patients (78%) had at least one co-morbidities factor (the majority: 9 with pulmonary antecedents) and 13 (57%) a severity factor (the majority: 10 with an attack of the vital functions). 12 antibiotic treatments were initiated in the unit and 11 out (9 in emergency department and 2 by general practitioner). All treatments initiated in the unit were consistent with the recommendations and revaluated with the bacterial results (except one treatment) or changed because of bad tolerability. Bacteriological documentation was always researched and the results were significant for 6 patients (26%): 3 Streptococcus pneumoniae, 1 Pseudomonas aeruginosa, 1 Proteus mirabilis with Morganella morganii and 1 Haemophilus influenzae. When it was possible, per os relay was realized in the 24 at 48 hours, except for 2 patients (relay in the 3 days).
Conclusions: In this survey, the management of pneumonia and ECOPD was globally consistent with the national guidelines. Nevertheless, the bacterial documentation is poor and the antibiotics prescriptions for bronchopulmonary infections are difficult and need using molecules with large spectrum.

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Keywords: Antibacterial prescriptions, Pneumonia, Exacerbation of chronic obstructive pulmonary disease

PC-147 The role of a pharmacist in safety treatment in the Czech Republic

Josef Maly[1], Michal Hojny[2], Martina Marikova[3], Jiri Vlcek[1]

[1]Department of Social and Clinical Pharmacy, Faculty of Pharmacy in Hradec Kralove, Charles University in Prague, Hradec Kralove, [2]Hospital pharmacy, Institute of Clinical and Experimental Medicine, Prague, [3]Hospital pharmacy, Teaching Hospital, Hradec Kralove, Czech Republic

Background and Objective: Occurrence and clinical relevancy of adverse drug events and medication errors were described by many quality studies. To prevent the medication errors it is necessary to

collaborate with all of the health care professionals and patients and to identify causes of errors. The unique position and possibilities of a pharmacist enable him to follow up the errors, from a fact that he is an expert on medication properties and is basically the last in a row who deals with drugs before their administration to the patients. The aim of this study was to describe and evaluate the role of pharmacist in identification and dealing with medication errors in Czech pharmacy.
Design: 30 pharmacists identified and recorded all medication errors over a period of six months of pharmaceutical care. Basic characteristic of pharmacists: mean age 35.0 years; mean length of pharmaceutical practice 9.7 years; 16 of them worked in the hospital pharmacy. 19 of them got the first grade of attestation in pharmacy (by 4 years of working experience in pharmacy and by passing exams). Pharmacists collected the following data: types and causes or errors, their interventions, drugs and time concerning errors, subjects making errors and patient's characteristics as age, gender, other drugs used and co-morbidities. All the data were processed by descriptive statistics.
Setting: Hospital and community pharmacies in the Czech Republic
Main Outcome Measures: Type, frequency and clinical importance of medication errors and relevancy of pharmacist's interventions
Results: During a six-month period there were identified 698 interventions of pharmacists, out of 110750 prescriptions. We evaluated the following errors: 49 cases of incorrect indication or contraindicated drugs, 266 cases of dosage of drugs – such as insufficient dosing, overdosing or other problem with dosages, 45 cases of potential drug interactions, 37 cases of duplications of therapy, 40 cases of wrongly prescribed drugs, 111 cases of wrongly or inappropriately prescribed strength of medication, 24 cases of inappropriate dosage forms, 59 cases of prescribed drugs unavailable on the Czech market, 27 cases of possible instabilities of specific dosage forms as dividing sustained release tablets and 40 cases of the other types of medication errors. Pharmacists most frequently consulted with prescribing physician their interventions (in 263 cases).
Conclusions: This study highlighted medications errors that pharmacist can identify, and are relevant to adverse drug events, originating mainly during prescription of drugs. It seems that Czech pharmacist could contribute to improvement of safety treatment.
Keywords: Medication errors, Pharmaceutical care, Pharmacy

PC-148 Mouthwashes and mucositis oral prevention: a possible consensus?

Marie Antignac[1], Malik Berhoune[1], Bertrand Billemont[2], Laura HASSAN[1], Annick Datry[3], Sylvain Choquet[4], Robert Farinotti[1], **Agnès Bellanger**[1]

[1]Pharmacy, [2]Medical Oncology, [3]Infectious Disease, [4]Hematology, Pitié-Salpétrière Hospital Group, Paris, France

Background and Objective: There is no standard of care to prevent oral mucositis for patients with cancer treated by chemotherapy. Most common treatment is local (mouthwashes).

No commercial mouthwash solution is available. Special preparations are compounded by clinical units. A new 1.4% sodium bicarbonate solution presentation was recently proposed for local treatment. Our hospital drug committee decided to evaluate the clinical practices of oral mucositis prevention related to anti-neoplasic agents.
Design: An observational study conducted in Pitié-Salpétrière Hospital. Interview of nurses and physicians by Pharmacy students about mouthwashes prescription and practice. Data recorded on pre-established questionnaire and analyzed in pharmacy department using Microsoft Excel®.
Setting: Study performed in oncology, hematology and radiotherapy clinical departments and in clinical units with oncologic activity (gastroenterology…). During one year, more than 2600 patients received anticancer chemotherapy.
Main Outcome Measures: Questionnaire items were: use of a specific mouthwash procedure within the service, use of a single agent or in combination. Data collected from the nurse point of view were: preparation and administration practices; from the physicians' perspective: circumstances of prescription and duration of the treatment.
Results: 31 questionnaires were analyzed (nurses: 10, physicians: 21) from 7 clinical units. There was a standard written procedure in only one clinical unit. Several formulations were used: each physician proposed his own, including antifungal prophylaxis (amphotericin B, nystatin), antimicrobial agents (povidone, chlorhexidine), mucosal surface protectant (sucralfate), alkalin solution (sodium bicarbonate), anti-inflammatory agent (aspirin), anaesthetic drugs (lidocaïn) and other agent (glycothymoline).

Preparations were not systematically labelled with patients name, formulation, date of preparation and stability duration. These were administered from 2 to 4 times daily regardless the stability compounding. For physicians, prescriptions of mouthwashes were done for patients with specific toxic anticancer drugs (5-FU, anthracyclin, capecitabin and sunitinib), were concomitant with chemotherapy and systematic after radiotherapy.
Conclusions: There are variations among clinical units in terms of mouth care regimen used. Treatment efficacy was never evaluated. Drug committee worked on guidelines in order to prescribe antifungal therapy only for curative aim or avoid anaesthetic drugs (swallowing difficulties). Good practices included, before chemotherapy, dental hygiene. Maintenance is realized by the patient himself (mouthrinses with alkalin solution or chlorhexidine). Analgesics can be taken orally in case of mouth pain.
Keywords: Oral mucositis, Prevention, Mouthwash

PC-161 Comparative bioavailability study of two olanzapine formulations administered orally in healthy male volunteers

Parvin Zakeri-Milani[1], Hadi Valizadeh[1]

[1]Pharmaceutics, Tabriz University of Medical Sciences, Tabriz, Iran (Islamic Republic of)

Background and Objective: The bioavailability of a new olanzapine tablet preparation was compared with the reference preparation of the drug in 24 healthy male volunteers.
Design: The open, randomized, single-blind two-sequence, two-period crossover study design was performed.
Setting: Under fasting conditions, each subject received a single oral dose of 10 mg olanzapine tablet as a test or reference formulation on 2 treatment days. The treatment periods were separated by a one-week washout period.
Main Outcome Measures: The plasma concentrations of drug were analyzed by a rapid and sensitive HPLC method with UV detection.
Results: The pharmacokinetic parameters included AUC0-24 h, AUC0-infinity, Cmax, t1/2, and Ke. The mean AUC0-infinity of olanzapine was 570.76 and 558.66 ng h/ml for the test and reference formulation, respectively. The maximum plasma concentration (Cmax) of olanzapine was on average 15.82 ng/ml for the test and 15.73 ng/ml for the reference product. No statistical differences were observed for Cmax and the area under the plasma concentration-time curve for test and reference tablets. 90% confidence limits calculated for Cmax and AUC0-infinity of cefixime were included in the bioequivalence range (97.3–109.2%).
Conclusions: Therefore, the two tablet formulations were considered to be bioequivalent.

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Keywords: Olanzapine, Bioequivalence, Bioavailability, AUC, Cmax

PC-169 Clinical pharmacists impact on validation orders: application to innovative drugs

Sarah Berdot[1], Julie Rouprêt[1], Etienne Guillard[1], Hanna Chaouch[1], Agnès Certain[1], Philippe Arnaud[1]

[1]Pharmacy, Teaching Hospital Bichat-Claude Bernard, Paris, France

Background and Objective: Hospital including 22 clinical services with satellite pharmacies including pharmacy technicians and clinical pharmacists and a central pharmacy department.

To ensure drug dispensing process in order to obtain a 100% clinical pharmacists validation before dispensation.

Focus on drugs that do not belong to Diagnosis-Related Group (DRG) created by French rules related to rational good use of drugs.
Design: Process analysis in an healthcare providers practices audit.
Prospective study over 5 months (January–May 2007) including 100 successive computerised and non-computerised prescriptions. Data were collected by a pharmacist resident.
Setting: Pharmacy department and all clinical units of the hospital.
Main Outcome Measures: Number of prescription validations compared to the total number of these prescriptions.
Identification of process dysfunctions.
Results: Of 100 prescriptions, validation before dispensation was effective by clinical pharmacists for 43% and by basement pharmacists for 57%.
Identified reasons for 57 prescriptions not validated by clinical pharmacists, were :

- no contact between pharmacy technician and clinical pharmacists: 10/57 (17.5%)
- no clinical pharmacists available: 11/57 (19.3%)
- direct transmission of prescriptions from clinical units to central pharmacy: 8/57 (14%)
- night and week-end dispensation: 16/57 (28.1%)
- clinical services without clinical pharmacists: 12/57 (21.1%)

Conclusions: Clinical pharmacists effectively validate 43% of these prescriptions but one third of prescriptions will inevitably remain validated by pharmacist residents during night and week-ends.

Performance criteria must be proposed to measure impact of pharmaceutical improvement initiatives (validation procedures writing, continuous education for example). We suggest to test clinical pharmacy activities related to economic indicators and to medication events reduction.
Keywords: Clinical pharmacist, Innovative drug, Practices audit, Indicators

PC-178 Challenge for clinical pharmacist in education of patients with type 2 diabetes

Oksana U. Hrem[1], Andrij B. Zimenkovsky[1], Oksana U. Hrem[1]

[1]Department of Clinical Pharmacy, Pharmacotherapy and Medical Standardization, Danylo Halytsky Lviv National Medical University, Lviv, Ukraine

Background and Objective: Education of patients with type 2 diabetes is a key point of non-medical management of that disease. Thus objective was evaluation of patients' knowledge about their disease and its management for further development of pharmaceutical care protocols.
Design: Prospective cohort control study. Total 100 patients casually were divided in two equivalent groups: study group ($n = 50$), age 64.4 ± 8.93, diabetes duration 9.02 ± 6.74 who were questioned by face-to-face technique and received pharmaceutical care during the interview; control group ($n = 50$), age 61.6 ± 8.89, diabetes duration 6.97 ± 5.63 and filled in questionnaires without clinical pharmacist. Inclusive criteria were: presence of type 2 diabetes mellitus, duration of the disease was not considered as criteria. Patients were inquired once following standardized questionnaire. All included patients could read and write. Two groups controlled their diabetes mostly by oral antidiabetics, only $n = 6$ in study group and $n = 2$ in control used insulin.
Setting: Out-patient setting of Lviv Clinical hospital No4, endocrinologist's office.
Main Outcome Measures: Assessment of patients' knowledge about diabetes and self-monitoring in study and control groups.
Results: Only 32.0% and 30.0% of inquired patients in both groups respectively stated that they possess good knowledge about diabetes. But as it was shown by evaluation of their level of knowledge through assessment of keeping to diet, regular physical activity, self monitoring it didn't conform completely. Diet was implemented by almost 70% of patients in two groups, while regular physical activity was declared only by 14.0% in study and 46% in control groups. Smoking was reported by 14.0% and 16.0% respectively. Next step was evaluation of self-monitoring. It has been revealed that only 12.0% and 10.0% of patients in two groups performed blood glucose monitoring at home; body weight was controlled by 58.0% and 50.0% respectively; blood pressure by 50.0% and 58.0% as well. Target level of blood pressure was achieved by 42.9% of subjects in study group and in 40.9% – in control. In study group foot examination was performed everyday by 70.0% of patients when in control only by 18.0%. No one from both groups evaluated glycated haemoglobin regularly as it is recommended by American Diabetes Association, those they couldn't state their present or previous parameter.
Conclusions: It was estimated that knowledge about necessity of diet following, regular physical activity, and particularly – self-monitoring was very poor in diabetic patients, no regarding compliance which possibly also will be low. Even if patients stated good knowledge about the disease they had problems with self-monitoring. It is obvious that patients of this out-patient setting require adequate education, which should be a component of pharmaceutical care program implemented by the clinical pharmacist. Protocols of pharmaceutical care for these patients must be developed and include standard procedure of type 2 diabetes patients' education.
Keywords: Education of diabetic patients, Pharmaceutical care protocols

PC-183 Evaluation of pharmaceutical care at hospital admission

Miriam Maroto[1], Elena Florensa[1], Ferran Sala[2], Pilar Lalueza[3], J. Carlos Juarez[3], Lourdes Girona[3]

[1]Pharmacy Department, Hospital Universitari Vall d'Hebron, [2]Pharmacy Department, [3]Pharmacy department, Hospital Universitari Vall Hebron, Barcelona, Spain

Background and Objective: Patients who are admitted for a programmed orthopedic surgery in a tertiary hospital are usually elderly and present high co-morbidity which makes therapy complexity increase. The objective is to evaluate whether a pharmaceutical care is necessary before patients hospital admission.
Design: We analysed the domiciliary treatment in 1000 patients who attended to a pre-surgery visit. A form designed by the Pharmacy department and validated by Anaesthesiology Unit was delivered to the patient to fill in with domiciliary therapy.

Our data base included information about patients epidemiological dates and the pharmacological treatment. Drugs were classified following the protocols of two hospitals and the Protocol published by Catalonian Society of Anaesthesiology.
Setting: Pharmacy Department and Traumatology Hospitalization Unit of a tertiary teaching hospital.
Main Outcome Measures: Evaluate how many patients require a pharmaceutical care in our hospital before undergoing surgery.
Results: We revise 1,000 patients treatments, 654 women and 246 men. 611 patients were over 64 (61.1%). We analysed 4660 different drugs prescriptions, which included 495 active ingredients (AI)

The average of prescribed drugs was 4.66 per patient, being this reduced to 3.9 drugs in patients younger than 65 and increased to 5.13 in patients older than 65. Over one third of patients (340/1000) were taken orally NonSteroidal Anti-Inflammatory Drugs (NSAIDs).

From 495 AI, 122 would need a pharmacological evaluation in the preoperative. Those were included in 1998 drugs, meaning the 42.8% of the different drugs prescriptions. This percentage belonged to 860 patients.
Conclusions: The fact that a high percentage of patients over 64 with an orthopedic pathology take a considerable amount of drugs at home makes it necessary to monitories the therapy in order to minimise the iatrogenic problems during the admission. We have seen that this situation is so frequently (86%) in our study, so the

Pharmacy Department has established a collaborative job with Anaesthesiologist Unit to reduce as much as possible therapy problems.
Keywords: Pharmaceutical care, Hospital and surgery

PC-189 Comparison of the administration of esomeprazole and lansoprazole through nasogastric tubes in the presence of nutrition mixture

Marie-Pierre Ponrouch[1], **Valérie Sautou-Miranda**[2], Anne Boyer-Grand[2], Jean Chopineau[2]

[1]Pharmacy, G. Montpied Hospital, [2]Laboratory of clinical pharmacy, Faculty of pharmacy, Clermont-Ferrand, France

Background and Objective: Nasogastric tubes are medical devices which first role is the administration of enteral nutrition to patients when oral way is not functional. These devices also authorize drug administration like protons pump inhibitors (PPIs). The reduced diameter of tubes used for children increases the risk of obstruction when these drugs are administered. Some studies (1.2) showed that the esomeprazole is the only PPI presenting a sufficient transit through adult nasogastric tubes. Is it the same with paediatric tubes particularly in the presence of nutrition mixture? Does orally disintegrating tablet of lansoprazole behave like esomeprazole under these conditions of administration?
Design: to compare the transit of esomeprazole and lansoprazole through nasogastric tubes at the time of a concomitant administration of a nutritive solution.
Setting: Laboratory of clinical pharmacy and biotechnics.
Main Outcome Measures: We used 8 French polyurethane nasogastric tubes French set to mimic their position in a child in a 30° elevation. Through each tube, a 1500 ml nutritive solution was delivered on 24 h each day during one week. After dissolution in 5 ml water the PPIs were administered once a day after stopping of the enteral nutrition and rinsing of the tube with 5 ml of water. The tubes were then rinsed with 10 ml of water and the nutrition was started again. During each administration of PPI the suspension was collected at the tube exit in order to quantify the PPI by UV-spectrometry.
Results: No tube was obstructed. The enteral nutrition mixture did not adversely affect the transit of lansoprazole through 8F nasogastric tubes. The transit of lansoprazole through the tube was complete and regular during the 7 days of the study (100.4 ± 4.2). For esomeprazole the mean recovery of active ingredient was of 79.2 ± 17.4 (coefficient of variation: 22%) This variability can be explained by the incomplete and inconstant dissolution of esomeprazole because of the low volume of water usable in paediatry.
Conclusions: Orally disintegrating tablet of lansoprazole can be administered through 8F nasogastric tubes in a concomitant way to an enteral nutrition mixture. For esomeprazole there is a variability of the administered active ingredient. However enteral nutrition doesn't seem to affect the esomeprazole transit. Low volumes of water used in paediatry seem to be responsible for the variability.

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Keywords: Lansoprazole, Esomeprazole, Enteral nutrition, Nasogastric tubes, Paediatry

PC-190 Pharmacological interactions in a spinal cord injury unit

Berta Renedo[1], Miriam Maroto[1], Ramon Arroyo[2], Lucrecia Ramirez[2], Pilar Lalueza[1], Juan Carlos Juárez[1], Lourdes Girona[1]

[1]Pharmacy, [2]Rehabilitation, Hospital Universitari Vall Hebron, barcelona, Spain

Background and Objective: The current complexity of pharmacological interactions (PI) forces to a special pharmaceutical care. The aim of this study is to analyse possible PI, and its clinical repercussion, in patients admitted in a Spinal Cord Injury (SCI) Unit.
Design: A prevalence study of PI, described and observed, in patients admitted in the SCI unit was performed. The following variables were registered: clinical patients characteristics, pharmacological treatment and PI defined and classified according to their severity in 3 different sources: Medinteract, Lexi-Comp and iMedicins.
Setting: Pharmacy department and SCI Unit of a tertiary hospital.
Main Outcome Measures: Pharmacological treatment, PI and their clinical repercussion.
Results: We analyzed pharmacological treatment in 14 patients, with a mean age of 46 years old (27–77). The average of drugs per patients was 11 (7–17).

After checking the sources we detected 63 possible PI (4 severe, 40 moderate and 19 slight), observed 73 times. PI were detected in 9 of 14 patients and mean per patient was 5.2 (0–19).

The following PI were described: increase of sedation (9 patients), risk of bleeding (2 patients), serum potassium levels alteration (3 patients), hypotension (1 patients), risk of hepatotoxicity (1 patients), increase of creatin kinase levels and risk of myopathy (1 patients). From all these, only two were observed: sedation which was observed in all patients and hypotension which permitted the reduction of patient antihypertensive treatment.
Conclusions: The most frequent PI was sedation which is considered beneficial in order to reduce anxiety in SCI patients. Arterial tension, electrolytic balance, hepatic and renal function, as well as risk of bleeding, are regularly controlled in the SCI unit. This way, if one of these parameters was altered it would be easily detected.

To conclude, it would be important to carry out regular checking to detect PI, especially for those drugs that are not usual and for those symptoms that are not controlled regularly in the SCI unit.
Keywords: Pharmacological interactions, Spinal cord injury

PC-196 Pharmacist intervention at the lipid clinic

Anthony Serracino-Inglott[1], Lilian M. Azzopardi[1], Maurice Zarb Adami[1], Annelise Sapiano[1]

[1]Department of Pharmacy, University of Malta, Msida, Malta

Background and Objective: Pharmacists' individualized counselling of patients has positive impacts on the management of hyperlipidaemia, including improved compliance and better treatment endpoints. The objective was to evaluate patient knowledge on hypercholesterolemia and its treatment and to assess impact of pharmacist intervention at the Lipid Clinic.
Design: One hundred and fifty statin-treated patients were recruited by convenience sampling. Following completion of a scored pre-intervention questionnaire, the pharmacist provided education on hypercholesterolaemia and the use of statins. A leaflet was prepared, evaluated and distributed to the patients. The patients completed again the same questionnaire after the intervention (post-intervention).
Setting: Lipid Clinic, Out-Patient Department, St Luke's General Hospital.
Main Outcome Measures: The pre-intervention questionnaire indicated patients' baseline knowledge and the post-intervention questionnaire assessed patient knowledge following the pharmacist intervention.
Results: Patient demographics: 42% (63) were males, 58% (87) were females, mean age was 59 years (range 32–76 years). A response rate of 71% was achieved with 98 patients completing both questionnaires. Following the educational intervention by the pharmacist, knowledge regarding the correct action to be taken if muscle pain or tenderness occur during statin therapy increased by 34% ($p = 0$). The awareness regarding the normal total blood cholesterol level increased by 22% ($p = 0.0001$) and the knowledge regarding the need for low-fat diet consumption during statin therapy increased by 27% ($p = 0$). Face and content validity of the patients' leaflet were strong. The average Gunning FOG Index obtained for the leaflet was 11.6 indicating good readability for individuals. The leaflet was endorsed by the local Health Promotion Department and 10 000 copies were printed and distributed to patients.
Conclusions: The pharmacist intervention at the Lipid Clinic resulted in an increased patient knowledge on hypercholesterolemia and on the use of statins.
Keywords: Hypercholesterolaemia, Pharmaceutical care, Patient counselling

PC-223 Risk-adjusted monitoring of veno-occlusive disease following bayesian individualization of busulfan dosage for bone marrow transplantation in paediatrics

Valerie Bertholle[1], Brice Kitio[1], Valerie Mialou[2], Claire Galambrun[2], Yves Bertrand[2], Gilles Aulagner[3], Nathalie Bleyzac[1]

[1]Pharmacy, [2]Paediatric Immuno-haematology and Bone Marrow Transplantation, Hospices Civils de Lyon – Debrousse Hospital, LYON, [3]Henry Poincarré University, Henry Poincarré University, Nancy, France

Background and Objective: In order to assess the performance of Bayesian individualization of busulfan (BU) dosage regimens, veno-occlusive disease (VOD) rate was monitored for paediatric patients undergoing allogeneic bone marrow transplantation (BMT).
Design: Consecutive patients undergoing allogeneic BMT with BU as conditioning regimen during five years period (January 2000 to Febuary 2006) were retrospectively reviewed (66 patients).
Setting: VOD was major outcome variable. Preconditioning risk of VOD was estimated for each patient using a scoring system that included type of transplant, recipient CMV-positive status and total parenteral nutrition provided pretransplantation. A risk-adjusted cumulative sum method was used to compare observed versus predicted outcome by assigning a risk score, based on log-likelihood ratios, to each patient.
Main Outcome Measures: The cumulative scores were sequentially plotted with preset control limits for "signalling" where results were substantially different than expected (doubling or halving of odds ratio).
Results: Sixty-six children received BMT after oral busulfan-based conditioning regimen with median age 3.9 years, 63.6% of male. Median preconditioning risk of VOD was 0.34 range (0.23–0.84). Observed VOD rate was 16.7% ($n = 11$) which was 60.7% (17 patients) fewer than the expected number estimated by the risk score. The resulting risk-adjusted score for each patient was plotted sequentially. This plot adopted early a negative slope, crossing the lower control limit twice, after 27 and 66 patients, indicating improved results compared to those expected.
Conclusions: Bayesian individualization of oral busulfan dosage regimens is useful to reduce VOD rate in children undergoing allogeneic BMT.
Keywords: Busulfan, Bayesian pharmacokinetic monitoring, Risk-adjusted cumulative sum

PC-228 Determination of geriatric patients' drug profile and identify their pharmaceutical care requirement

Betul Yalcin[1], Mesut Sancar[2], **Fikret Vehbi Izzettin**[2]

[1]Clinical Pharmacy Service, Yeditepe University Hospital, [2]Clinical Pharmacy Department, Marmara University – Faculty of Pharmacy, Istanbul, Turkey

Background and Objective: Geriatric patients use numerous drugs; because they have several concurrent diseases. 85% of those 65 years old and over have at least one chronic disease, 30% have 3 or more chronic diseases (1). The purpose of this study is to evaluate data on the geriatrics' drug usage, assess the appropriateness of their drug treatment and identify their pharmaceutical care requirements.
Design: Patients, who were 65 years old and over and live in a nursing home in the Anatolian part of Istanbul, were included in our study. By interviewing the patients, individualized information was obtained regarding the drugs they used, dose and frequency of drugs, the purposes of medication use and side effects, and who suggested or prescribed the drug. The patients at risk of drug induced problems were defined and a risk map was developed. Patients who have 4 or more risk factors were accepted as being in a high risk category.
Setting: A nursing home.
Main Outcome Measures: The demographic, clinical and drug data of the patients were recorded. The pills count that patients used daily and totally; side effects of the drugs; knowledge of patient's diseases and drugs; risk category of patients were assessed.
Results: Polypharmacy was identified in 44% of those included in the study (total of 146 patients who take drug therapy). Generally it was observed that the drugs were prescribed at an appropriate dosage and time; however 80% of the patients didn't know for what they were taking drugs. Just 2 (1.4%) of the patients were aware of the conditions under which they should take drugs. 88 of the patients (60.3%) were not aware on how to and when they should receive their drugs. 24 patients (16.4%) were using their drugs by self-administration. The drugs of 122 patients (83.6%) were administered by their nurse. 8.75% of the patients were receiving no medication. Mean of number of drug used by patients was 5.89 ± 3.61. 24.65% of patients were in a high risk category.
Conclusions: As a result, drug effects alter due to polypharmacy, physiological and psychological changes. Drug treatment should be individualized and monitored in geriatrics. According to our results, patients have lack of knowledge on drug use and they have never been educated in this matter. It is necessary to begin meeting their

pharmaceutical care needs with education. We believe that this study will help bring together specialist geriatric teams consisting of physician, pharmacist, nurse and other health professionals, and contribute to the development and spread of patient oriented pharmacy services.

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PC-230 Emergency contraception: change of user's profile 2003–2006

Kurt E. Hersberger[1], Tanja Bodenmann[1], Seraina Mengiardi[1], Patrick Eichenberger[1], Elisabeth Zemp Stutz[2], Brigitte Frey Tirri[3]

[1]Institute of Clinical Pharmacy, [2]Institute of Social and Preventive Medicine, University of Basel, [3]Women's Hospital, University Clinic, Basel, Switzerland

Background and Objective: In 2002, Levonorgestrel was introduced in Switzerland for emergency hormonal contraception (EC) without prescription ('pharmacist only'). In 2003, a first analysis of requests of EC showed that the dispensing of EC through pharmacies could successfully be implemented (Lemke et al 2004). This study was repeated three years later with the aim to explore whether the user's profile has changed over time.
Design: Retrospective analysis of requests of EC using pharmacy protocols registered in 2003 and 2006.
Setting: Selected Swiss community pharmacies with enlarged opening hours and providing access to their protocols on EC.
Main Outcome Measures: Age, reason for request of EC, contraceptive method used, report of previous use of EC.
Results: Comparison of requests in 2003 ($n = 205$) vs. 2006 ($n = 349$) showed a decrease in mean age of EC users (25.5 ± 7.1 vs. 24.2 ± 6.9 years; $p = 0.035$), but no significant difference in report of previous use of EC (48.8% vs. 50.1%; $p = 0.869$). Women seeking for EC used mainly condoms as their contraceptive method, in 2003 as well as in 2006 (68.8% vs. 62.8%; n.s.) or a hormonal contraceptive pill (17.1% vs. 24.9%; $p = 0.031$).
Conclusions: Four years after introduction of a low threshold access to EC through pharmacies, besides a slight decrease of the age of EC-users, no major trends in user's profile were observed, especially no increase of reported previous use of EC.

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Keywords: Pharmacy practice, Emergency hormonal contraception, Trend

PC-234 Development and validation of the socioeconomic impact profile (SEIP)-factor analysis

Adetomilola Aderounmu[1], Sam M. Salek[2]

[1]Centre for Socioeconomic Research, Welsh School of Pharmacy, Cardiff University, [2]Centre for Socioeconomic Research, Welsh School of Pharmacy, Cardiff University, Cardiff, United Kingdom

Background and Objective: As part of development process of a measurement technique, it is vital to carry out factor analysis to explore the statistical confirmation of the new instrument domains. Factor analytical technique can be either exploratory or confirmatory. Exploratory factor analysis (EFA) remains one of the standard and most widely used methods to demonstrate construct validity of new instruments. It is used to help development of the instrument by revealing items that may be made redundant from the questionnaire because they contribute little to the presumed construct. The SEIP consists of 24 items in five domains and is scored on a four-to-five-point Likert scale. The aim of the study was to assess further psychometric property of the SEIP using principal component factor analysis (PCA). The strength of the inter-correlations among the items will be assessed by the presence of coefficients greater than 0.30 in the correlation matrix. If few correlations above this level are found, then factor analysis may not be appropriate.
Design: Factor analysis was executed by an exploratory principal components analysis (PCA) on the correlation matrix of the 24 SEIP items with orthogonal rotation using the varimax procedure. Items with strong loadings (above 0.40) on each factor were retained and those with weak loadings (below 0.40) were eliminated. The inter-correlations among the factors and between factors and items were assessed by internal consistency reliability tests.
Setting: Community pharmacies in South Wales, United Kingdom.
Main Outcome Measures: The Kaiser–Meyer–Olkin (KMO) measure of sampling Adequacy for suitability of factor analysis and cronbach's coefficient alpha values for the internal consistency reliability tests to establish final domains of the SEIP and their components.
Results: Three-factor models were produced: 1) the impacts of statins on healthcare services use; 2) emotional distress and impacts on productivity; and 3) socio-emotional symptoms and use of healthcare services. The correlation matrix for SEIP revealed the presence of some coefficients of 0.3 and above (KMO value was 0.82) therefore confirming the suitability of the SEIP data set for factor analysis. The alpha coefficients for internal reliability ranged between 0.62–0.77.
Conclusions: The factor analysis results have clearly supported the clinical and statistical meaningfulness of the SEIP domains. Although the SEIP awaits full validation, encouraging results of pilot studies and the supporting evidence from this analysis indicate that it may become the gold standard for socioeconomic evaluation of medication – related problems in particular of cardiovascular drugs.

Keywords: Socioeconomic impact, Medication-related problems, Factor analysis

PC-244 Impact on the medical follow-up of inr in a 200-bed geriatric hospital with a computerized control (pharmacist developed)

Emmanuelle Orru Bravo[1], Celine Moreau[1], Bruno Baune[1]

[1]Pharmacy Department, Hospital Bretonneau, Paris, France

Background and Objective: Elderly patients are at high risk of over-anticoagulation when treated with oral anticoagulant therapy (OAT). To reduce this risk a regular control of INR is required. However scheduling the follow-up of several patients with OAT is complex with a risk of failure of INR regular control. The purpose of the study is to evaluate a systematic pharmaceutical computerized method of INR follow up.
Design: It is a 6-month prospective study. A Access® database was developed by the hospital pharmacists in order to extract a computerized prescription named GENOIS® of all the patients with OAT.

For every patient, an Excel® record is set up and updated with the INR results and dosage modifications of OAT, then filed in a folder corresponding to the day of the week the INR should be checked.

The INR control dates are based upon the recommandations of the Specific Product Characteristics of the anticoagulant

If necessary, the pharmacist sends an alert to the prescribor concerning the INRs follow-up.
Setting: Pharmacy Department and Clinical Units of the hospital
Main Outcome Measures: Number of patients with OAT/patient records in Excel/INR data base/number of identified follow-up issues
Results: Out of 83 patient receiving OAT, 86% (71/83) were registered (79% female, mean age = 86 years) in Excel. 14% patients were not recorded due to the time to fine tune the follow-up method. Within 2 months 100% patients were recorded.
A total of 477 INR was analysed (mean = 4/patient). 48% (34/71) and 11% (8/71) have an INR between 3–5, and INR between 5–9, respectively.

193 issues were identified including 101 related to INR controls not performed and 27 due to a poor/no adjustement of the OAT dosage. 91% of the issues resolved following the pharmacist recommandations
Conclusions: Computerized follow-up system allows to check INRs at the right date and to reduce the loss of results. Pharmacists' recommendations were well accepted by physicians. The impact of the follow-up on the reduction of the overdose incidence will have to be evaluated.
Keywords: Oral anticoagulant therapy, INR, Computerized follow-up, Pharmacist, Geriatric

PC-245 Four years experience of fondaparinux use in a French university hospital

Charlotte Trento[1], **Chloe Dupont**[1], Aurelie Barrail-Tran[1], Isabelle Vincent[1], Anne-Marie Taburet[1]

[1]Pharmacy, Bicetre, Le Kremlin Bicetre, France

Background and Objective: Fondaparinux is an antithrombotic agent approved for prophylaxis of thromboembolism events, following orthopaedic or abdominal surgery or in medical situation, and for deep vein thrombosis or pulmonary embolism treatment. Recently, the AFSSaPS (French Drug Agency) has notified haemorrhagic complications due to inappropriate or off label use of fondaparinux and has published guidelines of good practice. The objective of this study is to evaluate the fondaparinux use in regard with these recommendations.
Design: Retrospective analysis of fondaparinux prescriptions for four years (June 2003–June 2007).
Setting: One thousand beds in a French university hospital with surgical (orthopaedic and abdominal) and medicine wards.
Main Outcome Measures: Patient characteristics, type of surgery or indication, duration of treatment, were recorded. Haemorrhagic risks factors were age > 75 years, weight < 25 kg and inflammatory disease.
Results: During the study period 120 patients received fondaparinux (57 male). At least one of the 3 extra risks factor for thrombosis was recorded in 79 (66%) of them. Mean [range] demographic and biological characteristics of these patients were: 66 years old [4–94], body weight 77 kg [20–110], n = 81, creatinine clearance 93 ml/min [30–254], n = 72. Mean duration of treatment is 11 days [1–62] at the dose of 2.5 mg qd for prophylaxis excepted for one patient at 7.5 mg qd in pulmonary embolism treatment.

Indications were hip (n = 72) and knee (n = 24) total replacement, other orthopaedic surgery of lower limbs (n = 13) and pulmonary embolism treatment (n = 1). Indications were "off label" for 7 patients with allergic reaction to heparine and 3 were not documented.

At least one of the 3 haemorrhagic risks factors was identified in 42 patients (35%).
Conclusions: Fondaparinux is mainly used in approved indications. Within the 42 patients with haemorrhagic risks factors, no haemorrhagic accident was notified in the pharmacovigilance records of our hospital. Nevertheless, fondaparinux has to be administred cautiously in this population of patients for whom the 1.5 mg dose will be necessary and hopefully available in a few month.
Keywords: Fondaparinux, Haemorrhagic risks factors, Good practice

PC-248 Pharmacists' experience in a small village dispensary in Senegal

Ana Soler[1], **Ainhoa Rodriguez-Arias**[1], Maria Antonia Mangues[1]

[1]Pharmacy Department, Hospital de la Santa Creu i Sant Pau, Barcelona, Spain

Background and Objective: The Guerlé dispensary is an initiative of a Spanish non-governmental organization set up to optimise health resources in the Sadio rural community (Senegal). Every year, a team of doctors and nurses travel to a community dispensary to support the local nurse and a pharmacy technician. This visiting team provides the dispensary's essential drugs. In 2006, two pharmacists were included in this team.

This study describes the clinical activities undertaken by hospital pharmacists in a dispensary in this setting over a 3-week period.
Design: Descriptive study of activities developed by pharmacists in a community pharmacy dispensary in Senegal.
Setting: Guerlé village, Sadio rural community, Senegal.
Main Outcome Measures: Evaluation of the contribution of two pharmacists in a multidisciplinary health team in a developing country.
Results: A mean of 35 patients per day were attended at the dispensary from 8 am to 6 pm. The activities developed by the pharmacists were:

- Organisation of the dispensary's pharmacy, providing support for the reorganization of drugs and disposal of expired medication.
- Pharmacological advice to clinical personnel (interventions about indications and dosage)
- Dispensation of medicines, providing information to patients in French or Wolof and adapted to their sociocultural level. We dispensed the exact number of pills to complete a treatment and explained how to take it. In case of oral solutions for children, we taught mothers how to give the correct volume for the prescribed dose.
- Local medical staff training in pharmacology and consulting sources.
- Detection and resolution of medication dosing errors. This problem was found especially in paediatric patients.
- Health promotion campaigns.

Conclusions: Improving organisation and medicine management and providing patient information about drug use were the two main contributions of pharmacists. Local and Spanish medical teams evaluated the pharmacists' contribution as positive. Pharmacists can play an important role offering support to the medical team and improving global healthcare quality.

PC–253 Evaluation of a rapid streptococcus testing service in the community pharmacy

Sam Salek[1], Jigna Patel[1], Catrina Schwartz[2]

[1]Centre for Socioeconomic Research Welsh School of Pharmacy, Cardiff University, Cardiff, United Kingdom, [2]Jones Pharmacy, Cardiff University, Spokane, United States

Background and Objective: Jones Pharmacy is one of the first American community pharmacies piloting a testing service to

diagnose Group A Streptococcal (GAS) Acute Pharyngitis. This study aimed to evaluate the service; examine whether current clinical records were adequate; and test hypotheses investigating the association between clinical prediction rules (Center Criteria, CC), Rapid Antigen Detection Tests (RADT) and antibiotic prescription.
Design: Initially, a semi-structured interview was conducted to gain an insight into the service. Data was retrospectively obtained from a standardised template (APEF), completed by a pharmacist at the time of each patient visit. Patient demographics and symptoms, RADT results, CC scores and follow up rates were analysed. Chi squared analyses were performed to investigate the aforementioned hypotheses.
Setting: Jones Pharmacy, Spokane, Washington DC.
Main Outcome Measures: Establishing adequacy and effectiveness of clinical records and relationships between clinical prediction rules, RADT and the antibiotic prescription.
Results: Out of a total of 76 patients (mean age = 22; male = 33) there were 38 children (mean age = 9.9; male 16) and 38 adults (mean age = 33; male = 17). Ten (47.6%) of the 21 negative RADT results amongst children were referred to a primary healthcare provider. Out of 72 patients, 58 (80.6%) needed a RADT to be performed. Only 25 (34.7%) out of 72 patients were followed up. Significant association existed between RADT outcomes and the prescription of antibiotics ($p = 0.001$, $p < 0.05$).
Conclusions: The findings from this study indicate that pharmacists need to be educated on the importance of a comprehensive clinical record. Inconsistent practices occur amongst pharmacists due to the conflict between US guidelines, particularly relating to the referral of children with negative RADT results to a primary care provider. The template was an efficient tool for data collection. Jones did not tailor their data collection for the purpose of the study: with improved data collection, Jones can yield information demonstrating the value of this service in future studies.
Keywords: Rapid streptococcus testing service, Rapid Antigen Detection Tests (RADT), Community pharmacy

PC-254 Anti-D Ig prescriptions in Rh(D)-incompatible platelet transfusion at Montpellier Hospital

Cyril Breuker[1], Gaëlle de Barry[1], **Audrey Castet**[1], Morgane Lebeschu[1], Anne Jalabert[1], Sylvie Hansel[1]

[1]Pharmacy, Lapeyronie University Hospital, Montpellier, France

Background and Objective: Rh(D)-positive platelet transfusion to a Rh(D)-negative recipient may induce alloimmunization which can be dramatic for woman in childbearing age. Alloimmunization is linked to the immunologic status of the patient together with the red blood cell content in the platelet concentrate (PC) (1). In France, the 100 μg Ig anti-D NATEAD was replaced by RHOPHYLAC 200 or 300 μg (July 2005). The doses recommended are 20 μg of Ig per ml of Rh(D)-positive transfused erythrocyte concentrate whereas AFSSAPS (French Health Products Safety Agency) advocate to administer a dose of 100 μg for the female recipient of 10 apheresis PC, in childbearing age and without strong immunosuppression (2).
The aim of this study was to evaluate the quality of anti-D Ig prescriptions and the respect of the AFSSAPS recommendations.
Design: Descriptive retrospective study of anti-D Ig prescriptions during the 2005 and 2006 years.
Setting: Pharmacy, pediatric and adult hematology oncology units, various hospitalization units.
Main Outcome Measures: Identity of the patient, unit, sex, age, indication, drug, posology and dose administered.
Results: For the adults, 89 prescriptions were collected concerning 66 patients (81% from hematology oncology unit, 42 males, 24 females of whom 7 under 45 years). Among 22 NATEAD prescriptions, 73% were well specified (name and dosage or posology mentioned) and only 9% of the 67 RHOPHYLAC prescriptions. 100 μg of anti D Ig were administered when NATEAD was available, whereas 200 μg with RHOPHYLAC excepted 4 times where 300, 400 or 600 μg were administered. 5 times the pharmacist has induced a modification of the posology. However, none prescription was made according to the AFSSAPS recommendations.

15 prescriptions were made for children in hematology unit concerning 4 boys and 2 girls. Among 8 prescriptions of 100 μg NATEAD, 100% were correct and 29% for the 7 RHOPHYLAC. The dose administered was not standard (200, 100 or 25 μg) and none prescription was conformed to the recommendations.
Conclusions: This study shows that since RHOPHYLAC was commercialized (more expensive than NATEAD), the doses administered have doubled and the national recommendations (existent for adults only) are not followed. The reason is that hematologic patients may have a lot of transfusions so they want to protect them from any immunization, despite they are immunocompromised patients. New recommendations are needed, more applied to the practice and precising doses for children. The role of the pharmacist is then to remind physicians good practices of prescription.

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Keywords: Rh(D)-incompatible platelet transfusion, Anti-D Ig

PC-257 Pharmacist's interventions in three medical care units: analysis and impact on the physicians' prescriptions

Guillaume Hache[1], Aurélie Barrail-Tran[1], Muriel Bocquentin[1], **Isabelle Vincent**[1], Anne-Marie Taburet[1]

[1]Pharmacy, CHU Bicêtre, Le Kremlin Bicêtre, France

Background and Objective: Computerized prescriptions are settled in clinical wards of our hospital. As pharmacist we have to validate those prescriptions and make recommendations to change part of the prescription such as dose, drug drug interactions. The objective of this study is to evaluate what kind of pharmaceutical interventions physicians really pay attention to.
Design: The prescriptions had been analysed for three months in three medical care units by two pharmacists. One of them take part in the physician round in order to integrate particular medical practices. Pharmacist's interventions were recorded and categorized. The ratio of accepted interventions by the physicians was assessed.
Setting: Three medical care units: 2 internal medicine services (acute care unit: 10 beds and long term hospitalisation: 18 beds) and acute geriatric unit (12 beds) in a 1000-bed French university hospital.
Main Outcome Measures: Description and analysis of pharmacist's interventions in clinical wards.
Results: We analysed 944 prescriptions. 104 interventions were performed and categorized. It should be noticed that 35% of pharmaceutical interventions were for misused of the new software: wrong selection of unit (75%) and redundant order (25%). The other 65% interventions were related to the prescription, our suggestions were as follow: time of administration (29%), adequate drug formulation (18%), dose adjustment (17%), therapeutic drug monitoring or biologic follow up (16%), to stop treatment (13%), route of administration (7%). Among these recommendations, 32% were the consequence of drug–drug interaction. 57% of the interventions led to change in the prescription. 34% of the physicians maintained their prescription despite the recommendations, mainly for staggered administration to avoid drug interaction.

Conclusions: This work evaluated pharmacist's interventions. First, physicians training to use this new prescription software has to be improved. Then we identify what kind of pharmaceutical interventions are accepted by physicians. Pharmacists should be well-educated to be as persuasive as possible. Even though physicians are reluctant to change their prescription, they are willing to be warned to improve their practice.

Keywords: Clinical pharmacy, Computerized prescriptions, Pharmaceutical interventions

PC-258 Evaluation of the effectiveness of sliding scale insulin for glycemic control in the home care setting

Sam Salek[1], Navneet Gill[1], Brian Gates[2], Luke Rice[2], Douglas Weeks[2]

[1]Centre for Socioeconomic Research Welsh School of Pharmacy, Cardiff University, Cardiff, United Kingdom, [2]Department of Pharmacy, Washington State University, Spokane, United States

Background and Objective: Sliding scale insulin therapy (SSI) is a commonly used method of adjusting insulin in an attempt to control a patient's blood glucose levels. Previous research investigating SSI use in the hospital setting has determined that SSI therapy leads to poor glycaemic control and poor patient outcomes. Therefore, a Corrective Schedule for SSI therapy is recommended by The American Diabetes Association (ADA). The aims of this study were therefore to determine, for the first time whether SSI recipients experience problems in the home care setting and whether ADA guidelines on SSI use are being adhered to.
Design: Eligible patients were identified through electronic records of patients admitted from 1st January to 31st December 2006. The list was utilised to obtain medical charts of the patients. Relevant information including patient demographics, blood glucose readings and documented problems were recorded using a standardised data collection form. Chi-squared statistical analysis was determined using SPSS Version 14.0.
Setting: The Visiting Nurses Association (VNA) home care agency, Spokane, Washington State, USA.
Main Outcome Measures: Use of 'traditional SSI therapy' versus 'corrective' version recommended by ADA.
Results: Of the total 117 (male = 45, female = 72; mean age = 67.37, age range = 34–96) patient medical records examined in this study, 36.75% (n = 43) had at least one problem documented with their insulin regimen. The most common problem that affected over a quarter of the population, 25.64% (n = 30) was 'lack of control' which included any hyper- and hypoglycemic events. More than a third of sliding scale recipients, 37.61% (n = 44) had pre-prandial blood glucose levels above 150 mg/dl. In total 70.94% (n = 83) of patients were prescribed the non-recommended Traditional SSI therapy and only 29.06% (n = 34) were using the recommended Corrective SSI therapy.
Conclusions: The findings of this study support previous concerns that SSI use is prone to problems and poor glycaemic control. Furthermore, this study has established the lack of adherence to the ADA recommended use of the Corrective SSI schedule in the home care setting. It is hoped that this study will influence use of SSI in hospital and home care agencies as well as national and international guidelines.

Keywords: Sliding scale insulin therapy, Home care setting

PC-263 The impact of different schedules on the outcome of vap caused by pseudomonas aeruginosa

Dinamene D. M. Santos[1], Anabela A. G. Gusmão[1], **Armando Alcobia**[1]

[1]Pharmacy, Hospital Garcia de Orta, Almada, Portugal

Background and Objective: Prolonged (more than 48 hours) mechanical ventilation (MV) is the most important factor associated with nosocomial pneumonia (1). Nosocomial pneumonia (NP) is differentiated in to ventilator-associated pneumonia (VAP) if the process arose after the patient has been receiving at least 24 h of MV (2). VAP is defined as an inflamation of the lung parenchima caused by infectious agents not present or incubating at time MV was started (1).
Design: Longitudinal, prospective and observational study.
Setting: We made a prospective evaluation of the clinical files of a patient population of 14 cases with VAP diagnosed between April 2006 and December 2006, who were assisted in Hospital Garcia de Orta. A total of 14 patients, 57% male and 43% female, aged 62 ± 15 years were diagnosed with VAP. VAP was defined as new positive respiratory culture after at least 24 hours of MV.
Main Outcome Measures: These data sugest that the increase of PCR for documented VAP caused by Pseudomonas aeruginosa ocurred more frequently with ceftazidim than other antibiotics.
Results: In all VAP episodes, an aetiologic microrganism, was isolated from 26 hemocultures and 22 bronchic secretions. The gram-negative bacteria were the most commonly isolated microorganisms (68%).
We collected PCR and leucocytes data of seven documented schedules (n = 7) for erradication of Pseudomonas aeruginosa: (1) ceftazidime (2 g q8 h) + gentamicin (5 mg/Kg qd), (2) ceftazidime (2 g q8 h) + ciprofloxacin (200 mg q12 h), (3) Piperacillin-tazobactam (4 g/500 mg q6 h) + aztreonam (2 g q8 h), (4) Piperacillin-tazobactam (4 g/500 mg q6 h) + gentamicin (5 mg/Kg qd), (5) Piperacillin-tazobactam (4 g/500 mg q6 h) + amikacin (15 mg/Kg qd), (6) imipenem-cilastatine (500 mg q6 h) + gentamicin (5 mg/Kg qd), (7) meropenem (1 g q8 h) + gentamicin (5 mg/Kg qd). The mean duration of antibiotic therapy was 10 days. There was an increase of the PCR values of the patients who were scheduled with ceftazidim but in the other groups there was a decrease of this parameter. The number of leucocytes didn't have any impact of the PCR variation ($p > 0.05$, t-test). Considering the group of the 14 patients, 75% (6) of the positive cultures for Pseudomonas aeruginosa which were sensitive to either Ceftazidim or a carbapenem or piperacillin-tazobactam were treated with ceftazidim instead.
Conclusions: This approach provides useful information on the relation of host defenses and the clinical outcome. It is also useful to study the prevalence of acquired resistance to several antibiotics that may be used in documented antibiotherapy for Pseudomonas aeruginosa.

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Keywords: Pseudomonas aeruginosa, Antibiotherapy, VAP (ventilator-associated pneumonia)

PC-276 Use of recombinant activated factor vii (rFVIIa) in patients with uncontrolled bleeding: an evaluation of professional practices

Sophie Langevin[1], Amélie Liou[1], Estelle Bignon[1], Elisabeth Vaissier[2], Alexandre Ouattara[2], Robert Farinotti[1]

[1]Pharmacy, [2]Cardiac Surgery, Pitié Salpêtrière Hospital, Paris, France

Background and Objective: rFVIIa is increasingly used as rescue therapy in uncontrolled bleeding, however little information is available regarding its safety and efficacy in this indication.

Inadequate administration or dosage can induce severe adverse effects. Therefore, we elaborated standardized guidelines for physicians in December 2006. The aim of this study was to evaluate the impact of these recommendations on professional practices and to identify what should be improved.
Design: Retrospective study for patients treated in 2006 and prospective study in 2007 (6 months); drawing up of a form based on updated guidelines, validation of this form and data-gathering in patient's medical file.
Setting: Different departments using rFVIIa in our hospital, in particularly cardiac surgery department.
Main Outcome Measures: To measure the conformity of medical practice regarding the guideline in especially the following points:

- indication for use: massive bleeding when first-line treatment (surgical control of bleeding, use of blood products) has failed;
- to achieve the correction of factors that may interfere with coagulation (hypothermia, severe acidosis, hypocalcemia);
- before administration of rFVIIa the patient or his family should be informed about the treatment;
- the prescription of FVIIa should be initialized by a referent physician
- to conform the dose of 60 mu/kg in cardiac surgery patient.

Results:

- 17 patients received rFVIIa in cardiac surgery department (12 in 2006 and 5 in 2007);
- indication is respected in 100% of the cases;
- factors that may interfere with coagulation are rarely corrected (80% of patients are in acidosis in 2007 which represents a decrease of 3% in comparison with 2006);
- patient is never informed about the type of treatment that he has received (off-label use);
- rFVIIa is systemically prescribed by a referent physician in 2007 (72.6% in 2006);
- in 2007, dose is still wrong in 60% of cases.

Conclusions: Several solutions have been proposed to the physicians to improve their professional practices: to develop an algorithm for use of rFVIIa, to fill in a checklist before administration of rFVIIa to be sure to follow the guidelines, … This study will be extended in others departments using rFVIIa as gastroenterology and traumatology.

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Keywords: Recombinant activated factor VII, Massive bleeding, Guidelines

PC-277 Pharmaceutical care contribution in health teams in the Portuguese integrated health care system – between the hospital and the community pharmacy

Rita Lucas[1], Ana Paula Abreu[2], Miriam Capoulas[2], Fátima Cimadeira[2], Ondina Martins[2]

[1]Pharmacy, Administração Regional de Saúde de Lisboa, [2]Pharmacy, Administração regional de saúde de lisboa, Lisboa, Portugal

Background and Objective: The pharmacist can contribute to the maintenance and recovery of population health conditions participating in patient house visit′ s health teams. Pharmaceutical care at this level may also have a real impact on the health system costs. The aim of this project is to establish a pathway at this care level in which all aspects of pharmaceutical care are explained and defined.
Design: Program description.
Participation of the pharmacist in health care teams. Definition of field areas, between the pharmaceutical hospital care and the community pharmacy and health care centers. Articulation between the hospital pharmacist, the health care center pharmacist and this new "home pharmacist". Definition of the different types of pharmaceutical care to be implemented in this setting.
Setting: The implementation of this project in the Portuguese Integrated Health care System.
Main Outcome Measures: The implementation in near future by the governement.
Results: Non applicable at the moment.
Conclusions: The role of the pharmacist in the health system is well defined. Rational drug use promotion is an important tool to minimize adverse effects and maximize efficacy of medicines. Pharmaceutical Care should be implemented in all types of health care, including recovery care, for governmental and population benefits.
Keywords: Pharmacist, Health promotion, Pharmaceutical care, Health teams

PC-281 Pharmaceutical care in elderly patients with hip fracture: a prospective pilot-study

Miriam Maroto[1], Berta Renedo[1], Pilar Lalueza[1], Carmen Pilar Simeon[2], Juan Carlos Juarez[1], Lourdes Girona[1], Josep Monterde[1]

[1]Pharmacy, [2]Internal Medicine, Hospital Universitari Vall Hebron, Barcelona, Spain

Background and Objective: Hip fracture is a major public health problem with a high incidence and prevalence in people aged 65 years and older. Changes in body composition and organ function, drug-drug interactions, and co-morbidities should be taken into account in the pharmaceutical care of this group of patients. The aim of this study is to analyse pharmacological treatment of elderly patients ongoing hip fracture in order to improve pharmaceutical care in this group of patients.
Design: A prospective pilot-study was performed during one month, (May–June 2007) in 14 patients admitted in a tertiary hospital ongoing hip fracture. These variables were recorded for each patient: sex, age, body mass index (BMI), diseases antecedents, serum creatinine and creatinine clearance estimated by Cockroft-Gault formula, serum albumin levels, lymphocytes count, sodium and potassium levels. Drug treatment was recorded from pharmacy database.
Setting: Patients with hip fracture admitted in a tertiary hospital.
Main Outcome Measures: Prescription profile in elderly patients with hip fracture.
Results: Of 14 patients, 9 were female. Mean age was 80.4 years old (68–96). Mean BMI was 27.6 ($n = 10$, range 21–35). Albumin levels were lower than 3.4 g/dL in 10 patients. Sodium levels were out of the normal range in 7 patients. Five patients had creatinine clearance lower than 50 ml/min, 2 of them less than 30 ml/min.

We analysed 119 prescriptions which included 50 drugs. They were classified in 5 categories: not adjustment required (16 drugs), adjustment required (12), inappropriate based in Beer's criteria (1), precaution in elderly people (10) and not enough information available in geriatric population (11). Mean number of drugs per patient was 9 (5–15). Of 119 prescriptions revised, 22 required adjustment and 15 of them were correctly adjusted. Of 24 prescriptions in precaution group 18 were correctly prescribed.
Conclusions: Dosage adjustment or precaution was required in 40% of prescriptions. Of these, 75% (33/46) needed dosage adjustment according to renal function. Besides, 36% of patients had renal function alteration. Thus, it is important to improve pharmaceutical

care in this group of patients specially for those drugs that need dosage adjustment in renal failure.
Keywords: Pharmaceutical care, Hip fracture, Elderly patients

PC-282 Hospital pharmacists and community pharmacists: an experiment of pharmaceutical information transmission carried out in an anticancer center

Anne Lebreton[1], Erwin Raingeard[1], Christelle Audeval[1], Sophie Rochard[1]

[1]Anticancer Center, Centre René Gauducheau, Nantes, France

Background and Objective: To evaluate a programme of pharmaceutical information transmission from hospital pharmacists to the community pharmacists about drugs, particularly anticancer drugs, dispensed until then by hospital pharmacy and now distributed by them.
Design: While doing the last dispensation by the hospital pharmacy, an informative fax was sent to the community pharmacists indicating the name of the patient, prescribed drug and its posology, date and quantity dispensed, approximate date of the next dispensation and general information about the delivered drug. One month later a questionnaire was sent to the pharmacists to get their appreciation about this document. In the case of having no answer from them, the same questionnaire was re-sent.
Setting: Pharmacy of French Anticancer Center, Centre René Gauducheau, Nantes.
Main Outcome Measures

- Appropriateness of the way of transmission
- Pertinence of information sent
- Efficiency of the programme

Results: Out of 49 patients treated (11 vinorelbine oral, 10 erlotinib, 12 sorafenib, 16 sunitinib), 34 (69.4%) were registered in this study, involving 32 pharmacists. Six pharmacists (18.8%) answered after the first sending of the questionnaire and 14 (43.8%) answered after they received the remainder. Fourteen pharmacists (43.8%) did not answer. All the pharmacists were satisfied with the way of transmission. However, one of them suggested having the information sent by E-mail. Seventeen professionals (85%) thought information was useful and 9 (45%) thought that it was sufficient for their practice. Only 6 pharmacists (30%) encouraged us to continue the programme; the others did not express any opinion about its efficiency. Moreover, none of them called us even though we suggested so.
Conclusions: This experiment seems to be interesting and to correspond to the needs of the pharmacists. It would also be an easy way to make dispensation safe. Nevertheless, many problems appeared: much time spent and the difficulty making an exhaustive follow-up of all the patients thus limiting the application of this kind of programme to larger cohort.
Keywords: Community pharmacists, Pharmaceutical information transmission, Evaluation, Dispensing safe

PC-290 Proposal a software for analysis of clinical relevance of antiretroviral drug interactions

Pedro Amariles[1], Newar Giraldo[1], Maria Jose Faus[2], Francisco Javier Gutierrez[1]

[1]Pharmacy, University of Antioquia, Medellin, Colombia, [2]Research Group on Pharmaceutical Care (GIAF-UGR), University of Granada, Granada, Spain

Background and Objective: To make a proposal of software that facilitates the analysis of clinical relevance of antiretroviral drug interactions, in the medical prescription, dispensation and Dader methodology of pharmaceutical care study phase.
Design: Pubmed and other databases evaluate revision. Antiretroviral drug interactions were classified in four levels according to probability and severity of the interaction. The probability was grouped in 3 categories: defined, probable and possible. So, severity was grouped in 3 categories: serious, moderate, and slight. The levels are: Level 1 (serious and defined or probable); Level 2 (serious and possible, moderate and defined or probable); Level 3 (moderate and possible, slight and defined or probable) and Level 4 (slight and possible). We used the PubMed and database review for identified and organized the information to software elaboration.
Setting: University of Antioquia, Medellin – Colombia.
Main Outcome Measures: Interactions distribution by: level of clinical relevance, type, pharmacodinamic interactions, pharmacokinetics interactions, enzymatic inhibition, enzymatic induction and pharmacologic groups that interact with antiretroviral drugs.
Results: 3694 drug interactions were classified. The clinical relevance distribution by level was: level 1: 191 (5.2%), level 2: 1152 (31.2%), level 3: 2309 (62.3%), and level 4: 46 (1.2%). The type interactions distribution was: 3694 (94%) drug–drug interactions, 90 (2.7%) drug–disease interactions, 29 (0.8%) drug–food interactions, 22 (0.6%) drug–nutrient interactions, 43 (1.2%) drug–laboratory test interactions, and 27 (0.7%) drug–herbal product interactions. Of 3694 interactions, 213 (5.8%) were pharmacodinamic interactions and 3481 (94.2%) pharmacokinetics. 715 (20.5%) pharmacokinetics interactions were mediated by enzymatic induction, whereas 2727 (78.3%) were by the enzymatic inhibition. Antiarrhythmics, antihistaminics, ergot alkaloids, prokinetics, benzodiazepins, statines, calcium channels antagonists, phosphodiesterase inhibitors, azoles antifungics, selective serotonin reuptake inhibitors, opioid analgesic, immunosuppressants, macrolides, classic anticonvulsivants, and riphamicins were the most common drug therapeutic groups with anti-retroviral drug interactions.
Conclusions: 3694 interactions were classified, which 94% were drug–drug interactions; as well, 94.2% were pharmacokinetics interactions and in their majority (78.3%) were mediated by the enzymatic inhibition. About 36.7% of interactions were level 1 and 2, this levels of greater clinical relevance and whose the alert generated by software are contributions that help to analyze and take decisions with respect to the handling from the same ones.

Reference

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Keywords: Drug interactions, Anti-retroviral drugs, Software

PC-291 Evaluation of a pharmaceutical care model in a pediatric intensive care unit

A. Robelet[1], Jean-françois Bussieres[1], Annie Lavoie[1], Christopher Marquis[1], Denis Lebel[1]

[1]Pharmacy, Sainte-Justine Hospital, Montreal, Canada

Background and Objective: To develop a structured and reproducible approach to evaluate the pharmaceutical care model in a pediatric intensive care unit. The approach should allow a revision of the pharmacist task description on the unit in order to optimize pharmaceutical care. The evaluation conducted in a Canadian setting will be tested in a similar French context.
Design: Descriptive study of pharmaceutical care.
Setting: Pediatric intensive care unit in a 500 bed teaching hospital.
Main Outcome Measures: A literature search and review conducted to describe the impact of clinical pharmacist on a selected clinical

outcomes (e.g. mortality, morbidity, adverse drug reactions.); a profile of patients and clinical activities; an update of task description based on evidences and context.
Results: Studies demonstrate that pharmacists have an impact on selected clinical outcomes following clinical pharmacy activities (e.g. drug therapy monitoring, pharmacokinetics and education for medical and paramedical professional). Patients admitted in the intensive care unit have a higher level of complexity of care than average patients in the hospital, but a similar length of stay. For pharmacy services, their drug cost per admission is higher (503$CAD vs 380$CAD), as the number of pharmacist paid hours per admission (1.1 vs 0.88) and the number of pharmaceutical interventions per admission (2.05 vs 1.74). The approach helped us to identify solutions to problems like the non-participation to the cardiology patient's round, the absence of a medication reconciliation process or the inconstant documentation of interventions. A revised task description will be tested by both clinicians.
Conclusions: This study illustrates an approach for the evaluation of a pharmaceutical care model in a pediatric intensive care unit.
Keywords: Pharmaceutical care, Evaluation, Intensive care unit

PEC-126 Evaluation of the professional practices in cardiac surgery: application to the use of biological and synthetic glues

Ameslant Sandra[1], Capucine Delgove[2], Tramier Blaise[3], Lescoat Halima[4], Caus Thierry[4], Petit Abir[2], Desablens Françoise[2]

[1]Pharmacy, CHU Amiens, Amiens, France, [2]Pharmacy, [3]Medical Information, [4]Cardiology

Background and Objective: From 2005, an increase in the consumption of biological and synthetic glues was noted in the cardiac service of surgery. These are drugs and expensive medical devices, which represent an expenditure of more than 80 K€.

The impact of their use was evaluated on the post-operative bleedings, the duration and the cost of stay by the way of a economic medical study.
Design: An observational exploratory study was carried out between January and March 2007. All the operated patients were included.
Setting: The computerized consultation of the patient files made it possible to identify the following criteria of judgement: indication, surgeon, type of glue used, catch of platelet aggregation inhibitors or oral anticoagulants, volume of drainage, number blood transfused, duration of hospitalization.

The statistical analysis related to two groups of patients, treated or not by glues, with a stratification on the hemorrhagic factors of risk.
Main Outcome Measures: The comparison of the averages of the various parameters was carried out by tests of Student, for the large samples presenting comparable variables, and of Fisher in the other cases. The cost of each hospitalization was calculated from the numbers of stays.
Results: During the three months of study, 154 patients, whom average age was 70 years [35–90], were operated. The two principal indications were the valvular replacement (45.5%) and aorto-coronary bridging (39%). On all six surgeons, 70% of the interventions were dealt with by three. On the whole, 57 patients receive a glue (37%), of biological type with Tissucol® (32.5%), and synthetic with Bioglue® (4%), Arista® (2%) and the GRF® (1%). Some patients received two types of glues (3.5%). No significant difference between the two groups appeared in the total analysis.

Among the 120 patients who received a pre-operative anticoagulant treatment (78%), only 37% were treated by a glue, for which the number of transfused globular bases and the duration of stay in reanimation were significantly lower ($p < 0.05$; $p < 0.01$), compared to untreated patients.

Conclusions: In general, the use of glues in cardiac surgery does not decrease the post-operative bleedings, but increases the cost of the stay. It however finds its utility with patients at the hemorrhagic risk. A standardization of the local practices of the surgeons is in progress because there is not any national consensus. These results should be confirmed by randomized studies on a large scale.
Keywords: Glues, Cardiac surgery, Economic medical study, Evaluation of the professional practices

PEC-92 Economic impact of the modification of zoledronic acid refunding on hospital budget

Isabelle Alleman[1], Sophie Gensollen[1], Christelle Labrande[1], Sylvie Laurent[2], Philippe Monges[1], Marion Gaudry[3], Albert Darque[1], Marie Claude Bongrand[1]

[1]Pharmacy, [2]Management Control, [3]Medical Information, CHU Conception, Marseille, France

Background and Objective: Pamidronic (PA) and zoledronic (ZA, Zometa®) acids are the intravenous biphosphonates (BP) referred for use in our hospital. Until March 2007, these drugs were not part of the "activity-based tariffing" system (T2A) which provides for a global refunding fare for an "homogeneous group of patients" (GHS) pooled by pathology and cost, and involves extra refunding of expensive drugs used in addition to the standard of care. Since then, GHS fare has increased and now includes BP which are no more extra refunded.

Although ZA is 5 times more expensive than PA, it seems more effective with a shortened administration time (20 minutes vs 2–4 hours).

In respect of the contract of good use (CBU), our objective was to evaluate the real cost of a daily hospital (HDJ) session per patient treated with BP, and to compare it with the one obtained from the national study of costs (ENC) in order to determine if whether our hospital gained or loosed benefit from this new refunding status.
Design: Retrospective study.
Setting: Conception Hospital, 147 Bd Baille, 13385 Marseille Cedex5, France.
Main Outcome Measures: For every HDJ session, we accounted pharmacy direct expenditures (including implants, medical devices or drugs), medical technical acts, and structure and logistic supports costs. Moreover, we evaluated matching of prescriptions with the CBU criteria. We analyzed data together with the Public Health and Medical Information ward and the Department of Management Control.
Results: Real costs of HDJ session amounted to 327 € without BP, and increased to 368 € and 537 € with PA and ZA administration, respectively. According to ENC results, each session including intravenous BP was refunded for 459.39 €.

In 2005, on a total of 5242 HDJ sessions (2085 patients), 712 sessions had BP administration (13.58%) and concerned 243 patients (11.65%). Real costs of HDJ were 302914 € (172960 € and 129954 €, for 470 and 242 HDJ sessions with PA and ZA, respectively). If BP administrations were integrated in the GHS at this time, the 712 sessions would have been refunded for 327086 € (215913 € and 111172 € with PA and ZA, respectively) resulting in a profit of 24171 € for the hospital.

Among BP prescriptions, 32% matched approved indications, 4.6% were part of temporary protocol of use and 63.4% were medical publication-based. Internal medicine ward initiated 37% of the prescriptions.
Conclusions: Using pamidronic acid compensates the deficit generated by zoledronic acid use. In respect with the CBU, zoledronic acid use will be restrained to approved indications in outpatients and pamidronic acid will be preferred in all others indications.
Keywords: Biphosphanate, Refund, Economy

PEC-127 Evaluation of the implementation of automated medication-dispensing system in an intensive care ward

Gregory Gaudillot[1], Marie Antignac[1], Fabien Heck[1], Nadine Casimir[1], Robert Farinotti[1]

[1]Pharmacy, Groupe Hospitalier Pitié-Salpétrière, Paris, France

Background and Objective: The development of the implementation of automated medication-dispensing system in French hospitals is the main aim, defined in the "Good Use" Contract voted in 2005. The purpose is to improve the safety around the drug dispensing by the nurses.

The objective of this work was to evaluate this implementation in 3 thrusts: safety, economic and organization.

Design: Comparison between two different organization ways: before the implementation (pharmacy order by nurses chief) and 6 months afterwards (automated order and arrangement by a chemist assistant).

Setting: Surgery intensive care unit (8 beds) in the Pitie-Salpétrière Hospital (GHPS), a large teaching hospital.

Main Outcome Measures: Study "Before and after": Follow up of prescribing and dispensing matches, analysis of time repartition between nurses and chemist assistants, follow up of line of emergency order, analysis of the results of a nurses satisfaction survey and costs study of drug consumption and drug storage.

Results: This study, performed over 50 days, showed very small differences between prescribing and administered medications (1% before versus 4% afterwards = no significant difference). Organization: Implementation of automated device allowed a better division of activities, the management by nurses chief of the pharmacy order decreased (from 9% to 2% of their weekly working time), because this part was attributed to the chemist assistant (15% of their weekly working time). Satisfaction: 70% of nurses preferred the automated system and especially because they find that this system was safe. In the same time, 80% of them appreciate with the new relationship with the Pharmacy Department. Costs Study: a huge decrease of the storage: −34% of cost (14,819 € versus 9,806 €) and −13% of references number (296 versus 230). In the same time, over 2 months, the drug consumption of the unit has been reduced by 30% (−11,680 €).

Conclusions: Even if the study did not demonstrate a decrease of the number of medication errors (due to the tiny number of them as much before than afterwards the implementation), this automated system allowed a safety access to the drugs (biometric system) and contributed to reduce the risk of medication errors. The other great interest is the real involvement of the pharmacy in the clinical wards. The presence of the chemist assistant ensures a better management of drug storage (decrease of emergency order), a direct follow up and allowed a contact with nurses.

PEC-202 Intracranial stents: an evaluative and cost impact study in Paris hospitals

Serry Géraldine[1], Maubert Marie-Anne[2], Naud Carole[2], Goeury Dominique[2], Doreau Christian[2]

[1]GIEAP, AP-HP, Paris, France, [2]GIEAP, AP-HP, Paris

Background and Objective: Since 2005, manufacturers develop a new class of implantable medical device: intracranial stents. It can be used for intracranial angioplasty or in endovascular management of intracranial aneurysm. The aim of this study is, firstly to review the different stents available in France, their technical characteristics according to indications and, secondly to estimate the cost impact of those new devices uses for 2007.

Design: Descriptive and cost evaluating study, literature review, manufacturers sales, neuroradiologists and manufacturers interviews.

Setting: 3 Neuroradiology departments of Paris hospitals, Evaluation and purchase of medical device unit of Paris hospitals.

Main Outcome Measures: Technical description of intracranial stents, quantitative analysis of stent implantations in Paris hospitals and in France, cost.

Results: In 2007 in France, 5 intracranial stents with various technical characteristics are available (steel or nitinol, learning curve: 2 to 5 procedures, follow-up of patients is from 6 months to 2 years).

Stents with a hight radial force are used for intracranial artery angioplasty. More precisely, those devices are implanted in patients with recidive stroke, with an intracranial stenosis ≥50% and who had failed medical therapy. Two stents are identified in this therapeutic use: Wingspan® (Boston) and Pharos® (Micrus). About 120 implantations are estimated for 2007 in France, whom 35 implantations (cost = 105,000 €) in Paris hospitals. The need is not actually clearly identified: the number of eligible patients is not already known and not systematically searched by neuroradiologists. So number of implantations will evolve.

4 intracranial stents are used in combination with detachable coils embolization in patients with wide-necked cerebral aneurysms: Léo® (Balt), Neuroform 3® (Boston), Entreprise® (Cordis) and Pharos® (Micrus, double therapeutic use). For 2007, about 230 to 300 implantations are estimated in France (10 to 25% of endovascular treatment of intracranial aneurysm), whom 40 implantations (cost = 116 000 €) in Paris hospitals. Those data might increase. Indeed, there is evidence of the effectiveness of stent implantation in intracranial aneurysm which generates lower rate of aneurysm recanalisation.

Conclusions: 5 intracranial stents has been identified in 2 precise therapeutic uses. However, an exact quantitative assessment can not be realised: those medical devices are innovating and are actually changing the management of patients concerned. Those quantitative results might evolve. Further similar studies will be necessary in order to follow up those innovating therapeutic uses in neuroradiology departments and to estimate their cost impact, actually negligible.

Keywords: Stent, Intracranial angioplasty, Intracranial aneurysm, Implantable medical device, Cost evaluation

PEC-216 Feasibility of economical impact of management of cytotoxic remainders in a centralized cytotoxic unit

Hélène Corneau[1], Déborah Schlecht[1], Sébastien Bauer[1], Sylvie Froger[1], Jacqueline Grassin[1]

[1]Pharmacy, University Hospital of Tours, Tours, France

Background and Objective: The French law forecasts to reimburse the most expensive cytotoxic drugs to the real quantity administered to the patient. So to set up a secured procedure to use remainders of cytotoxic drugs in a centralized cytotoxic preparation unit in order to conform to the French law.

Design: Prospective study.

Setting: Clinic unit of oncologic pharmacy.

Main Outcome Measures: This procedure was tested during ten weeks and had concerned the three most expensive cytotoxic drugs used in digestive cancers. Generated remaining quantities are conditioned inside isolator in radio-sterilized bags, and identified with the number of register of prescriptions, the drug's name, the remaining quantity, the conservation' conditions, the opening date, the duration of physico-chemical stability according to the data of the literature. Bags are joined when they are gone out of the isolator. A theoretical differential is daily established between the doses which are prepared with or without management of remainders.

Results: The management of remainders involves that a rigorous manipulation during the conditioning and a daily management of the out-of-dates. The average of realized savings 800 € a week, that represents 41,600 € extrapolated to one year and a decrease of 7.5% of expenses for these three drugs.

Our software of the preparations of drugs is adapted for the use of the remainders. But the invoice-software allows only one invoice for one flask, which involves with the management of the remainders an unequal invoicing system for the patients

Conclusions: The management of remainders generates a real financial profit. But the really administered quantity cannot be imputed to the patient because the software of inventory control and invoicing does not manage the fraction of flasks. Nevertheless, according to the French law we must express under fractional shape the quantities of cytotoxics, which are administered by stay to the patients for the most expensive drugs.

Reference

Ordinance n°2005–1023 of August 24th 2005

Keywords: Expensive cytotoxic drugs, Savings, Remainders

PEC-232 Measuring the activities of a clinical pharmacist on sequential treatment on the emergency department

Sabrina De Winter[1], Sandrina von Winckelmann[1], Isabel Spriet[1], Daniel Knockaert[2], **Ludo Willems**[1]

[1]Pharmacy Dpt, [2]Emergency Dpt, University Hospital Leuven, Gasthuisberg, Leuven, Belgium

Background and Objective: Since July 2006, financing of drugs in Belgian hospitals is based on a lump-sump system. This decision favours efforts leading to more rational use of medication like for example the sequential treatment. Efforts like posters, recommendation letters and information rounds were part of the strategy. Since 01–11–2007 a clinical pharmacist puts also attention on this subject by contacting physicians and nurses regarding individual drug therapies. Documenting the results of interventions suggested by a clinical pharmacist is often quite difficult. The number of DDD of intravenous administered drug versus the total amount of DDD [oral + IV] of the particular drug administered has been described. This parameter can be disturbed by the use of the oral form over a long period of time or by the early discharge of patients combined with a continuation of the therapy at home. To follow up the sequential treatment on the emergency department, this parameter seems to be accurate by the fact that the stay of the patient here is between 1 and 2 days.

Design: A clinical pharmacist attends daily patient rounds and gives advice to physicians and nurses about the route of administration of drugs. Retrospective evaluation of the administration of levofloxacin and paracetamol to patients at the emergency department between January 2006 and May 2007.

Setting: Emergency department, University Hospital, Leuven, Belgium

Main Outcome Measures: DDD-IV versus DDD total of levofloxacin and paracetamol over time.

Savings by orally administered paracetamol and levofloxacin were calculated.

Results: The start of the activities of the clinical pharmacist is well documented with the described method showing a drop of DDD IV/DDD total. The average of DDD IV/DDD total of paracetamol respectively levofloxacin between January 2006 and June 2006 is 91% and 85% which is decreased to 87% and 79% between July 2006 and December 2006 and further dropped to 84% and 62% between January 2007 and June 2007.

Cost savings by sequential treatment of paracetamol and levofloxacin were 1274 euro and 2025 euro, calculated from the start of the activities the clinical pharmacist (for 8 months).

Old habits are difficult to change among them the administration of drugs by intravenous route. Almost every medical and surgical patient admitted to the emergency department receives an intravenous line, so the threshold for intravenous administration is low. Furthermore a wide variety in patients' medical conditions added to a rapidly changing timetable for technical examinations and surgery necessitates an individual approach of the most suitable route of drug administration. Official letters and posters may be useful. However this report confirms the importance of a clinical pharmacists' permanent presence on the ward for maintaining awareness of sequential treatment.

Conclusions: The number of IV-DDD's versus the number of total-DDD's of a particular drug enables the documentation of sequential treatment by a clinical pharmacist on the emergency department.

Keywords: Sequential treatment, Paracetamol, Levofloxacin

PEC-235 Analysis and economic impact of utilization of medicinal product for compassionate use

Carolina Apezteguia-Fernández[1], Maria del Pilar Vicente-Sanchez[1], Nuria Ibañez-Heras[1], Marta Arteta-Jimenez[1]

[1]Pharmacy, Hospital Universitario de Getafe, Getafe, Spain

Background and Objective: To analize utilization of drugs for compassionate use and economic impact in a 600 bed hospital with an attended population of 319,000 inhabitants.

Design: Retrospective study of applications of drugs for compassionate use during 2006.

Setting: Hospital Universitario de Getafe.

Main Outcome Measures: From each application following data were collected: medicinal product arranged as compassionate use, clinical unit which requested the application, indication and price.

Results: 303 applications for compassionate use treatment were processed (0.95 processings/1000 inhabitants). The higher number of applications has corresponded to Gynecology Unit, 154 processings of misoprostol to use in delayed curettage. Secondly, botulinum toxin was processed in 81 cases, 96.3% of them corresponding to Anaesthesic and Reanimation Unit for miofascial pain. Active substance that has caused a higher impact on the hospital′s budget was inhalated tobramicin, processed for a total of 5 patients with bronchiectasias colonized by Pseudomonas aeruginosa. The expenses for this indication has added up to 35,000 € during 2006.

Secondly, as regards to economic impact we found botulinum toxin which raised up to 26,300 €, expenses that were attributed in 95% to Anaesthesic and Reanimation Unit.

The highest cost/treatment by patient during 2006 corresponded to inhalated tobramicin that has increased up to 14,000 €, followed by infliximab approved for hydrosadenitis treatment which accounted for 11,000 €. Total cost of treatments for compassionate use has involved approximately 0.7% of total consumption for drugs during 2006.

Conclusions: The higher number of processings in 2006 corresponds to misoprostol requested by Gynecology Unit although its economic impact on the consumption of medicinal products for compassionate use is very low.

Inhalated tobramicin utilization for colonized bronchiectasias involves the highest global cost and the highest cost/treatment on total medicinal products for compassionate use.

The percentage accounted for medicinal products for compassionate use on total consumption of medicinal products is low. It would be interesting to perform a multicenter study in order to value economic impact in last years of medicinal products for compassionate use.

PEC-288 The vacuum-assisted closure (VAC) therapy: a 17-months medico-economic retrospective study

Stéphanie Roche[1], Nathalie Herment[2], Sandrine Havet[2], Amélie Pruvost[2], Willemin Jean-Claude[2], Frances Carole[2]

[1]PHARMACIE, Reims teaching hospital, Reims, France, [2]PHARMACIE, Reims teaching hospital, Reims

Background and Objective: In the management of wounds care, spectacular results have been achieved through the application of negative pressure wound therapy. This approach known as Vacuum-Assisted Closure (VAC) involves the use of a defined controlled negative pressure (delivered by an ambulatory motor) over a polyurethane or polyvinyl sponge (which are considered as consumables) placed in the wound. In our hospital, this therapy was first introduced for acute traumatic wounds. In June 2005, the interdisciplinary wound and cicatrisation group decided to extend indications to chronic wounds. To improve management regarding this larger and complex use through all units, a specific prescription form associated with recommendations was set up. This document is available as well as paper or electronic form.

The purpose of this study was to evaluate conditions of use and global costs of VAC therapy.

Design: A 17-months retrospective study was based on the analysis of nominative prescriptions of VAC consumables (canisters with gel, small, medium or large foam dressing kits and Y connectors). All patients treated with VAC therapy from June 2005 to October 2006 were included.

Setting: care units.

Main Outcome Measures: Demographic data, indications, type of consumables, hospitalisation units.

Results: Among the 89 patients (49 male, 40 female; mean age 58.2 ± 19.8 years), 21 (23.6%) were treated for acute wounds, 27 (30.4%) for subacute wounds, 32 (36.0%) for chronic wounds and 9 (10%) for others indications. We identified 4 mainly users departments: Departments of Traumatology (22 patients), Vascular Surgery (22 patients), Dermatology (20 patients) and Digestive Surgery (13 patients). The average treatment duration was 23.6 days [3–60]. The cost of consumables was estimated to 28.8 euros per day per patient. Total cost over the study period amounted to 171366 euros, including the hiring of the VAC system (52.73 euros per day). These data indicate that the use seems to be appropriate and optimized without overuse.

Conclusions: Facing the high cost of this technical therapy, its use must be closely managed. This study suggests that the multidisciplinary collaboration in our hospital between medical staff and pharmacist unit contributes to guarantee the optimal use of this specific therapy.

Keywords: VAC therapy, Wound, Cost

PEPI-48 Epidemiology of adverse drug reactions in an intensive care unit

Canadell Laura[1], **Pardo Rocio**[1], Gilabert M Carmen[2], Ruiz M Angeles[3], Alonso Santiago[2], Pérez Enrique[4], Gallart M Jesus[1], Rello Jordi[2]

[1]Pharmacy service, [2]Intensive Care Unit, [3]Internal Medicine, [4]Database service, Hospital Universitari Joan XXIII, Tarragona, Spain

Background and Objective: To evaluate the prevalence and characteristics of adverse drug reactions (ADRs) in an Intensive Care Unite (ICU) from January to May 2007.

To analyze the effectiveness of an educational programme to increase the ADRs reports during this period.

Design: Clinically relevant events possibly caused by exposure to drugs have been analysed in a retrospective study for a period of five months. We analysed the prevalence of ADRs reported, the medical conditions of the patients, the relationship between ADR and the suspected drug using Karch–Lasagne algorithm and the severity of the reaction using WHO criteria.

During this period, we implemented a pharmacovigilance programme in order to increase the reports and to estimate the prevalence of ADR in this unit.

Setting: Pharmacy service and Critical care service of a general hospital

Main Outcome Measures: To evaluate prevalence, characteristics, nature and severity of ADRs in UCI.

To measure the effectiveness of an educational programme to improve the awareness and detection of ADRs.

Results: A total of 243 patients were hospitalized during this period, 24 ADRs were detected (9.9%).

Severe sepsis and cardiac arrest were the most frequent diagnosis in this group of patients. 66.6% males and 33.3% females, 65.1 years in average.

Dermatologic effects as urticaria rashes and haematological effects as pancytopenia were the most frequently noted, with more than 20% each. Therapies most often associated with the reported events were antibiotics (piperacillin/tazobactam, ertapenem, azitromicin) in 41.7% of cases and nitroglycerin in 8.3% of them.

The ADR reported were classified as low severity in 29.2% of cases, medium in 45.8% and high severity in 25% of them. Level of causality more frequent was "probable" in a 62.5% of the reports followed by "possible" in 37.5% of them.

Since the implementation of the educational programme the number of reports of ADR have increased from 3.2% to 13.7%. The high level severity of ADRs reported has increased in this period from 0% to 41%.

Conclusions: Communication and educational programmes should be implemented to promote detection, identification, reporting and evaluation of ADRs. The analysis to determine the probability, causality and severity of ADR is necessary to establish the measures needed to improve the security and the quality of health attention.

Keywords: Adverse drug reaction, Intensive care unit

PEPI-122 The incidence of dry cough in angiotensin-converting enzyme inhibitor users

Mustafa Ozyalcin[1], **Mesut Sancar**[1], Fikret Vehbi Izzettin[1]

[1]Clinical Pharmacy Department, Marmara Univ. Faculty of Pharmacy, Istanbul, Turkey

Background and Objective: ACE inhibitors are used for controlling blood pressure, treating heart failure and preventing kidney damage in people with hypertension or diabetes. Although ACE inhibitors are generally well-tolerated by the most individuals, they are not free of side effects. Dry cough is one of the most common side effects seen in patients during ACE inhibor therapy. In this study, we have evaluated the incidence of dry cough that appears during the ACE inhibitors therapy and relationships with the other coughing factors and the other side effects that may appear.

Design: The questionnaire was applied on 304 ambulatory patients (144 m/160 f) who have used or been using ACE inhibitors and 100 hypertension patients as control group who use also anti-hypertensive drugs except ACE inhibitors.

Setting: The study was conducted in 25 different pharmacies located in The West Blacksea Region of Turkey between June 2006 and May 2007.

Main Outcome Measures: The demographic characteristics and the chronic problems of the patients on ACE inhibitors, the side effects of

ACE inhibitors, and the reactions against the dry cough were determined by pharmacist's questionnaire on the patients who come to the community pharmacy.
Results: Dry cough was observed on the 65 patients out of 304, during their using of ACE inhibitors (21%). 24% of male patients and 19% of female patients were having a cough. The 5 patients out of 100 (5%) from control group were having a cough. The incidence of dry cough that appears on the patients who use ACE inhibitors were; silazopril 28%, ramipril 26%, lisinopril 21%, fosinopril 17%, qinapril 14%, perindopril 13%, enalapril 11% and trandolapril 10%. The treatments of 32 patients out of 65 who complain from coughing during the therapy of ACE inhibitors were changed with angiotensin receptor antagonists and calcium antagonists by their physician. Treatment changes were resulted in increasing in the cost by 382.08 YTL monthly if it was calculated on the base of generics.
Conclusions: As a conclusion, the incidence of dry cough from ACE inhibitors was found to be 21% in The Blacksea Region of Turkey. The pharmacist can play an important role in determining side effects such as dry cough and refer the these patients to physician. Patient counselling and drug therapy monitoring in the community pharmacies will increase the compliance and provide better outcomes in many chronic diseases.
Keywords: ACE inhibitors, Dry cough, Side effects, Community pharmacy

PEPI-138 Evaluation of pain and analgesic usage in Turkish population

Filiz Cevik[1], Sibel Cýrak[2], Philip M. Clark[2]

[1]Clinical Pharmacy, Yeditepe University, School of Pharmacy, [2]Clinical Pharmacy, Yeditepe University, School of Pharmacy, Istanbul, Turkey

Background and Objective: To evaluate analgesic drugs usage in community, the assessment of pain and the role of pharmacists for people while taking drugs
Design: Litarature review and consultation with Anesthesia & Algology departments in faculty of medicine in Istanbul (Çapa and Cerrahpaşa) and Marmara Universities in order to create a valid questionnaire. The questionnaire consisted of 15 questions derived from these sources. Two months randomised study.
Setting: Community in İstanbul
Main Outcome Measures: Visual Analouge Scale (VAS) was used for assessment of pain. The universe of the study consisted of randomly selected 210 women and 190 men (n = 400). A pilot study was run on 15 individuals from different occupation groups to determine the validity and intelligibility of the questionnaire.
Results: The data were analyzed using a SPSS 10.0 program. The level of significance was accepted as $p < 0.05$. The results show that women experience more intense pain than men; their mean VAS score is higher than men (6 vs 4). Headache is the most common type of pain (41.5%) and also its VAS scores reached the highest level (9–10). This pain is especially caused by migraine and hypertension. In addition, 56% of questionees prefer to take an analgesic drug in order to manage their pain problem. It was recorded that especially Non-steroidal Antiinflammatory Drugs (NSAIDs) and preparations containing paracetamol are the first choice in pain management. Most respondees took analgesics when pain begun (37.5%), when pain increased (39.5%) or when was intolerable (20.5%).
Conclusions: The majority of those who participated in the study took their analgesic medication without consulting a health professional. This indicates a high level of self medication in our population. This gives rise to a number of potential drug problems such as NSAIDs usage in gastrointestinal disorders, hypertension and renal failure. Although many participants used their drugs in a rondom and improper way, unfortunately the pharmacist was rated second to last as a drug consultant.

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Keywords: Pain, Analgesic, VAS score, Pharmacist

PEPI-164 The role of community pharmacist on oral and dental health: prevention of diseases and toothache management

Sabriye Tunc[1], Mesut Sancar[1], **Pelin Sarica**[1], Fikret Vehbi Izzettin[1]

[1]Clinical Pharmacy Department, Marmara Univ. Faculty of Pharmacy, Istanbul, Turkey

Background and Objective: Many patients visit the pharmacy for their oral problems like toothache and ask for appropriate pain relievers. The purpose of this study is to examine the attitude and role of pharmacists, dentists and non-health workers towards solving of dental and oral health (like management of toothache).
Design: 3 different questionnaires were applied randomly on 30 pharmacists, 30 dentists and 30 non-health workers.
Setting: Canakkale – Turkey.
Main Outcome Measures: Dentists' and pharmacists' approach to patients with toothache, drug usage evaluation in dental problems, the type of information given by pharmacists, patient behaviors.
Results: 30% of non-health workers (n = 30) indicated that if they complain about toothache they choose their pharmacist as their consultant. 50% of non-health workers (n = 30) indicated that they use various medications without consulting a dentist (44% naproxen sodium, 21% paracetamol, 7% methimazole, 7% flurbiprofen, 7% amoxicillin, 7% carnation essence). The most common suggested antibiotics was amoxicillin (66%) by pharmacists and amoxicillin-clavulanate (21%) by dentists. The most common suggested pain relievers were naproxen sodium by both pharmacists (59%) and dentists (36%). Only 28% of dentists declared that they consult with a pharmacist about drug usage. 41% of dentists indicated the importance of consultation of patients by pharmacists.
Conclusions: According to our results; pharmacists must take an important role in prevention and management of oral and dental health problems including informing the patients about convenient drug usage. Also collaboration between dental staff and pharmacists need to be improved.
Keywords: Oral health, Toothache, Pharmacist, Drug usage

PEPI-165 Cardiovascular drugs: prescription profiles and the economic impact of a generic-based reimbursement system

Nuha B. Cinemre-Solmaz[1], Kutlay Burat[1], **Sule Apikoglu Rabus**[2]

[1]Biochemistry Department, Ankara University Faculty of Pharmacy, Ankara, [2]Clinical Pharmacy Department, Marmara University Faculty of Pharmacy, Istanbul, Turkey

Background and Objective: Cardiovascular drugs are among the most frequently prescribed drugs and account for a high percentage of medical expenditure. The aim of this study is to assess the prescription profiles and the economic impact of a generic-based reimburesement system for the cardiovascular drugs.
Design: The study was performed in three community pharmacies, each from a different district of Ankara (the capital of Turkey). Each

district represented a different socio-economic level expressed as "low; middle and high" socioeconomic levels. The study used 100 consecutive prescriptions collected from each pharmacy during the spring season. Percentage of cardiovascular prescriptions (prescriptions containing at least one cardiovascular drug item) and number of cardiovascular drug items calculated for each pharmacy.
Setting: Three community pharmacies.
Main Outcome Measures: The percentage of cardiovascular prescriptions and number of cardiovascular drug items for each pharmacy. Monetary savings that would have been achieved if the generic drug with the lowest-price had been substituted for each cardiovascular drug item in the cardiovascular prescriptions was calculated.
Results: The percentage of cardiovascular prescriptions and number of cardiovascular drug items calculated for each pharmacy were as follows: 8% (26 items) in the low; 7% (35 items) in the middle; and 17% (60 items) in the high socioeconomic levels. Monetary savings if a generic-based reimbursement system had been used was calculated as 269.99 YTL -new Turkish liras- (€ 145). This amount was equal to the total cost of an average of 4 cardiovascular prescriptions. In this study 4 cardiovascular prescriptions could be supplied by the money saved when a generic-based reimbursement system was applied to 65 cardiovascular prescriptions.
Conclusions: In the developing countries generic-based reimbursement systems can help optimizing medication related health-care expenditures, especially in chronic conditions like cardiovascular diseases.

PEPI-198 Folic acid awareness and intake survey in the Iran

Simin Mashayekhi[1], Maryam Dilmaghanizadeh[2], Zahra Fardi-azar[3], Roghayeh Bamdad-Moghadam[4]

[1]Pharmaceutics Department, Tabriz Medical University, [2]Pharmaceutics Department, Tabriz Medical university, [3]Faculty of Medicine, Tabriz Medical University, [4]Private, Private, Tabriz, Iran (Islamic Republic of)

Background and Objective: In 1965 Hibbard and Smithells suggested a link between inadequate maternal intake of folic acid and neural tube defects in their offspring (1). Consequently, it has been recommended that all women planning to become pregnant should consume additional folic acid before conception and during the first 12 weeks of pregnancy. Despite these recommendations, periconceptional intake of additional folic acid is still low in many developed countries and a substantial percentage of women are not aware of its benefits (2).
Design: A questionnaire was used in a face-to-face encounter.
Setting: Postnatal wards of a teaching and a private hospital in Iran.
Main Outcome Measures: Awareness of the effects of folic acid on the fetus was evaluated among 400 women.
The questionnaire included questions about demographic information, folic acid supplementation before and during pregnancy, its effects and the most susceptible periods in pregnancy and the source of information regarding the drug's effects during pregnancy.
Results: The mean age of women was 26.4 (± 5.2) years old. The majority of the subjects had more than high-school education (53% vs.47%).

Out of 400 subjects, 359 (89.8%) took folic acid supplement before and during pregnancy. Only 2.5% believed that its usage was unnecessary, 81.5% believed in its positive effects. In the subjects' opinion, the most important time for taking this supplement was the first trimester (32.5%), then prior to pregnancy (19.5%). The second and third trimester were noted important by 4.0%. 7.8% believed in the importance of this supplement during all nine months.

The advisor for taking this supplement was doctors (74.4%), health visitor (23.3%), self-medication (2.7%), TV and Radio (1.8%), family members and friends (1.8%) and pharmacist (0%).
Conclusions: Awareness of the value of periconceptional folic acid was high among women of Iranian nationality compare to similar studies (3). The majority of the participants believed in the positive effects of folic acid. The advices provided by doctors and pharmacists had the greatest and least effect on the use of this medication. Regarding the best time of usage of this supplement, the most emphasis was on the first trimester and next on prior to pregnancy.

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Keywords: Pregnancy, Folic acid, Neural tube defects

PEPI-199 Pre-diabetes screening program: a proactive study in istanbul community pharmacies

Asuman Cakiroglu[1], Ayse Koroglu[2], Zehra Almila-Oztosun[3], Ayse Dundar[4], Alper Okyar[5], F. Ilkay Alp[5], Gul Baktir[5]

[1] Yonca Pharmacy, [2] Rifat Sargin Pharmacy, [3] Capitol Pharmacy, [4] Pelikan Pharmacy, [5]Pharmacology, Istanbul University Faculty of Pharmacy, Istanbul, Turkey

Background and Objective: Diabetes mellitus type-II is a metabolic disorder that is primarily characterized by insulin resistance, relative insulin deficiency, and hyperglycemia. Before type II diabetes stage, people almost always have "pre-diabetes"; in which blood glucose levels are higher than normal but not yet high enough to be diagnosed as diabetes. While some people with type-II diabetes have symptoms, the majority may go 7–10 years without apparent symptoms. Because some of the symptoms for diabetes mimic other diseases or conditions, makes it harder to predict an precise diagnosis without any additional information. The purpose of this study is early diagnosis of pre-diabetes, prevention or delay of the complications with a collaboration of community pharmacists and patients.
Design: Pharmacists used a structured questionnaire containing questions concerning demographic data and informations which indicate prediabetes symptoms.
Setting: Four community pharmacies in Istanbul.
Main Outcome Measures: Data: age, gender, body mass index (BMI), genetic predisposition, blood pressure, pysical activity and hypoglycemia symptoms.
Results: One hundred people were screened for undiagnosed diabetes. and the risk for pre-diabetes is evaluated according fasting plasma glucose (FPG) and total oral glucose tolerance (OGTT) test results. Blood glucose level between 100 and 125 mg/dl with the FPG test and 140 and 199 mg/dl with OGTT test are considered as pre-diabetes.
Conclusions: Diagnosis of pre-diabetes can prevent the development of type II diabetes and making changes in nutrition and increasing the level physical activity may even be able to return the elevated blood glucose levels to the normal levels.

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Keywords: Type-II diabetes, Prediabetes, Pharmacy based study

PEPI-207 Awareness among pregnant women of the effects of drugs on the fetus and mother

Maryam Dilmaghanizadeh[1], Simin Mashayekhi[1], Masoud Naghizadeh[2], Zahra FardiAzar[2], Roghaiieh Bamdad Moghaddam[2]

[1]Pharmaceutics Department, [2]The faculty of Medicine, Tabriz university of medical sciences, Tabriz, Iran (Islamic Republic of)

Background and Objective: Since the talidomide catastrophy [1] concern about the safety of drugs in pregnancy has been increasingly evident. Studies have revealed that pregnant women continue to take considerable quantities of drugs. However, all pregnant women worry about whether to take any medications. Because of an estimated 10% of birth defects resulted from maternal drug exposure [2], this fear is well justified.

Little is known about the knowledge of pregnant women regarding the safety of medications during pregnancy. To our knowledge the present study is the first performed in Iran.
Design: A questionnaire was used in a face-to-face encounter.
Setting: Postnatal wards of a teaching and a private hospital in Iran.
Main Outcome Measures: Awareness of the safety of drug use during pregnancy among 400 women. The questionnaire included questions about demographic information, drugs use before and during pregnancy, information regarding the safety of drugs during pregnancy and the most susceptible periods in pregnancy, the source of information regarding drugs' safety during pregnancy.
Results: The mean age of women was 26.4 years old. Only an 18.85% and 22.25% used conventional medications and herbal remedies during pregnancy, respectively. A great percentages (87.5%) believed in harmfulness of drugs during pregnancy, but only a 38.3% believed in harmfulness of herbal remedies. The first trimester and the second trimester were believed to be the most and the least susceptible period, respectively (60.8% vs. 3.0%).

The sources of information for the subjects regarding the safety of medications was specialist doctors (53.8%), general practitioner (9.3%), pharmacist (5.8%), midwives (1.3%), health center (17.5%), media and books (9.5%) and friends and family member (1%).
Discussion: A common concern about the care of pregnant women involves the medications, which led us to establish a special initiative to review available knowledge among our general population. The present study highlights weakness of the role the pharmacists play in providing the information to this vulnerable and eligible group of people, who nourishing our next generation.
Conclusions: A common concern about the care of pregnant women involves the medications, which led us to establish a special initiative to review available knowledge among our general population. The present study highlights weakness of the role the pharmacists play in providing the information to this vulnerable and eligible group of people, who nourishing our next generation.

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Keywords: Pregnancy, Drugs, Fetus, Mother, Awareness, Herbal

PEPI-210 Pediatric drug intoxications and the experiences of hacettepe drug and poison information center

Ayce Celiker[1], Nergiz Nemutlu[1], **Gulru Ozkaya**[1]

[1]Hacettepe Drug and Poison Information Center, Hacettepe University, Ankara, Turkey

Background and Objective: Poisoning casualties require be approached with utmost attention due to their "medico-social emergency" nature. Children are more vulnerable because of their inherent interests for knowing the environment besides ignorance and carelessness of adults. Drugs are among the leading offending agents in children poisonings.
The services of drug and/or poison information centers have been regarded as one of the main challenge areas of clinical pharmacy practice. Being a pioneer in Turkey, Hacettepe Drug and Poison Information Center (HIZBIM), has been run for 15 years in working hours basis.
Objective: The objective is to evaluate the demographic and epidemiological characteristics of drug poisonings in children, thus, to contribute to clarify the actual "intoxication profile" and identify necessary measures for the children in Turkey.
Design: The data of childhood (aged < 17 years) poisoning enquiries received by HIZBIM between January 1, 1996 and December 31, 2005 were collected retrospectively and analyzed with SPSS 11.5®
Setting: HIZBIM is affiliated to Hacettepe University, Faculty of Pharmacy
Main Outcome Measures: Categorization and comparison of data of children intoxicated with drugs during ten years
Results: Children were involved in 54% of all poisoning cases and 63% of those cases were due to drugs. There was no gender difference among very young children, however, girls dominated as the age increases ($p < 0.05$). 88% of the cases were accidental, and analgesics were involved in 40% of the accidental poisonings ($p < 0.05$). While the most offending agent group was analgesics in children younger than 12 years ($p < 0.05$), multiple drug ingestions were the main causes of the cases involved older children ($p < 0.05$). Multiple drugs were mostly encountered (63%) in suicidal attempts where the dominant gender was girls (75%) ($p < 0.05$). The most frequently reported symptoms indicated central nervous system involvement almost in all intoxication cases and in all age groups.
Conclusions: Pediatric poisonings are rather high in Turkey like many other countries and drugs are accounted for mostly in those injuries whether accidental or suicidal exposures. Some regulations, the attitudes of physicians, pharmacists, and parents and other care givers make contributions to that outcome.
In the prevention of childhood drug intoxications it is essential to make cooperation between drug manufacturers, regulatory authorities, health professionals, and families, besides increasing social awareness.

Drug and/or poison information centers stimulate rational drug use through providing accurate and rapid information to health care providers, educating people directly, documenting current epidemiological data.

Keywords: Poison information center, Childhood poisoning, Drug poisoning, Drug intoxication

PEPI-226 Analysis of clinical trials in Montpellier teaching hospital: what's new in biomedical research?

Marlene Ester[1], Laetitia Guillon[1], Pierre-Jean Aragon[1], Sylvie Hansel-Esteller[1]

[1]Pharmacy, Lapeyronie-Arnaud de Villeneuve Teaching Hospital, Montpellier, France

Background and Objective: 130 clinical trials are managed by Lapeyronie-Arnaud de Villeneuve pharmacy in Montpellier. Recently, we noticed a great interest of pharmaceutical companies in drugs such as monoclonal antibodies or in diseases such as inflammatory rheumatism. The aim of this study is to put in evidence the orientations of biomedical research. We particularly analysed the pathologies concerned, the type and the target of the experimental drugs, and the aim of the biomedical researches.

Design: Analysis of the protocols and of the investigator's brochures of the ongoing clinical trials in January 2007.
Setting: Clinical trials sector of Lapeyronie-Arnaud de Villeneuve hospital, Montpellier.
Main Outcome Measures: Methodological aspects were first analysed: aim of the study, phase, type of sponsor, type of binding, inclusion rate.
Then, we focused on the experimental drugs involved: type of drug, target, therapeutic area concerned.
Results: 84% of clinical trials are promoted by pharmaceutical companies. 68% are phase 3 trials, 56% are open-label trials. 5 objectives can be found: testing a new molecule on a new target (17%), testing a new molecule in an known pharmacological group (19%), testing a new formulation (7%), testing an known molecule in a new indication (24%), evaluating a therapeutic strategy (33%).
20% concern rheumatology, 20% pneumology, 11% infectiology, 8% haematology, and 8% nephrology. The most frequent pathologies concerned are inflamatory rheumatism (23%), malignancies (17%), asthma/COBP (10%), HIV infection (11%), and post renal transplantation immunosuppression (6%). The percentage of patients included (Number of patients in the trials concerned/Total number of included patients) and the inclusion rate (Real number of inclusions/Number of expected inclusions)are respectively 16% and 126% in rheumatology, 32% and 174% in pneumology, 10% and 48% in haematology, 9% and 80% in infectiology and 19% and 113% in nephrology.

50% of experimental drugs are injectable. 54% are little molecules obtained by chemical synthesis, and 46% are issued from biotechnologies: monoclonal antibodies (34%), peptide (10%), and gene therapy (2%). The new targets (17% of clinical trials) are receptors (57%), enzymes (29%), gene transcription (9%), cytokines (5%).
Conclusions: This analysis gives an idea of the future commercialized drugs. It puts in evidence the development of drugs in therapeutic areas which concern a lot of patients and whose financial rentability is high. Furthermore, only 17% of clinical trials concern new drugs and new targets. Development of me-too and optimization of therapeutic strategies are the most frequent clinical trials.

PEPI-242 Assessment of drug utilization profiles, attitudes and knowledge on "performance enhancing drugs" among players of the amateur football league

Banu Ayca[1], Sule Apikoglu Rabus[2]

[1]Department of Sports and Health Sciences, Marmara University, School of Physical Education and Sports, [2]Clinical Pharmacy Department, Marmara University Faculty of Pharmacy, Istanbul, Turkey

Background and Objective: The increasing use of performance-enhancing substances and methods in sport threatens not only the meaning and the ethical value of the sport itself, but also the health of the athletes. This study aims to assess the drug utilization profiles of the amateur football players, as well as their attitudes and knowledge on "performance enhancing drugs".
Design: This study was conducted on 62 male players of the amateur football league. The players were asked to fill in a standard questionnaire, where information about their drug utilization profiles as well as their attitudes and knowledge on "performance enhancing drugs" were sought through various questions.
Setting: Various amateur football clubs in Turkey.
Main Outcome Measures: Drug consumption rates of the players. Answers to the pre-prepared questions.
Results: The age of the players ranged between 16 and 30 years. Forty-four (71%) players thought that drugs have a positive impact on sports performance; while 29% did not share this idea. The resource of this idea was a team-member for 45.2%, the trainer for 25.8%, sports magazines for 25.8% and a family-member for 3.2%.
The players were asked to name the drugs that could be used for performance enhancement and 80.6% replied as vitamins, while 51.6% replied as central nervous system (CNS) stimulants and 25.8% replied as anabolic steroids.

Thirty-six players (58.1%) reported that they use various drugs with the aim of performance enhancement. The drug utilization profile was as follows: vitamins were consumed by 54.8% of the players; where CNS stimulants, anabolic steroids, diuretics and growth hormone were consumed by 48.4%, 16.1%, 12.9% and 6.5% of the players, respectively. The players reported the reasons referring them to drug-use as follows: 1. Drugs always have a positive impact on sports performance (83.3% of the drug-users); 2. Drugs are necessary in case of inadequate training (33.3% of the drug-users); 3. Performance enhancement leads to individual success in the team and this brings prices and rewards in return (11.1% of the drug-users).

About 40% of the players thought that CNS stimulants have the main effects of increasing the heart rate, endurance and strength. The main potential adverse effects of the CNS stimulants were reported as gastrointestinal problems, dependency and tachycardia. About 40% of the players thought that anabolic steroids increase muscle volume, endurance and strength. The main potential adverse effects of the anabolic steroids were reported as hypertension, hepatotoxicity and dependency.
Conclusions: The results of the questionnaire suggests that drug-use with the aim of performance-enhancement was common among the amateur football players; and the players were not adequately and properly informed on the effects and adverse effects of the (so called performance-enhancing) drugs. This reality yields new responsibilities in this challenging area of practice, for the clinical pharmacist.

PEPI-243 How prevalent are opioid misuse and affective disorders in patients with fibromyalgia?

Sam Salek[1], Rosalind E. Lewis-Smith[1], Timothy J. Ives[2], Kristen M. Rake[2]

[1]Centre for Socioeconomic Research Welsh School of Pharmacy, Cardiff University, Cardiff, United Kingdom, [2]School of Pharmacy, University of North Carolina, Chapel Hill, United States

Background and Objective: Psychiatric disorders and opiate misuse are associated with chronic pain syndromes, but their incidence in fibromyalgia (FMS) is unknown. The aim of this study was to identify if the incidence of affective disorders, and opioid misuse, was more common in patients with FMS than those with other forms of non-malignant chronic pain.
Design: A prospective, cohort study was carried out involving 66 patients, who were internally referred to a chronic pain management program. Subjects with a working diagnosis of FMS were matched by age (mean = 53) and sex (82% female) and compared to a control group of patients with alternative forms of non-malignant chronic pain. Individuals were compared using urine toxicological screens, drug-related criminal convictions, diagnoses of affective disorders, and responses to the following inventories: Screener and Opioid Assessment for Patients in Pain, the Pain Disability Index, the Personal Health Questionnaire and the Fibromyalgia Impact Questionnaire. Patients also underwent a standardised physical examination using American College of Rheumatology (ACR) guidelines to diagnose FMS.
Setting: This was a quantitative, hypothesis-testing cohort study, conducted in an academic general internal medicine practice.
Main Outcome Measures: Diagnosis of fibromyalgia, clinician's awareness of ACR guidelines, pain intensity and impact of fibromyalgia on physical and psychosocial activity.
Results: Response rate was 67% (n = 44; mean age = 53, median = 52, age range = 35–80; male = 8); the most common

affective disorders were mood (42%) and anxiety disorders (27%) and there was a correlation between them (rs = 0.45; p = 0.01). Mean incidence of affective disorders was 2.3 (±1.4) in the FMS group and 2.0 (±1.5) in the control group but the only significant difference ($P < 0.05$) between the two populations was the mean number of tender points; FMS 5.8 (±4.6), control 3.1 (±2.1).
Conclusions: Three (14%) FMS patients fulfilled the diagnostic criteria revealing that FMS is a commonly misdiagnosed pain syndrome and clinician awareness of ACR criteria for FMS requires promotion.
Keywords: Opioid misuse, Fibromyalgia, Affective disorders

PEPI-246 Second-generation antipsychotics and metabolic syndrome

Magali Farines[1], Marie-Christine M. C. Alberto-Gondouin[1]

[1]Pharmacy, Saint Egreve Hospital, Saint Egreve, France

Background and Objective: The increase in the frequency of the metabolic syndrome and its implication, in the development of ischemic cardiovascular disease and type II diabetes mellitus, represent a real public health problem and of much interest in the medical field.

Otherwise, the cardiovascular pathologies are twice more frequent among chronics psychotics patients, for that reason we were interested in the prevention of these pathologys. This phenomena have been accentuated with the arrival of second generation antipsychotic drugs which were associated with weight gain, disorders of glycemia and lipidemia.

In the aim to elaborate recommendations, at first we proceeded to the assessment of biological and clinical follow-up of the patients hospitalized in the Saint-Egreves hospital.
Design: Literature review, 6 months prospective study.
Setting: We asked 2 doctors of each unit (13) to answer 5 questionaries corresponding to 5 patient files. We worked out a general questionary to avoid revealing our objective.
Main Outcome Measures: Blood pressure, body weight, height, abdominal perimeter, glycemia, total cholesterol, triglyceridemia, cholesterol's fractions(HDL and LDL).
Results: Our results showed a good clinical follow-up but the frequency of biological control was not sufficient. The blood pressure and weight were evaluated respectively in 85 and 69% of the patients, the total cholesterol, glycemia and triglyceridemia were in 40% of patients. On the other hand, cholesterol's fractions (HDL and LDL) were rarely evaluated. As for the abdominal perimeter, where the increase is predictive of cardiovascular disease, is never measured.
Conclusions: It seems difficult to evaluate the risk of either cardiovascular disease or metabolic syndrome of these patients or to determine if there is any possible relationship between the nombre of cardiovascular risk factors and the apparition of this syndrome. These findings imply to identify these high risk subjects and to define the optimal preventive, or curative, management strategy of metabolic syndrome and this, through simple measurements to realize in clinical practice.

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Keywords: Metabolic syndrome, Second-generation antipsychotic, Biological and clinical follow-up

PEPI-255 Companies submission strategies and regulatory approval times greatly influence patient access to medicine

Sam Salek[1], Laura Morgan[1], Neil McAuslane[2], Kate Read[2], Stuart Walker[2]

[1]Centre for Socioeconomic Research Welsh School of Pharmacy, Cardiff University, Cardiff, [2]CMR Institute for Regulatory Science, Novellus Court, Epsom, United Kingdom

Background and Objective: Availability of a medicine in Western markets can be delayed either due to differential submission strategies of companies or differences in review process between countries. The aim of this study was to examine delays in patient access to medicines for compounds approved by two or more authorities (US FDA, EU EMEA, Australian TGA, Health Canada and SwissMedic), by characterising potential drivers for new active substances (NAS) approved between 1997 and 2006, from both a company and regulatory agency perspective.
Design: 310 NASs approved by FDA since 1997 were compared to NASs approved by the other agencies. This data was analysed comparing the difference between submission and approval dates and characterised by; type of approval route, company size, and therapy area.
Setting: Data on NAS's approved by the Authorities was collected from agencies and from public domain sources.
Main Outcome Measures: The difference in patient access to new medicines in different countries and factors influencing such differences.
Results: 170 NASs have been approved by FDA and one or more of the agencies studied. The median time ranged between submissions to FDA and another authority from 20 days at EMEA to 99 days at TGA. The difference between approval dates ranged from a median of 230 days at EMEA to 331 at Health Canada. However these differ depending on company size, therapy area and approval route.
Conclusions: Availability of a new medicine is a mixture of company submission strategies and approval process, although therapeutic profile of submissions and company size are also influencing factors. In Europe the main driver to patient access is review timelines rather than delay in submission by companies.
Keywords: Review process, Patient access to medicines, FDA

PEPI-256 Quality of life assessment with a portuguese hypertension health status inventory (hyper 27)

Esperança Silva[1], Margarida Caramona[2], Barbara Oliveiros[3], Emanuel Ponciano[3]

[1]Community Pharmacy, Farmacia Rocha, [2]Pharmacology, Faculty of Pharmacy, [3]Ibili, Faculty of Medicine, Coimbra, Portugal

Background and Objective: Hypertension is one of the major factors for many chronic diseases, playing an important role affecting the quality of life of many patients.
The aim of this work is to validate a quality of life in adult hypertensive patients scale – Hypertension Health Status Inventory (Hyper).
Design: Patients over 18 years old and with a history of antihypertensive treatment for at least 6 months were invited at the pharmacy to complete the 45 items version of the original Hyper, the Beck Depression Inventory, 2nd edition (BDI-II) and the Beck Anxiety Inventory (BAI) as well as a sociodemografic questionnaire. The scales were self administered or filled by the pharmacist when necessary.
Setting: A sample of 1512 subjects was gathered in over 300 Portuguese Community Pharmacies were involved in the study following the previously defined criteria.
Main Outcome Measures: Validity of the Hyper was evaluated using exploratory factor analysis (principal axis factoring with varimax and promax rotation). Depressive and anxiety symptoms being important

components of quality of life, concurrent validity was evaluated using BDI-II and BAI. Reliability was assessed using Cronbach′s alpha and item remainder correlations.
Results: After factoring the 45 items of the Hyper, 27 items were retained using as criteria salient loadings >.30. Further analysis were performed on 27 items of 1512 questionnaires showing a two factor structure labelled Emotion/Physical (15 items) and Daily (12 items). Cronbach′s alpha for the subscales was .87 and .76 respectively. Item remainder correlations for Emotional/Physical subscale have a maximum and a minimum value of .71 and .30 respectively with a median value of .59. Values of .60, .27 and .39 were found for the Daily subscale.

Concurrent validity: Correlations with BDI-II and BAI were −.68 and −.65.

No significant correlations between Emotion/Physical and Daily Hyper27 subscales and blood pressure, duration of hypertension after diagnosis where found.

No significantly differences in mean values on Hyper 27 total and subscales scores of controlled and uncontrolled blood pressure of hypertensive patients where found.
Conclusions: The final version of Hyper (27 items) has good construct and concurrent validity as well as good internal consistency. In Portuguese language Hyper 27 seems to be a promising scale in the evaluation of a chronic disease-related quality of life, which is becoming an increasingly important goal for health professionals.
Keywords: Quality of life, Community pharmacy, Hypertension, Hyper 27

PEPI-264 Proton pomp inhibitor (PPI) prescription in a medicine unit of a university hospital: indications and part of off-label use

Emmanuel Gasperi[1], **Philippe Mougenot**[1], Bénédicte Giroux Le Prieur[2], Paul Escure[2], Axele Reberga[1], Agnès Certain[1], Thomas Papo[2], Philippe Arnaud[1]

[1]Pharmacy, [2]Internal Medicine, Chu Bichat-Claude Bernard AP-HP, Paris, France

Background and Objective: The aim of this study was to analyse the indication of PPI prescription during hospitalization to determinate the part of off-label use in a department of internal medicine.
Design: All patients were consecutively hospitalized in February and March 2007 in the department of internal medicine.
Setting: Department of internal medicine in a teaching Hospital.
Main Outcome Measures: Data on sex, age, origin of PPI prescription and indication were collected by a standardized questionnaire and were retrospectively analysed.
Results: 76 men and 84 women were reviewed. The median age was 68 years (range, 20–99). 54% of patients received PPI therapy by pantoprazole (available in our hospital) when hospitalized. 77% of patients received daily 40 mg of pantoprazole and 23% received 20 mg a day. 21% of the prescriptions were validated. The main off-label indications were prevention of hemorrhagic risk of antiplatelet agent (23%), hemoglobin decrease(16%), anticoagulant co-prescription(13%), steroids co-prescription(6%).
Conclusions: This prospective study confirms the large prescription of PPI therapy in a department of internal medicine. Nevertheless, this study highlights the difficulties to interrupt this well tolerated therapy after the first prescription by family physicians. Clinical pharmacist interventions in the department consist of explaining the difference of indications between pantoprazole 20 mg and pantoprazole 40 mg, he makes physicians aware of prescribing PPI therapy with a cautious reweighted cost/benefit consideration.

Reference

Vidal 2007 Dictionary, Vidal Edition.

Keywords: PPI, Indication, Internal medicine

PEPI-266 Can systematic use of scorecards be of value in the evaluation of the quality of industry submissions and their regulatory review?

Sam Salek[1], Andrea Mallia-Milanes[1], Neil McAuslane[2], Stuart Walker[2]

[1]Centre for Socioeconomic Research Welsh School of Pharmacy, Cardiff University, Cardiff, [2]CMR Institute for Regulatory Science, Novellus Court, Epsom, United Kingdom

Background and Objective: To develop and validate a system for regulatory authorities to provide feedback to companies on the quality of their submissions while companies report to authorities on the quality of the review. A standardised report format will allow performance comparisons within and across companies and agencies.
Design: Draft scorecards were tested in a study on the same four compounds, each reviewed recently by the agencies in Australia, Canada and Switzerland. The agencies provided feedback on the quality of submissions and sponsors, AstraZeneca, GSK, Novo Nordisk and Pfizer gave views on the conduct of reviews.
Setting: Four pharmaceutical companies and three regulatory authorities (Europe, Australia and Canada).
Main Outcome Measures: Development of scorecards for companies to evaluate the quality of the regulatory review of their new compound and regulatory authorities to assess quality of dossiers submitted by companies.
Results: The companies and agencies responded openly and without reserve to requests for ratings and commentary on the quality of performance by the other parties. The data gave insights into different perceptions of quality in relation to submitted data, review procedures and the assessment of benefit-risk.
Conclusions: This study demonstrated the value, relevance and effectiveness of the proposed scorecard framework for reviewing the quality of submissions and their assessment. Agencies and companies all responded positively to the proposed extension to a wider pilot study on current and future applications.
Keywords: Regulatory review, Scorecards, Regulatory authorities

PEPI-289 Lack of knowledge of ICS' actions in patients who discontinued early with inhaled corticosteroids

Tanja T Menckeberg[1], Marcel L. Bouvy[1], Madelon Bracke[1], Jacqueline G. Hugtenburg[2], Jan-Willem J. Lammers[3], Jan A. M. Raaijmakers[1]

[1]Division of Pharmacoepidemiology and Pharmacotherapy, Utrecht Institute for Pharmaceutical Science, Utrecht, [2]Department of Clinical Pharmacology & Pharmacy, Section Pharmacotherapy, VU Medical Centre, Amsterdam, [3]Department of Pulmonary Diseases, University Medical Centre Utrecht, Utrecht, Netherlands

Background and Objective: Adherence with chronic medication such as inhaled corticosteroids (ICS) has repeatedly been reported to be low. Non-adherence could be related to inadequate knowledge of ICS' actions and lack of ICS' instructions on the use of inhalers. This has not been reported previously to our knowledge among new users of ICS who discontinued ICS treatment early.
The aim of the study is therefore to describe, among new users of ICS that discontinued, their knowledge of ICS' actions and whether they were instructed on the use of their inhaler.
Design: A cross-sectional study among new users of ICS that discontinued use. Patients were interviewed by telephone and their GP received a mailed questionnaire. Automated dispensing records of all patients were retrieved.
Setting: 15 community pharmacies in the Netherlands.
Main Outcome Measures: By use of conditional logistic regression the association between knowledge and study variables was assessed.

Results: From 287 eligible patients, 230 (78.2%) were interviewed. The majority (83.5%) of these new users of ICS who discontinued ICS early was not aware of the anti-inflammatory actions of ICS. Most patients (79.6%) were instructed on the use of their inhaler, predominantly by the GP (27.8%). After adjusting for symptom experience by ACQ, asthma diagnosis, having persistend asthma or use of medication only age (OR 1.03 95% CI 0.99–1.07) and male gender (OR 0.04 95% CI 0.03–0.91) were associated with unawareness of anti-inflammatory actions.
Conclusions: This study shows that a substantial number of new patients that did not refill their ICS prescriptions, were unaware of ICS' inflammatory actions. Surprisingly only age and gender seemed associated with awareness of ICS actions. Most patients were instructed on the use on their inhaler by a health care provider. Physicians and pharmacists could cooperate in identifying and motivating these patients to continue ICS use.
Keywords: Asthma, Epidemiology, Pharmacy, Inhaled corticosteroids, Discontinuing treatment, Disease control, ACQ

PK-102 Antibiotic drug monitoring quality assessed by a clinical pharmacist: observational study

E. Ampe[1], A. Spinewine[1], Y. Glupczynski[2], B. Delaere[3], J.D. Hecq[4], P.M. Tulkens[1]

[1]Centre for Clinical Pharmacy, Université catholique de Louvain, Brussels, [2]Laboratoire de Biologie Clinique, [3]Service d'Infectiologie, [4]Pharmacie, Cliniques universitaires de Mont-Godinne, Yvoir, Belgium

Background and Objective: To assess the quality of Antibiotic Therapeutic Drug Monitoring (TDM) in routine hospital practice and establish baseline status for rationally defining future actions aimed at improving it (by implementation of clinical pharmacy services).
Design: 4 months prospective observational study with validated data collection form using predefined criteria for TDM quality assessment. Descriptive statistics performed with SPSS 13.0 for Windows®.
Setting: Orthopaedic surgery, general surgery, neurosurgery, vascular surgery, haematology and pulmonary wards of a 400 beds teaching hospital, using vancomycin twice daily and amikacin once daily administration schemes.
Main Outcome Measures: Adherence to predefined criteria for sample timing, information transmission, and follow up of dose adjustment recommendations. Criteria: (i) sampling time: less than ±15 min (amikacin) and ±30 min (vancomycin) deviation from preset time for peak levels; less than ±30 min for trough levels; (ii) information transmission: patient's full name, dose, schedule of administration, time of previous and current dose, actual time of peak and trough level sampling; (iii) quality of the analysis [internal and external controls]; (iv) acceptance of dose adjustment (more than 10%) recommendations.
Results: Inclusion: 94 patients (46 vancomycin and 65 amikacin courses). Correct sampling times: (i) peak levels: 39% (n = 15) for vancomycin and 11% (n = 9) for amikacin, (ii) trough levels: 63% (n = 51) for both antibiotics. Correct information transmission: 55% (n = 83). No issue noted for the quality of the laboratory analyses. Implementation of recommendations: 32% (n = 66) for vancomycin and 18% (n = 17) for amikacin.
Conclusions: Incorrect sampling times and deficiencies in communication between the ward and the laboratory are key factors affecting the quality of TDM, leading to dosage adjustment recommendations that are only infrequently implemented. The companion abstract examines the underlying reasons for such poor performance of the TDM process using a qualitative approach.
Keywords: Therapeutic drug monitoring, Clinical pharmacist, Quality

PK-129 Evaluation of needs for pharmacokinetic monitoring of carbamazepine and digoxin in tertiary hospital

Justina Penkauskaite[1], Omar Mneimneh[1], Romaldas Maèiulaitis[1], Birute Varanavièiene[2], Birute Tarutiene[3]

[1]Pharmacy, Kaunas University of Medicine, [2]Pharmacy, [3]Hematology laboratory and Medicinal Chemistry, Kaunas University of Medicine Hospital, Kaunas, Lithuania

Background and Objective: Tendencies in Drug Use (DU) of highly toxic drugs-such as Digoxin (D)and Carbamazepin (C) and level of Rational Drug Use (RDU) is unknown in Lithuania. Our goal was to evaluate the first experiences in serum concentration (Sc) measurements of D and C. We tried to discover practical consumption tendencies of D and C using defined daily dose (DDD) in our measuring.
Design: DU study is based on hospital pharmacy and hospital administrative databases; consumption is in DDD per 100 occupied bed daily (100OBD) during 2004–6; highest consumers of C and D in 2006. Evaluation of all Sc in 2005 and 2006. Data were processed with SPSS 16.0 using descriptive and comparative statistics for nonparametric values (Mann Whitney test).
Setting: Tertiary hospital, 2600 beds, 63 departments. Information about the population studied: tertiary level requiring patients; age-paediatric and adults.
Main Outcome Measures: Annual consumptions according to DDD/100OBD; Sc intensity of Digoxin & Carbamazepine (as per number of DDDs) and proportions of abnormal Sc.
Results: Values of Carbamazepin:

In 2004: mean (±SD) DDD/100OBD 1.02 ± 1.93 (median 0.13; CI95% 0.50–1.54);
In 2005: mean 0.90 ± 1.79 (median 0.13; CI 95% 0. 45–1.35);
In 2006: mean 1.11 ± 2.21 (median 0.18; CI95% 0.56–1.65).

Corresponding values of D were:

In 2004: mean 1.73 ± 2.48 (median 0.92; CI95% 1.07–2.39);
In 2005: mean 1.07 ± 1.44 (median 0.54; CI95% 0.7–1.44);
In 2006: mean: 1.90 ± 3.26 (median 0.59; CI 95%1.08–2.71).

Intensity of Sc measurements were: for C 1/125 DDDs in 2005, 1/74 DDDs in 2006; for D 1/147 DDDs in 2005; 1/309 in 2006. Sc of C in 2005: 12/57 (21%) too low, 32/57 (56%) normal, and 13/57 (23%) too high; C in 2006 42/122 (34%) too low, 61/122 (50%) normal, 19/122 (16%) too high; Sc of D in 2005: 22/58 (38%) too low, 24/58 (41%) normal, 12/58 (21%) too high, in 2006 5/31 (16%) too low, 16/31 (50%) normal, 10/31 (32%) too high.

In 2006 the highest consumer of C were Head &brain surgery, Head brain traumas, Psychiatry, Face&jaw surgery (71.47% of total DU), for D- Cardiology II, Palliative oncology, Endocrinology, Neurology and other 16 departments (64.28% of total DU).
Conclusions: The consumption of C did not change essentially during last 3 years, the consumption of D decreased in 2005. Sc measurements in 2006 vs 2005 increased for C and decreased for D. Clear insufficiency in Sc. of C and D reveals high need for intensifying Sc starting from highest consumers.

Reference

Kaunas University of Medicine Hospital databases

Keywords: Rationality, Defined daily dose, Occupied bed daily

PK-153 Amikacin – vancomycin: is it possible to design initial dosage regimen from their respective pharmacokinetic parameters? A retrospective study

Sandra Fontanals[1], Dolors Soy[1], Josep Ribas[1]

[1]Pharmacy, Hospital Clinic i Provincial de Barcelona, Barcelona, Spain

Background and Objective: To evaluate the relation between vancomycin and amikacin pharmacokinetic (PK) parameters in an intensive care unit population.
Design: Data from intensive care unit patients were collected over a 48-month period, through a retrospective review of medical records and Therapeutic Drug Monitoring (TDM) reports. Patients were included only if at least two blood samples, at steady state conditions, had been drawn. Data were first evaluated for completeness and consistency of recorded sampling and dosing times.

Individual PK parameters were estimated (Bayesian analysis) using a one-compartmental PK model for amikacin and a two-compartmental PK model for vancomycin (PKS® Abbot).

Phase I of the study determined relationships between vancomycin and amikacin pharmacokinetic parameters, mainly clearance and volume of distribution. For that purpose, linear regression analysis of data from 63 out of 83 patients (analysis dataset) was performed. Phase II tested the predictability of the developed equations in an additional sample of 20 patients (validation dataset) by comparing predicted PK parameters from equations (PREDEQ) to those estimated by Bayesian analysis (PREDBAY). T-test between PREDEQ and PREDBAY from each antimicrobial was performed. Bias and precision were evaluated calculating the mean prediction error (MPE) and mean absolute error (MAPE), respectively (S-plus 5).
Setting: Intensive Care Units. Tertiary University Hospital.
Main Outcome Measures: Patients demographics, clinical and TMD records, creatinine clearance by Cockcroft-Gault, vancomycin and amikacin blood levels and PK parameters.
Results: Eighty-three critically ill patients (33 females, 48 males)were recruited for the study (Mean values: Age 59.30 yr, Weight: 71.63 kg, Cr: 0.92 mg/dL).
A correlation between vancomycin and amikacin regarding their CL was found ($CL_{vancomycin} = 0.5678\ CL_{amikacin} + 0.7648$; $R = 0.811$). However, no correlation was observed for Vd ($R = 0.114$).

Concerning Phase II, differences in demographic data from both datasets were not statistically significant. No significant differences were observed when performing PREDEQ versus PREDBAY T-test. Nevertheless, boxplot graphs for PREDEQ and PREDBAY residuals showed a wide variability of the values distribution and a lack of precision for both antimicrobials.
Conclusions: In our patient population this studied approach reveals an existing relation between amikacin and vancomycin PK parameters (or vice versa). However, the poor precision and large bias of residual values prevents us from recommending the use of these equations as PK parameters predictors (or regimen dose predictors) in intensive care patients. Further studies with larger samples are definitely required in such an heterogeneous population.

Reference

Predictive Performance of a Vancomycin-Aminoglycoside Population Model. Paul M Beringer, Annie Wong-Beringer and Jay P Rho

Keywords: Amikacin, Vancomycin, Pharmacokinetic

PK-172 Single dose of clarithromycin leads to toxic tacrolimus levels

Sarah Mertens[1], Isabel Spriet[1], Sandrina von Winckelmann[1], Ludo Willems[1]

[1]Pharmacy, University Hospital Leuven, Leuven, Belgium

Background and Objective: Tacrolimus is widely used as a potent immunosuppressive agent. However, it has a small therapeutic window and toxic levels are possibly leading to severe side effects such as nephrotoxicity, neurotoxicity and QT prolongation. Tacrolimus is nearly completely metabolised in the liver by CYP3A4; drug interactions are hence expected with potent CYP3A4 inhibitors.
Design: Case report.
Setting: Medical Intensive Care Unit.
Main Outcome Measures: Toxic tacrolimus levels after administration of a single dose of clarithromycin.
Results: A 22-year old woman with a medical history of heart-lungtransplantation for multiple major aortic pulmonary collateral arteries, was admitted with fever and progressive dyspnea. Her immunosuppressive therapy consisted of tacrolimus (5–4 mg PO) and methylprednisolone 4 mg PO. Meropenem was started empirically to treat pneumonia. On day 3, the patient was transferred to the ICU because of progressive respiratory insufficiency, where she was immediately intubated. Ganciclovir and SMX-TMP were associated to cover possible opportunistic infections by CMV and Pneumocystis jiroveci. Clarithromycin 500 mg BD IV was also associated, because Legionella pneumoniae as causative agent was not yet ruled out. However, Legionella antigen was negative and treatment could be stopped after administration of a single dose of clarithromycin. Tacrolimus (0.5 mg/24u IV) was daily monitored, trough level was 14 μg/L on day 3 after admission but increased on day 4 up to 24 μg/L after association of clarithromycin. Concomitant treatment on day 4 was azathioprine, methylprednisolone, meropenem, ganciclovir, SMX-TMP, piritramide and midazolam. We believe that clarithromycin is the causative agent leading to toxic levels as the time-relationship between administration and toxic levels is clear. Other causative factors could be ruled out: no other potent CYP3A4 inhibitors were administered and renal function did not change (serum creatinine 0.84 (day3) and 0.64 mg/dL (day4). We calculated the DIPS score, which assesses the causation of potential drug interactions, and concluded that the interaction is at least probable.1 A Medline search revealed other case reports describing the same interaction in renal, bone marrow and heart transplant patients.2,3,4,5 Clarithromycin is a potent inhibitor of CYP3A4, leading to competitive inhibition and toxic levels of tacrolimus. It is remarkable that even one single dose of clarithromycin results in plasma concentrations that are capable of blocking CYP3A4. In this patient, the interaction did not have clinical consequences.
Conclusions: This case illustrates that even one single dose of clarithromycin can lead to toxic tacrolimus levels. We believe that other antibiotics, such as azithromycin or fluoroquinolones, should be used if patients on tacrolimus have to be treated for Legionella pneumoniae. These drugs do not have the potential to interact with tacrolimus.

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Keywords: Tacrolimus, Clarithromycin, Interaction

PK-209 Pharmacokinetics of oral taurine in healthy volunteers

Mohammadreza Ghandforoush-Sattari[1], Siminozar Mashayekhi[2]

[1]Pharmacology and Toxicology, Tabriz University of Medical Sciences, Tabriz, [2]Clinical Pharmacy, Iran (Islamic Republic of)

Background and Objective: Taurine is a relatively non-toxic substance and a normal constituent of the human diet. Protective effects of taurine on cells against different toxic agents have already been established. Little is known of the pharmacokinetics of taurine in man after oral administration.
Design: Eight healthy male volunteers (median age 27.5, range 22–45) were recruited from the general population. Taurine 4 g was administered orally to each volunteer in the fasting state in the morning.
Setting: The study was performed in the Cardiff Poisons Unit, Llandough Hospital, Cardiff, Wales, UK.
Main Outcome Measures: Blood samples were taken (3 ml each time) at regular intervals and Plasma taurine concentration was measured by a modified HPLC method. Pharmacokinetic analysis was performed by WinNonlin (Version 1.5) software package.
Results: Maximum plasma taurine concentration (Cmax) was 86.1 ± 19.0 mg/L, time of maximum concentration (Tmax) between 1 and 2.5 hours (1.5 ± 0.6 hr), plasma elimination half-life (T1/2) 1.0 ± 0.3 hr, and the ratio of clearance/bioavailability (Cl/F) was 21.1 ± 7.8 L/hr.
Conclusions: All pharmacokinetic parameters were significantly different from the only one previous study which was studied following an IV injection of 200 mg bolus dose on six hypertensive human patients and six healthy volunteers. This was probably because they were examining an alpha phase which was obscured by the absorption phase for taurine after oral absorption.

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Keywords: Taurine, Pharmacokinetics, Oral administration

PK-268 Effect of human immunodeficiency virus-1 protease inhibitors on itraconazole metabolism in V79 Chinese hamster cells expressing human cytochrome P450 3A4

Estelle Huet[1], Bijan Ghaleb[2], Anne Hulin[1], Alain Astier[1]

[1]Laboratory of Pharmacology and Toxicology, Henri Mondor Hospital, [2]Laboratory of Pharmacology, Faculty of Medecine, CRETEIL, France

Background and Objective: Liver cytochrome P450 3A4 (CYP3A4) is involved in the metabolism of about 60% of drugs, notably all human immunodeficiency virus-1 protease inhibitors (PIs), and itraconazole (ITRA), an antifungal azole. Coadministration of ITRA with PIs may lead to serious drug–drug interaction (DDI) by increasing ITRA concentration because of CYP3A4 inhibition properties of PIs. The aim of this study was to investigate the effect of PIs on ITRA metabolism in a Chinese hamster V79-derived cell line, stably expressing human CYP3A4.
Design: Studies monitoring CYP3A4-mediated ITRA metabolite formation with time, in the presence of increasing concentrations of each PI were used to obtain in vitro Ki values. Kinetic parameters of ITRA hydroxylation were determined by incubating for 3 h at 37°C the V79 cells in 6-well plates in 1 mL of complete culture medium containing increasing concentrations of ITRA (0.14 to 3.5 μM) with or without PIs. ITRA metabolite (hydroxy-itraconazole) concentrations in culture medium were measured using validated reverse-phase high-performance liquid chromatography (HPLC) coupled with fluorescence detector.
Setting: Laboratory of Pharmacology and Toxicology, Henri Mondor Hospital.
Main Outcome Measures: Enzyme inhibition by PIs (Ki) were estimated using a non linear least square regression with proportional weighting (1/v2) with SigmaPlot® Enzyme Kinetics Module. The data were fitted using conventional relationships for competitive, noncompetitive or mixed-type inhibition.
Results: Lopinavir, indinavir PIs used at maximal plasma concentrations inhibit ITRA hydroxylation competitively for lopinavir, indinavir, amprenavir with a Ki values of 0.37, 0.54 and 0.66 μM, respectively, non-competitively for ritonavir, saquinavir, atazanavir and tipranavir with a Ki value of 0.31, 3.3, 1.10 and 32.1 μM, respectively and with a mixed-type inhibition mechanism for nelfinavir, with apparent Ki equal to 2.4 μM. All PIs, except saquinavir, are expected to inhibit in vivo ITRA hydroxylation with predicted inhibition percentage from 74.4% for atazanavir to 98% for ritonavir.
Conclusions: In clinical settings, this suggests obvious potential of significant DDI for all of the PIs, except for nelfinavir which is also metabolized by others CYP450. Finally, a close therapeutic drug monitoring of ITRA plasma concentrations for these patients is recommended.

Keywords: CYP3A4, Protease inhibitor, Drug interaction

PK-293 Prevention of chemotherapy related errors one step toward

Catarina Oliveira[1], Filipa Duarte-Ramos[1], José Cabrita[1]

[1]Social-Pharmacy, Faculty of Pharmacy, University of Lisbon, Lisbon, Portugal

Background and Objective: Several strategies have been proposed to minimize cytotoxic medication errors. Different guidelines identify items that must be filled-in in prescriptions and cytotoxics identification labels aiming to prevent these errors.
Objective: Define a national consensus document concerning chemotherapy error prevention. Evaluate the extent of agreement with the consensus document of chemotherapy prescriptions and identification labels.
Design: Consensus Document: Delphi Technique. Prescriptions evaluation: descriptive, retrospective study. Labels evaluation: descritive, prospective study.
Main Outcome Measures: Consensus Document: Hospital pharmacists that manipulate cytotoxics were identified (n = 67) from all national hospitals and invited to participate in a 2 round Delphi Technique. They were asked to identify which items of the ASHP Guidelines and GEDEFO they considered that must be filled in, in a prescription or in an identification label. Consensus was defined as an agreement rate ≥66%.

Prescriptions/Labels evaluation: All breast or colon intravenous chemotherapy prescriptions, from a central hospital, have been evaluated from January to December 2004 (n = 920), based on the parameters identified in the consensus document. A two month analysis of identification labels was performed.
Results: Consensus Document: A total of 49 hospital pharmacists (73.1%) completed the 2 rounds of the Delphi. Consensus was

obtained for 84.6% of the prescription items and for 90.9% of the labels items.

Prescriptions/Labels evaluation: More than 2/3 of the analysed prescriptions were for breast cancer (69%) and the rest for colon. None of the analysed prescriptions had all the consensus items filled-in. Information that allowed the validation of the prescription by the pharmacist (ex: height, weight, body surface or number of cycle) was present in less then 10% of the prescriptions. No one had the prescriptor telephone, or the justification for dose reduction (when appropriate).

Only 68.8% (110/160) of the labels mentioned the full identification of the solvent (96% miss the concentration) used and none of them stressed out the need for filter use when applicable.

Conclusions: Consensus was obtained about a large number of items, which may constitute a difficulty in daily practice The evaluation of prescriptions highlights the lack of information that could allow confirmation by the pharmacist. Labels do not seem to alert about special administration conditions.

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Keywords: Preventing medication errors, Consensus document, Chemotherapy error prevention

PT-8 Compliance with recommendations on length of treatment with interferon plus ribavirine depending on viral response in patients with hepatitis C

Sanchez Azhara[1], Murgadella A. M. Anna[1], Gurrera T. G. Teresa[1], Agustí C. A. Clara[1], Fàbregas X. F. Xavier[1], Castellví J. C. Josep[2]

[1]Pharmacy, [2]Digestive, Mataro Hospital, Mataro, Spain

Background and Objective: Background: The Ministerial advisor on Hepatitis C in Catalonia has established a series of recommendations concerning Hepatitis C treatment distinguishing between two groups: viral genotypes 1 and 4, and viral genotypes 2 and 3.

In genotypes 1 and 4 it is necessary to evaluate treatment continuity after 12 and 24 weeks, depending on viral load and it is also necessary to prolong the treatment to 48 weeks if there is viral response. In genotypes 2 and 3 it has not to be longer than 24 weeks regardless of viral load.

Objective: To evaluate the adequacy of Hepatitis C treatment and analytic monitoring, following the recommendations of the catalonian Ministerial advisor.

Design: Observational and retrospective study.

Setting: Patients that started treatment with PEG-interferon plus ribavirine in this hospital during 2005.

The information obtained was: viral genotype, the beginning and the end of treatment, quantitative basal RNA (in all genotypes), quantitative RNA (12 weeks) and qualitative RNA (24 weeks) in genotypes 1 and 4 and at the end of the treatment in all genotypes.

Main Outcome Measures: The application of global advices ranges from 59% to 100% according to viral genotype and established recommendation.

Results: The compliance degree in genotypes 1 and 4: 100% application of quantitative basal RNA and 59% after 12 weeks. 60% of treatments were discontinued with quantitative RNA positive after 12 weeks, 78% with qualitative RNA positive after 24 weeks and 6% the treatment was continued longer than 48 weeks.

In genotypes 2 and 3: 100% application of quantitative basal RNA, 65% application of qualitative RNA after 24 weeks and 20% the treatment was continued longer than 24 weeks.

Conclusions: Following the recommendations on viral response evaluation after 12 and 24 weeks allows the early suspension of therapy in non-responsive patients. This leads to and improvement in patients' quality of life, a reduction in adverse side-effects and savings in medical care costs.

Treatment monitoring by Hospital Pharmacist provides medical decision support. In consequence these patients constitute a target group to establish pharmacy care programs focused on hospital outpatients.

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Keywords: Hepatitis C, Treatment, Genotype

PT-12 Zidovudine induced anemia in patients received HAART

Hossein Khalili[1], Simin Dashti-Khavidaki[1], Mahbobeh Hajiabdolbaghi[2], Atefeh Etghani[1]

[1]Clinical Pharmacy, Tehran University of Medical Sciences, [2]Infectious Disease, Iranian AIDS Research Center, Tehran, Iran (Islamic Republic of)

Background and Objective: Zidovudine (ZDV) is the first drug that approved for treatment of HIV infected patients and now has wide use in HAART regimens. This drug can cause hypoproliferative anemia bone marrow toxicity. The object of this study is evaluation of incidence of anemia in Iranian HIV positive patients that received ZDV in HAART regimens.

Design: In a prospective study, 162 HIV positive patients were referred to Iranian HIV Research Center that start ZDV in HAART combination were entered the study and have followed for at least one year. Baseline and monthly hematological parameters were recorded.

Setting: Iranian HIV Research Center.

Main Outcome Measures: patients Demographic parameters, Route of Infection exposure, stage of Disease, CD4 counts, CBC, and Hematological Parameters.

Results: Twenty nine (29) patients were excluded from the study because of impossible follow-up. From 133 patients, 77 of them have anemia (Hemoglobin less than 12 g/dl for female and less than 13 g/dl for male). Thirty there (33) patients have anemia before starting HAART. Thirty four (34) patients have showed anemia following received ZDV. Twenty (12) patients have improved anemia after were changed ZDV to stavudine.

Conclusions: About 34% of HIV positive patients that were received ZDV have experienced anemia.

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Keywords: Zidovudine, Anemia

PT-18 Post-operative pain management in opioid naïve and opioid tolerant patients after orthopedic surgery

Asad E. Patanwala[1], **Brian Erstad**[1], Donna Jarzyna[2], Michael Miller[3]

[1]Pharmacy Practice and Science, University of Arizona College of Pharmacy, [2]Nursing, University Medical Center, [3]Orthopedic Surgery, Arizona Health Sciences Center, Tucson, United States

Background and Objective: To compare post-operative opioid requirements in opioid naïve and opioid tolerant patients after orthopedic surgery. Secondary endpoints included comparisons of pain scores, sedation scores, and adverse effects between the two groups.
Design: Prospective observational study design. Patient's ≥18 years of age that were scheduled for elective total knee arthroplasty between October 2005 and June 2007 were included in the study. Patients were classified into one of two categories based on their daily opioid consumption during the week prior to surgery; 1) opioid naïve (≤10 mg of oral morphine equivalent); 2) opioid tolerant (≥30 mg of oral morphine equivalent).
Setting: Academic medical center in the United States.
Main Outcome Measures: Post-operative opioid consumption, pain scores and sedation scores were compared between the two groups during three different time periods: 1) Time in the post-anesthesia care unit (PACU), 2) 24 hours after discharge from the PACU and 3) 24–48 hours after discharge from the PACU.
Results: A total of 29 patients satisfied criteria for inclusion into the study (20 opioid naïve, 9 opioid tolerant). Post-operative opioid consumption (intravenous morphine equivalent) was significantly greater in the opioid tolerant group in the PACU (median 56 vs. 8.2 mg, $p = 0.0013$); during the first 24 hours after discharge from the PACU (108 vs. 20.5 mg, $p = 0.0004$) and 24 to 48 hours after discharge from the PACU (152.3 vs. 25 mg, $p = 0.0001$). Pain scores (verbal numeric scale from 0–10) were significantly greater in the opioid tolerant group during the first 24 hours after discharge from the PACU (5.9 vs. 4.1, $p = 0.03$). There was no difference in pain scores during the other time periods studied. Sedation scores and adverse effects were similar between the groups during the study.
Conclusions: Opioid tolerant patients have significantly greater opioid requirements in the PACU and up to 48 hours after discharge from the PACU compared to opioid naïve patients after orthopedic surgery.
Keywords: Pain, Opioid, Surgery

PT-26 Evaluation of the compliance of clinical practice with approved prescription information for Rituximab

Mari Carmen Conde[1], Beatriz Garcia[1], Jaime Vargas[1], Maria Amalia Fernandez[1]

[1]Pharmacy, Cytostatic Unit CCU, Virgen de las Nieves University Hospital, Granada, Spain

Background and Objective: To evaluate the compliance of clinical practice with conditions of use in the Prescription Information Sheet in relation to the utilization of Rituximab between July 1 2006 and December 31 2006.
Design: Prospective, observational, single-centre study of all patients who started treatment with Rituximab at the Virgen de las Nieves University Hospital between July 1 2006 and December 31 2006, with follow-up to April 30 2007.
Setting: Department of Pharmacy Cytostatic Unit and Medical Departments of Oncology, Rheumatology, Internal Medicine and Day-Hospital.
Main Outcome Measures: Degree of compliance of clinical practice with the indications, regimen, line of treatment, dose, and frequency and number of courses established in the Prescription Information Sheet.
Results: Out of the 31 treated patients, 7 (23%) received Rituximab for a disease not included in the Prescription Information Sheet, i.e., in practically a quarter of cases, approval is required for compassionate use. Only 65% of the drug regimens accorded with the Prescription Information Sheet. Among the patients receiving Rituximab for an approved indication and with an appropriate regimen, the correct dose and treatment line were used in 100% of cases, whereas recommendations for the frequency and number of courses were only followed in 86% and 42% of cases, respectively.
Conclusions: A very high proportion of patients are being treated with Rituximab for an indication that is not approved in the Prescription Information Sheet, meaning that there are no conclusive data on the efficacy and safety of this drug in these cases. Indications for Rituximab treatment were completely followed in only four (12.9%) of the patients in this sample.

PT-43 Clinical pharmacist intervention in nephrology ward in an Iranian academic health center

Talia Mazidi[1], Simin Dashti Khavidaki[1], Hossein Khalili[1]

[1]Clinical Pharmacy, Tehran University of Medical Sciences, Tehran, Iran (Islamic Republic of)

Background and Objective: Patients with chronic kidney disease have several complications which necessitate drug therapy. Because of polypharmacy in this population, risk of drug interactions and adverse drug effects (ADEs) will increase. It is established that clinical pharmacist have critical role in the treatment safety and reducing healthcare cost by monitoring patients for ADEs, appropriate dose and rational drug administration and identification of prescription errors. So we decided to evaluate the impact of pharmacist intervention in drug safety in our hospital.
Design: During an ongoing activity in an academic nephrology ward, we have visited 61 patients till now and did some interventions for the first 2 months. Interventions were about dose adjustment, adverse effects alert, drug interactions, IV to PO conversion, drug information, drug administration,…
Setting: Nephrology Ward in Imam Referral Hospital affiliated to Tehran University, Tehran, Iran.
Main Outcome Measures: For treatment monitoring we have used NKF/DOQI guidelines in chronic kidney disease: $Hg = 11–12$, $Hct = 33–36\%$, $Ca\text{-}P < 55$, $2.5 < P < 5.5$.
Results: We did 1.2 intervention per patient during this time. Among these patients, 11.4% needed treatment interchange (drug replacement), 9.8% drug discontinuation, 29.5% dose adjustment, 6.6% IV to PO conversion, 32.8% recommendation about drug administration, 11.4% adding a drug to previous order, 4.9% ADEs alert, 21.3% monitoring for drug interactions and in 3.3% of cases there was a prescription error.
Conclusions: As it is clear, by clinical pharmacist interventions, in addition to giving better healthcare services, reducing healthcare cost will be achievable as well.

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Keywords: Clinical pharmacist, Chronic kidney disease, Treatment safety

PT-53 Topical mitomycin 0.02% as an adjunct to surgical repair of choanal atresia

Canadell Laura[1], Pardo Rocio[1], Aviles Francisco J[2], **Cañete Carmen**[1], Figuerola Enric[2], Gallart M Jesus[1]

[1]Pharmacy service, [2]Otorhinolaryngology, Hospital Universitari Joan XXIII, Tarragona, Spain

Background and Objective: To evaluate the use of topical mitomycin 0.02% used as an adjunct to choanal atresia surgical repair to reduce the development of granulation tissue and cicatrix.
Design: Description of results of two patients with either unilateral and bilateral congenital choanal atresia who were under transnasal endoscopic surgical repair.

Topical application of mitomycin 0.02% during two minutes and postoperative stenting for a period of four-ten weeks were used, no second application of mitomycin was used.

The follow-up was 2 years in bilateral case and six months for the unilateral case.
Setting: Pharmacy and Otorhinolaryngology Service. Hospital Universitari Joan XXIII de Tarragona. Spain.
Main Outcome Measures: The success of the repair was measured according to the following items: endoscopic evaluation of the patency of the choanae, respiratory distress and nasal drainage.
Results: Bilateral membranous choanal atresia was surgical repaired five days after birth, using transnasal endoscopic approach and topical mitomycin 0.02% during de proceeding. No operative complications occurred and stents were removed four weeks after repair. The choanae was inspected endoscopically to asses healing and no presence of re-estenosis was found. No clinical symptomatology.

Unilateral mixted atresia on the left side was diagnostic at six years old and surgical repaired because of association of respiratory distress and nasal mucus drainage symptomatology. No restenosis has appeared and syntomatology has improved.

Nome patient required surgical revision.
Conclusions: Although, the exact role of the topical application of mitomycin 0.02% must to be further investigated, the use of this drug as an adjunct to the surgical repair of choanal atresia may offer decreased need for revision surgery due to re-estenosis.
Keywords: Mitomycin 0.02%, Choanal atresia

PT-57 Adherence to clinical guidelines for upper respiratory and ear infections in out-of-hours primary care – a retrospective study

Sara Claesson[1]

[1]Biofarmaci, Uppsala University, Täby, Sweden

Background and Objective: Infections in the upper airways and ears are a frequently occurring reason for patients to visit primary care settings. Prescribing adherence to local guidelines for handling infections of ears and upper airways and antibiotic prescribing is of both local and national concern. Increasing antibiotic resistance is one reason, cost and patient quality of care are others. The objective of this study was to investigate physician adherence to clinical guidelines at the out-of-hours primary care clinic in Täby.
Design: A retrospective study. Clinical case notes were scrutinised for all patients seeking care for problems with ear, nose, throat, fever, cough or cold between January 1 and March 31 2007. Data was analysed for patients who were diagnosed with specified ear or upper respiratory infections. Laboratory tests taken and antibiotic prescriptions were anonymously documented. Antibiotic prescription filling dates were investigated.
Setting: Husläkarjouren, the out-of-hours primary care clinic in Täby.
Main Outcome Measures: Adherence to and fulfillment of local therapeutic guidelines and professional quality criteria was defined with respect to immediate, delayed or no prescription, drug choice, dose and duration and the use of diagnostic tests. Adherence was defined as complete or not, and deviations from the guidelines were separately analysed. Prescription filling was analysed with respect to time from clinic visit to pharmacy visit.
Results: Data from 1077 patient visits were analysed. Adherence to local guidelines was disappointingly low. General treatment of infections was only according to guidelines in 44% of the cases and only laboratory testing met the quality criteria. Adherence to antibiotic prescribing guidelines was even lower, only 22% of antibiotic prescriptions were completely according to local guidelines. 93% of all antibiotic prescriptions were filled within one day from the visit to the clinic.
Conclusions: Communicating guidelines to prescribers and continuous follow up of prescribing behaviour is essential for improving patient care and decreasing the risk of antibiotic resistance in the community. This study exposes gaps in the quality of care that may not be picked up by traditional follow up measurments. Studies with a wider scope and in depth analysis of reasons for nonadherence to guidelines are warranted if antibiotic use is to be improved.
Keywords: Infection, Antibiotics, Adherence, Guidelines, Quality of care, Resistance, Primary care

PT-85 One year of experience with bortezomib in patients with diagnostic of multiple myeloma

Alexandra Reis[1], **Patricia Cavaco**[1], Nadine Ribeiro[1], Fernando Lima[2], Isabel Ribeiro[2], Fátima Falcão[3]

[1]Pharmacy, [2]Haematology, CHLO, [3]Pharmacy, CHLO, Pharmacy Faculty, Lisbon, Portugal

Background and Objective: To evaluate one year of experience with bortezomib in patients with diagnostic of Multiple Myeloma (MM), according with the NCCN guidelines and their clinical outcomes.
Design: One year retrospective study, review of NCCN guidelines in MM.
Setting: Haematology Ward and Day Hospital of CHLO (general hospital).
Main Outcome Measures: Number of therapeutic according NCCN guidelines, effectiveness of bortezomib's therapeutics established according to immunoglobulin values.
Results: From the 8 patients with the diagnostic of Multiple Myeloma, one had a diagnostic of MM IgG K, five MM IgA K and one MM IgGλ. Three were male and five female. The mean age was 57.25 ± 10.99 years. The Bortezomib was initiated 3.14 lines after other therapies. Before bortezomib one patient received therapeutic with thalidomide/dexametasone, one VAD, one cyclophosphamide (CTX), three followed by VAD, one MP followed VAD and followed CTX, and another with VAD followed by CTX. The therapeutic selection followed the NCCN guidelines in all patients. The average number of cycles with bortezomib has 4.14. From the 8 patients, 2 stopped, one had a generalized face oedema bortezomib related, although the disease was in remission, and another died by sepsis not related with this drug. In relation to bortezomib's effectiveness, 6 (75%) patients had a very good response, since the immunoglobulin decreased and three (25%) of these patients are actually at consolidation cycles (7th and 8th).
Conclusions: The use of Bortezomib in our hospital was according the NCCN guidelines and the experience was very positive. Nevertheless, and considering also the high cost of this therapeutic, we consider very important to continue to follow up this group in order to evaluate the rate of response to bortezomib during time.

Reference

NCCN Clinical Practice Guidelines in Oncoloy for Multiple Myeloma 2007; Nice guidence by tipe on Multipe Myeloma; Paul G. Richardson, et al., A Phase 2 Study of Bortezomib in Relapsed, Refractory Myeloma; Velcade RCM.

PT-90 Evaluation of the time interval between admission on the emergency department and administration of the first dose of antibiotics

Saskia Vandenput[1], **Ludo Willems**[1], Sabrina De Winter[1], Sandrina von Winckelmann[1], Daniel Knockaert[2]

[1]Pharmacy, [2]Internal medicine, University Hospital Leuven, Gasthuisberg, Leuven, Belgium

Background and Objective: When patients are admitted with a proven or suspected infection on the emergency department, adequate antibiotic treatment must be started as soon as possible. Literature reveals that the time between admission and administration of the first dose of antibiotics can reach about 5 hours and this can influence the prognosis of the patient. International guidelines for community acquired pneumonia (CAP) and bacterial meningitis define this time interval of 4 hours(1) and less than 2 hours(2) respectively. To evaluate the practice on the emergency department of our hospital, with an average daily admission of 136 patients, a study on this interval was carried out.
Design: Prospective observational study during a 3-week period
Setting: Emergency Department, University Hospital, Leuven, Belgium.
Main Outcome Measures: – Mean time interval between admission of patients on the emergency department and administration of the first doseof antibiotics – Adherence to local guidelines.
Results: 76 patients were included in the study. The mean time interval is 2 h 52 min (range 3 min–14 h 07 min). The mean time intervals measured at night and during the day are 2 h 16 min and 3 h 17 min respectively. For bronchopulmonar infections (44 patients) the mean time interval is 2 h 35 min, skin and soft tissue infections (13 patients) 1 h 50 min, urogenital infections (4 patients) 2 h 54 min, sepsis (4 patients) 4 h 25 min, abdominal infections (8 patients) 5 h 34 min and bacterial meningitis (1 patient) 1 h 15 min. Specifically for CAP (28 patients) the mean time interval is 2 h 56 min.

80.3% of all administered antibiotics is in adherence to the local guidelines; however this was only evaluated by the clinical pharmacist.

A possible explanation for the relatively short time intervals could be that the antibiotics which are frequently used are available at the emergency department and that the guidelines are at all time available on our hospital intranet. The time intervals of CAP and bacterial meningitis are shorter than the defined international guidelines.(1, 2)
Conclusions: The time interval, found in our study, between admission on the emergency department and administration of the first dose of antibiotics is short, compared with similar conducted studies.(3, 4)

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Keywords: Antibiotics, Emergency department

PT-91 Compassionate use of mitomycin C in the management of laryngeal papillomas. A case report

Ana Such-Diaz[1], Carmen Sanchez-Gil[1], Maria del Puy Goyache-Goñi[1], Pilar San Miguel[1], Rodrigo Monge-Jodra[2], Alberto Herreros de Tejada[1]

[1]Pharmacy, [2]Otolaryngology, 12 de Octubre University Hospital, Madrid, Spain

Background and Objective: A woman diagnosed with laryngeal papillomatosis. Treatment consisted of laser excision of the granulomatous lesions, followed by mitomycin C instillation over the surgical bed.

Description of the preparation and utilization of mitomycin C instillation over the surgical bed for the treatment of laryngeal papillomatosis.
Design: Request by the ENT Service for compassionate use of mitomycin C.
Following authorization from the health authorities, a literature search was made.

After determining the dose/day for the patient, elaboration was carried out according to the literature references.
Setting: Vials of 10 mg of mitomycin C were used as starting material, with 1-ml syringes to facilitate instillation in the operating room. Dilution was made to double the standard in our centre (20 ml).
Main Outcome Measures: Two 1-ml syringes were prepared per cycle, with a mitomycin C solution of 0.5 mg/ml for instillation, though finally in all cases only one of them was used.

Stability was established as 24 hours at room temperature, without special considerations regarding light exposure, as specified by the literature.

The entire procedure was carried out in a laminar flow chamber, in compliance with the specifications for manipulating cytostatic agents.
Results: The patient received a total of three cycles of mitomycin C, the last two being maintenance cycles.
The patient has experienced no papilloma relapse, and only right vocal cord hyperaemia is observed, probably secondary to surgery.
Conclusions: Collaboration between the Service of Pharmacy and the ENT Service allowed adequate treatment and recovery of the patient, without apparent adverse effects.

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Keywords: Mitomycin C, Laryngeal papillomatosis, Papillomas

PT-93 Effectiveness of Rituximab in rheumatoid arthritis

Marta Martí-Navarro[1], Carmen Frías-López[2], Toni Gómez-Centeno[3], Begoña Campos[4], Sarai Humbert[1], Roger Salvador[1], Joan Altimiras-Ruiz[1]

[1]Pharmacy, Corporació Sanitària Parc Taulí, [2]Pharmacy, Corporacio Sanitaria Parc Tauli, Sabadell, Spain, [3]Rheumatology, [4]Medicine, Universitat de Barcelona, Barcelona, Spain

Background and Objective: To assess the response to Rituximab in patients with rheumatoid arthritis (RA) who were refractory to anti-TNF treatment.
Design: Observational, cross-sectional study. Performed on patients diagnosed of RA according to ACR criteria (American College of Rheumatology), undergoing treatment with Rituximab due to their refractoriness to at least two differents anti-TNF drugs. All patients who had been receiving treatment with Rituximab for at least 3 months before beginning of study were included.
Setting: Performed in a level II teaching Hospital.
Main Outcome Measures: The main variables used to assess clinical evolution were: decrease in DAS28-ESR, considering the number of

swollen and tender joints over 28 joints evaluated, and the value of erythrocyte sedimentation rate, comparing the DAS28 from one patient on two different time points; EULAR response, that classifies patients in 3 groups according to treatment response, and decrease in MHAQ (Modified Health Assessment Questionnaire), that indicates patient's awareness of disability. Data were recollected at beginning and at 12 weeks of initiating treatment with Rituximab. Differences between B-lymphocyte count at beginning and at 2 weeks was of initiating treatment was used as a secondary variable.

Results: We collected data of 6 patients, all being females, 1 was RF positive and 5 were anti-CCP positive. At 2 weeks, all the patients presented B-lymphocyte depletion. Mean DAS28 basal rate was 6.55 and MHAQ was 2.29.

At 12 weeks, mean DAS28 was 4.86 and mean MHAQ was 1.98. Assessment of disease evolution was performed with these values during this period according to EULAR criteria, obtaining 83.3% moderate response and 16.7% no response.

The difference in the decrease of DAS28 between the 1st and 2nd visit was 1.69 CI95 [0.63, 2.74] $p = 0.009$ statistically significant and difference in MHAQ between 1st and 2nd visit was 0.35 CI95 [−0.41, 1.11] $p = 0.268$ not statistically significant.

Conclusions: These results suggest that Rituximab is an effective treatment in patients affected by RA refractory to 2 or more current anti-TNF. Although patients did not realise this improvement, the decrease in DAS makes Rituximab an interesting option in this type of patients. However a higher number of patients is required to confirm these results.

Keywords: Rituximab, Refractory arthritis, DAS28

PT-96 Use of low molecular weight heparin in venous tromboembolic disease prophylaxis in general surgery

Marta Gallego[1], Elena Fuentes[2], Jesus Llorente[2], Marian Campos Fernandez de sevilla[2], Francisco Moreno[2], Esperanza Jimenez-Caballero[2]

[1]Pharmacy, Hospital La Paz, [2]Pharmacy, Hospital la Paz, Madrid, Spain

Background and Objective: Evaluate compliance of low molecular weigh heparin (LMWH) to Guidelines of Clinical Practice published in 7th Conference of ACCP antitrombotic therapy for prevention of venous thromboembolism in general surgery.

Design: Prospective study, three months duration (January–March 2007). Medical histories of patients hospitalized in surgery department, either with or without LMWH prescription were revised daily. The collected data were: Patient identification along with th number of medical history, sex, age, date and reason of admission to hospital, surgery (major or minor, duration and kind anesthesia), risk factors (prior history venous tromboembolism, prolonged immobilisation, cancer, obesity, varicose veins, estrogens use, haemodynamic state, serious infection), LMWH prophylactic prescription or not (posology, start date and end of prophylaxis) and adverse events related.

Setting: General and Diegestive Surgery department of tertiary Hospital.

Main Outcome Measures: From elaborate database, the LMWH prescription habits and their compliance with Guidelines of Clinical Practice published in 7th Conference of ACCP in 2004, were analyzed. Proceeded analysis of 2 surgeries with greater prevalence, being these, pathologies related to cholédoco (cholelythiasis, cholecystitis) and cancer (colon, rectum, cecum, esophagus, breast, stomach, thyroid, pancreas, liver metastasis, mouth) representing 15.5% and a 17.9% respectively, of a total of 168 patients recruited.

Results: Pathologies related to cholédoco (26 surgeries, 13 men, 13 women) a 65.38% of patients received adjusted prophylaxis to their degree of risk (76.5% with heparin prescription and 23.5% without it) from all 11.53% of inadequate prescription (100% of the patients with LMWH prescription); 6 patients lost follow up. Patients submitted to cancer surgery (30 surgeries, 17 men, 13 women), 40% received apropiate prophylaxis (83.3% with LMWH and 16.6% without it). Same percentage of patients (40%) was not adapted to correct prophylaxis (100% patients with LMWH); 6 patients lost follow up.

Conclusions: There is a greater percentage of choledoco surgery patients with LMHW prescription in compliance with published guidelines than oncology surgery patients, however it will be necessary carry out a better implementation
among healthy professionals in order to increase this percentage of patientes.

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Keywords: Heparin low molecular weith, Thromboembolism, Prophilaxis

PT-97 Alternatives in the treatment of refractory dermatomyositis

Francisco Moreno[1], Diana Gonzalez[1], Elena Fuentes[1], Marta Gallego[1], Angeles M. Tacoronte[1], Yolanda Larrubia[1], Esperanza Jimenez[1]

[1]Pharmacy, La Paz University Hospital, Madrid, Spain

Background and Objective: Effectiveness of infliximab and rituximab in a patient diagnosed of refractory dermatomyositis (DM). The idiopatic inflammatory myopathies constitute a group of disorders characterized by muscle weakness, increased of muscle enzymes levels, dermatologic features and abnormalities found in muscle biopsy and electromyography. Most patients respond to corticosteroids.

Design: Retrospective study of a case of refractory dermatomyositis.

Setting: Rheumathology, Dermatology and Pharmacy Departments. University hospital La Paz. Madrid. Spain.

Main Outcome Measures: Creatine phosphokinasse (CPK), aspartate aminotransferase (AST), alanine aminotransferase (ALT) and lactate dehydrogenase (LDH).

Results: A 40-year-old female diagnosed of DM in October 1997. She firstly presented a rash on her hands and knees, the laboratory studies revealed an elevation of muscle enzymes, and the patient had dysphagia and respiratory failure requiring mechanical ventilation. CPK of 164 UI/L; AST of 28 UI/L; ALT of 22 UI/L; LDH of 459 UI/L. During seven years, the treatment consisted of different doses of corticosteroids and methotrexate(10 mg/week) and was changed to cyclosporine (50 mg/12 h) and azathioprine (50 mg/7 days) since the patient showed esteroid myophaty and progressive muscular weakness. No significant improvements were observed, so a new treatment with infliximab 5 mg/Kg is begun as off-label use. Nevertheless, after the fourth infusion the patient developed an infusional reaction and infliximab was withdrawn. To date, the patient has received 2 doses of rituximab(1000 mg) as off-label use without any complication, being the current levels: CPK of 135 UI/L; AST of 19 UI/L; ALT of 15 UI/L; LDH of 334 UI/L.

Conclusions: B-cell depletion therapy with rituximab may be a viable option in patients with dermatomyositis refractory to current therapies. More studies are needed to determine the efficacy of anti-TNF (infliximab) and rituximab in DM

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Keywords: Dermatomyositis, Rituximab, Infliximab

PT-132 Multi-field evaluation of antibiotherapy quality in a university hospital

Coralie Lepage[1], Frédérique Bouchand[1], Rachel Favreau[1], Anne-Claude Crémieux[2], Christine Lawrence[3], **Catherine Bouiri**[1], Jean-Charles Nicoulaud[1], Maryvonne Villart[1]

[1]Pharmacy, [2]Infectiology department, [3]Bacteriology, Hopital Raymond Poincaré, APHP, Garches, France

Background and Objective: Bacterial resistances, compromising antibiotics efficiency, constitute a major problem of public health. Their emergence is related on overconsumption and misuse of antibiotics. Checking the use of antibiotics could help to prevent this phenomenon. In May 2007, the anti-microbial drug commission of the hospital set up a study in order to evaluate the appropriateness of prescriptions of 5 broad-spectrum antibiotics: vancomycin, teicoplanin, ceftazidim, piperacillin/tazobactam, imipenem/cilastatin.
Design: A multi-field team, composed with infectious disease physicians, pharmacists and bacteriologists, was involved in this study. An evaluation schedule was mapped out. This work presents the preliminary results, based on 1 month.
Setting: Every care units, including orthopaedic surgery, intensive care, medicine and rehabilitation departments.
Main Outcome Measures: Relevance of indications, choice of the antimicrobial agents, duration of the treatment, dosing and adjustment of treatment regarding bacteriological results were analysed by members of the multi-field team.
Results: 55 prescriptions of these broad-spectrum antibiotics were collected and analysed. 58% of the prescriptions were initiated by residents, 42% by senior physicians. Vancomycin was the most prescribed antibiotic (53%), mainly in the orthopaedic surgery unit. The indications of antibiotics were osteomyelitis (31%), septic arthritis (15%), prosthetic joint infections (13%) and pneumonia (11%). Only 13% of antibiotic doses were not correctly adapted to creatinine clearances or to plasmatic vancomycin rates. The initial choice of antibiotic was considered appropriate in 90% of cases. Regarding bacteriological results (bacteria, antibiogram), the continuation of the treatement was acceptable in 80% of cases. However in 20% of prescriptions, an adjustment of therapy with a more narrow spectrum antibiotic could have been done.
Conclusions: These results have to be extended with further investigation (at least 3 months). The improvement of the quality of antibiotherapy in health care establishments go through a decrease of prescriptions and optimization of the treatments. This clinical study, carried out by a multi-field team, gives a reliable evaluation of antibiotherapy practices in the establishment. Corrective actions are considered.
Keywords: Broad-spectrum antibiotic, Multi-field evaluation, Antibiotherapy quality

PT-134 Care givers' assessment of the sedation drug use in an adult intensive care unit (ICU)

Pierre Voirol[1], Anne Laure Blanc[1], Valia Humbert Delaloye[1], Laurence Van Tulder[2], Laurent Gattlen[2], Rene Chiolero[2], Andre Pannatier[1]

[1]Dept of Pharmacy, [2]Adult ICU, University Hospital CHUV, Lausanne, Switzerland

Background and Objective: Sedation and analgesia are crucial therapies in ICU but few guidelines for their use are available. A recent retrospective local study showed that the drugs and doses used in the local adult ICU are similar to reports in the literature. Propofol, morphine, fentanyl and midazolam are the most prescribed drugs. This study aimed at measuring the nurses' and physicians' global assessment of the patient sedation and at comparing the results with those of the retrospective study. The final aim was to evaluate the need for local guidelines on ICU sedation.
Design: Two anonymous 10-item questionnaires were developed for this protocol. The first one, sent to the 36 physicians of the ICU, included also 4 additional clinical cases to discuss. The second one was send to the 207 nurses. 6 questions were the same in both questionnaires.
Setting: 34-bed adult ICU of a university hospital
Main Outcome Measures: Physicians' and nurses' perception of sedation.
Results: 47 percent of physicians and 15% of nurses returned the questionnaire despite 3 reminders. 47% physicians and 50% nurses considered the sedation adequate in 50–75% cases and 47% and 27% respectively considered it adequate in 75–90% cases. When the sedation was rated as inadequate, 80% of the nurses thought that patients were under-sedated while over-sedation was mentioned by 65% of the physicians. The vast majority of physicians (76%) and nurses (93%) mentioned using the sedation agitation scale (SAS) on a regular basis and 87% of physicians said that they prescribed a daily interruption of sedation. However, a daily interruption was observed in only 20% of cases during the retrospective study. This discrepancy could partly be explained by the lack of response from medical residents. Moreover, in practice, the sedation level is sometimes just decreased to allow a clinical evaluation of the patient without a formal interruption of the administration of esdatives. This could also explain the very low percentage observed. The discussion of the 4 clinical cases showed a large variability in the choice of sedative drugs. This demonstrated a lack of consensus among the prescribers. The implementation of local guidelines for the sedation was requested by nurses and physicians.
Conclusions: This study demonstrated a large diversity among prescribers in the management of sedation. Hence, the need for guidelines exists. Such a document also requested by nurses and physicians. Once the new guidelines will be available, teaching to the nurses and to the medical residents has to be provided. The enhancement of the communication between physicians and nurses about the level of sedation and its goal has to be promoted. The pharmacist will contribute to the elaboration and implementation of the guidelines.
Keywords: Sedation, Guidelines, ICU

PT-135 Breast cancer: analysis of different treatments (2005–May 07)

Gisela Costa[1], Armando Alcobia[1]

[1]Pharmacy, Garcia de Orta Hospital, Almada, Portugal

Background and Objective: Breast cancer is the most common malignancy in women in Portugal. The treatment of breast cancer includes the surgery, radiation therapy or both, cytotoxic chemotherapy, endocrine and biological therapy or combinations of these. The aim of this study was to analyse the drugs use in breast cancer (chemotherapy schemes and hormonal agent) and haematopoietic growth factors needs.
Design: A retrospective study was carried out of women with breast cancer diagnosis who received chemotherapy/hormone therapy during

2005–May 2007. Data collected included: age, sex, stage disease, type of treatment, treatment line. Data was obtained from a computer application (SONHO) and medical order. A statistical evaluation was made with SPSS 11.0.
Setting: Oncology Day Hospital and Pharmacy Department of Garcia Orta Hospital.
Main Outcome Measures: Evaluation of different combinations of cytotoxics used in treatment of breast cancer.
Results: The study included 192 patients, 190 female and 2 male. The mean age was 55.59 ± 12.96 years. In this study 19.8% patients had metastatic disease. Sixteen combinations of cytotoxics in first line treatment were identified. The most common regimens was the FEC scheme (5-Fluorouracil, Epirubicin, Cyclophosphamide), used in 39.6% of patients. In second line treatment 36.5% received docetaxel. In third line 20% of patients used G + VNB scheme (Gemcitabine, Vinorelbine). In first line treatment taxanes-based therapy was used in 25.7% of patients in 2005, 20.8% in 2006 and 12.1% in 2007. The anthracycline-containing therapy was used in first line in 45.9% (2005), 70.8% (2006) and 72.7% (2007). In early stage disease, the taxanes was used in 17.4% of patients in 2005, 50% in 2006 and 53.8% in 2007. In metastatic breast cancer the most used regimens are Docetaxel, Gemcitabine + Vinorelbine, Capecitabine, Doxorubicin Liposomal and Trastuzumab + Paclitaxel. In relation to endocrine therapy, tamoxifen was used in 34.4%, letrozol in 19.8% and 18.7% of patients change the hormonal agent prescription. The therapy with filgrastim was used in 47.9% of patients and 6.8% received darbepoetin. The patients with filgrastim prescription 51.1% received FEC scheme. The mean of units used was higher in TAC scheme (Docetaxel, Doxorubicin, Cyclophosphamide) 23.14 ± 9.15 units.
Conclusions: The therapeutic options for patients with breast cancer are complex and varied. The use of taxanes-containing regimens in first line decrease in 2006 and increasing the use in early stage disease. In literature taxanes are not recommended as an option for the treatment of early breast cancer. The increasing use of taxanes treatment will potentially alter treatment strategies of patients with metastatic breast cancer. The state-of-the-art treatment of metastatic breast cancer depending on disease-associated and biological variables.

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Keywords: Breast cancer, Chemotherapy, Analysis

PT-143 Dose efficiency observed with darbepoetin alfa in renal patients previously treated with epoetin: a meta-analysis

X Bonafont[1], M Iskedjian[2], M Machado[2], R Aziziyeh[2], T Einarson[3], S Robbins[4], B Molemans[5], B Dehmel[5]

[1]Pharmacy, Hospital Universitari Germans Trias Pujol, Badalona, Spain, [2], PharmIdeas, Oakville, [3]Leslie Dan Faculty of Pharmacy, University of Toronto, Toronto, Canada, [4]Health Economics, [5]Medical Affairs, Amgen Europe GmbH, Zug, Switzerland

Background and Objective: Anemia is a common complication in patients with chronic kidney disease undergoing dialysis. Erythropoeisis stimulating agents (ESAs) such as epoetins alfa and beta (rHuEPO) and darbepoetin alfa (Aranesp®; DA) are effective treatments of anemia. DA is a longer-acting ESA that can be administered less frequently. Previous studies have suggested that when patients are converted from rHuEPO to DA using an initial rHuEPO:DA conversion ratio of 200:1 (Aranesp® EU label), the DA dose can be reduced while maintaining Hb levels. In this study, we estimated the relative doses of DA required to maintain comparable Hb levels in dialysis patients switched from rHuEPO.
Design: Medline (1956–2007) and Embase (1980–2007) were systematically reviewed to retrieve prospective trials describing ESA doses in dialysis pts who converted from rHuEPO to DA. Search words included: "epoetin, darbepoetin, ESRD, CKD, and dialysis." The inclusion criteria required a study to have dose data available during the evaluation period for both rHuEPO and DA. Study selection and data extraction were performed by 2 independent reviewers and verified by a 3rd. Relative doses and dose changes after conversion from rHuEPO to DA were estimated using an initial rHuEPO:DA 200:1 conversion ratio (Aranesp® EU label). Study quality assessment was performed using the Downs-Black checklist, a standard method used to assess the quality of a study using EBM principles.
Setting: Meta-analysis.
Main Outcome Measures: Dose efficiency.
Results: The search yielded 34 studies meeting the inclusion criteria. Upon further review, 19 studies were excluded (14 had unextractable data, 3 were retrospective analyses, and 2 had predialysis pts). The remaining 15 studies were analyzed: 3 RCTs with parallel control groups, 3 cross-over trials, and 9 observational conversion studies (table). The studies yielded data on 3,380 rHuEPO and 3,164 DA pts, with a mean treatment duration being 21 weeks. We found the average study quality was 70%, with RCTs (n = 663) having a higher quality score (87%) than crossover (72%; n = 497) or observational (66%; n = 5384) studies. There was a notable dose efficiency observed when pts were converted to DA from rHuEPO. This effect was greater in the RCTs (27.5%) than in crossover (19.1%) or observational (12.1%) studies.
Conclusions: We found a notable DA dose efficiency (up to 27%) in pts who were converted from rHuEPO to DA using a 200:1 conversion ratio. Additionally, studies with the highest quality scores (eg RCTs) had the greatest observed dose efficiency while non controlled studies scored lowest in both quality and dose efficiency.
Keywords: Darbepoetin, Epoetin, Dose efficiency

PT-150 An evaluation of systemic and topical treatments of otitis media: a hospital study in Turkey

Mert Eken[1], **Betul Okuyan**[1], Mesut Sancar[1], Mehmet Eken[2], Fikret Vehbi Izzettin[1]

[1]Clinical Pharmacy Department, Marmara University – Faculty of Pharmacy, [2]2nd ENT, Kartal Training and Research Hospital, Istanbul, Turkey

Background and Objective: The purpose of this study is to evaluate the frequency of otitis media and the assessment of its relationship to patients' socio-demographic characteristics and determination of systemic and topical drug profiles in otitis media.
Design: This retrospective study included the assessment of patients diagnosed with otitis media, who admitted to the study hospital during a 3 months period (March–May 2006). Demographic, clinical and prescription data of these patients were collected and analyzed.
Setting: The ear-nose-throat out-patient clinic of a states hospital.
Main Outcome Measures: The socio-demographic data of patients; the frequency of otitis media; type and percentage of prescribed drugs; the most used treatment regimens.
Results: 216 patients (122 women and 94 men), who were diagnosed with otitis media, were included in our study. Patients were diagnosed as chronic otitis media or serous otitis media or acute otitis media or external otitis media at rates of 37.5%, 30.5%, 20.4%, and 11.6%; respectively.

In children, the acute and serous otitis media were seen more often than in adults ($p < 0.05$). However, chronic otitis media were seen

more frequently in adults ($p < 0.05$). All patients were administered drug therapy for their diseases.

It was observed that antibiotics (oral and/or topical), analgesics, decongestants, and topical corticosteroids were prescribed at rates of 99.1%, 88.0%, 76.8%, and 7.4%; respectively. Prescribed oral antibiotics were cephalosporins [cefixime (17.6%), cefuroxime axetil (15.6%) and cefaclor (8.3%)], amoxicillin-clavulanate, and floroquinolones [levofloxacin (10.7%) and ciprofloxacin (9.8%)] at rates of 41.5%, 38%, and 20.5% respectively. Rifampin and ciprofloxacin were prescribed as topical antibiotics at rates of 87.5%, 12.5% respectively. When the number of drug used by the patients was evaluated, 38 were on quadri-therapy, 126 on tri-therapy, 46 on dual-therapy and 6 on mono-therapy. 89 patients were treated with the combination of antibiotic-analgesic-decongestants.

Conclusions: Our study indicated that the most frequently prescribed drugs were antibiotics in otitis media. Clinical pharmacists have a potential role in rational antibiotic use by providing clinical pharmacy services such as antibiotic selection, drug monitoring and patient education; so that they would reduce both antibiotic resistance and treatment costs.

PT-152 Antineoplastic chemotherapies monitoring: sampling method optimization

Christophe Bazin[1], Bruno Cassard[1], Marie-Christine Gerain[1], Isabelle Frazier[1], Brigitte Bonan[1], Patrice Prognon[1], Laurent Havard[1]

[1]Pharmacy, Hôpital Européen Georges Pompidou, Paris Cedex, France

Background and Objective: The sampling method is crucial for the physical and chemical quality control of antineoplastic chemotherapies. This step acts upon the dosage correctness and may lead to risk of needle-stick or cytotoxic drug projection during its achievement. Beyond, the sampling time must be as short as possible and the sample be directly placed on the analysis machine. This work evaluates a new and improved sampling method, specially worked out for this application.

Design: This study was designed to ensure the vial airtightness and the volume sampling. A cost and time study was also performed.

Setting: The vial is an HPLC type, Chromacol® 2 mL, 12 × 32 mm DP = 500 hPa, (Interchim®, Montluçon, 03). The vial is airtight thanks to a PTFE silicon septum set with an aluminium collar. The vials are vacuum-packed in a PVC bag (DIDOP®, Compiègne, 60). A void test was led on unpacked vials up to 3 months, to ensure a maximum conservation, and showed a filling volume of 448 ± 90 µL, very close of the 500 µL target.

Main Outcome Measures: One week samples have been weighed to calculate the filling volume in real conditions of use. This volume is 747 ± 17 µL ranging from 220 to 1130 µL. Since this sampling method has been set up, the percentage of refusal for insufficient volume is lower than 0.1%. This technique was compared to the previous method in terms of cost: vial, sampling adjuncts, handling-time and waste. The vials are filled with a secured double-needle Eclipse®, 32 mm, 7/10 (Becton-Dickinson®, Le-Pont-de-Claix, 38).

Results: About 10,000 chemotherapies controls are made each year in the hospital. The vial and the sampling device costs are higher than the previous (1 € versus 0.25 €, and 0.29 € versus 0.05 €). On the contrary, the handling-time for sampling was estimated 1 minute lower (which corresponds to 0.388 € less per sample). Furthermore, the waste weight is 1 gram lighter with the new devices, which costs 0.003 € less in the waste disposal. The total cost difference is 0.60 € higher per sample. An estimation of a needle-stick accident has been carried out, with the human cost (pharmacist technician's compensation and medical consulting) and the equipment including gloves, sterilization devices and post-sterilization check; the lowest estimation cost of an accident is 274.58 €.

Conclusions: The secured needle makes the sampling operation easier for the workers and it lowers the risk of needle-stick. Besides, this closed system avoids completely the antineoplastic contact for the manipulators during the confection and the control. Moreover, this system allows to secure the sample library.

Keywords: Chemotherapy, Monitoring, Sampling, Quality control

PT-158 Audit of cardiovascular risk management in diabetic outpatients in Kuwait

Phillip Capps[1], Ahmed S. Abdelmoneim[1]

[1]Faculty of Pharmacy, Kuwait University, Jabriya, Kuwait

Background and Objective: The prevalence of diabetes mellitus in Kuwait ranks amongst the highest in world at about 15%. Diabetes is a well recognized independent risk factor for cardiovascular disease (CVD). The increased prevalence of several other known risk factors for CVD in Kuwaiti diabetics further increases the risk. Since CVD is the leading cause of death in Kuwait, the high incidence of diabetes has major social and economic impact. Diabetics aged 40 years or older have, in general, an increased 10-year risk of developing CVD compared to younger patients but there have been no audits involving this group of patients in Kuwait. The objective of this study was therefore to audit achievement of CVD risk factor goals according to JBS2 guidelines (1).

Design: Retrospective audit of patient medical notes.

Setting: Patients aged 40 years or older scheduled to attend the diabetic outpatient clinic at a major hospital in Kuwait during the period September 2006 to March 2007 were included in the study.

Main Outcome Measures: Percentage of patients achieving optimum and minimum audit standards for serum total cholesterol, LDL-C, glycosylated haemoglobin (HbA1C), BP and take up of aspirin.

Results: Out of the 201 patients included in the study, 51.2% were men, 92% were Kuwaiti nationals, mean age was 58.13 years (SD ± 9.795; median = 57), 89.5% had type 2 diabetes and 39.8% were obese (≥30 Kg/m2). Clinical CHD, CVD and PVD were present in 24.9% (n = 50), 1.5% (n = 3) and 3% (n = 6), respectively.

Hypertension was diagnosed in 133 patients. Of these, only 28.6% (n = 38) had achieved the optimum treatment standard of <130/80 and 95.5% (n = 127) of patients were receiving at least one antihypertensive. Values for total cholesterol and LDL-C were documented for 153 and 157 patients, respectively. Of these, optimum treatment standards for total cholesterol (<4 mmol/L) and LDL-C (<2 mmol/L) were achieved by 34.6% (n = 53) and 23.6% (n = 37), respectively. Patients within the minimum audit goal for total cholesterol (<5 mmol/L) and LDL-C (<3 mmol/L) were 74.5% (n = 114) and 65.6% (n = 103), respectively.

HbA1C values were documented for 185 patients. Of these, the optimum treatment standard (HbA1C 6.5% or less) and minimum audit goal (HbA1C 7.5% or less) was met by 9.7% (n = 18) and 33.5% (n = 62), respectively. Male patients were significantly more likely than females ($P < 0.05$) to be within the minimum audit goal for HbA1C. Patients meeting this standard were also more likely to meet the minimum audit goal for cholesterol (<5 mmol/L). 111 of 177 patients who fulfilled the JBS2 criteria for antiplatelet therapy were receiving aspirin. One patient was taking clopidogrel.

Conclusions: Although achievement of key treatment goals compares favourably with studies from other countries, a high percentage of patients still did not achieve optimum goals for BP, cholesterol and glycaemic control. Documentation for some parameters could be improved.

Reference

JBS2: Joint British Societies' guidelines on prevention of cardiovascular disease in clinical practice. Heart 2005;91(suppl_5): v1–v52

Keywords: Audit, Diabetes, CVD

PT-180 Pediatric use of infliximab: retrospective study

Vanida Brunie[1], Sandrine Roy[2], Ariane Blanc[1], Francoise Brion[1], Olivier Bourdon[1]

[1]Pharmacy, Robert DEBRE, [2]Pharmacy, AP-HP – Robert DEBRE, Paris, France

Background and Objective: In June 2007, the use of infliximab has been approved by EMEA for the treatment of severe active Crohn's disease in pediatric patients aged 6 to 17 years old, who have not responded to conventional therapy (corticosteroid, immunomodulator and nutrition therapy). However, pediatricians were already using infliximab for patients with inflammatory bowel syndrome (IBD) such as Crohn's disease (CD), ulcerative colitis (UC) and indeterminate colitis (IC). The goal of the study was to analyze infliximab prescriptions for children and to evaluate changes in prescriptions of corticosteroid due to the introduction of infliximab.
Design: Retrospective study in 33 IBD patients in a pediatric teaching hospital.
Setting: Gastroenterology unit and pharmacy department.
Main Outcome Measures: Indications, infliximab dosage, anterior treatments, reason of therapeutic change (non-tolerance or inefficiency of anterior treatment and/or cortico-dependance), evolution of corticosteroid dosage 3 and 6 months after the introduction of infliximab.
Results: Thirty-three children were treated by infliximab: 20 CD, 3 UC and 10 IC. Age for diagnosis was an average of 11 years old (5.2–16.5) and 13.5 years old (7–17) for the beginning of infliximab. Previous treatment to infliximab was immunomodulators, single therapy for 31 patients (azathioprine n = 23, mercaptopurine n = 3, methotrexate n = 5) or dual therapy (n = 2 azathioprine + methotrexate), with corticosteroids (n = 32) and/or mesalazine (n = 6). Various etiologies justified infliximab administration: corticodependance (n = 31), corticoresistance (n = 1), non compliance to corticotherapy (n = 1), insufficient efficacy of previous treatment (n = 23), non tolerance to previous treatment (n = 2). At the beginning, dosage of infliximab was 5 mg/kg. Dosages were increased (10 mg/kg) for 6 patients due to insufficient clinical results. One patient also had to be switched for adalimumab because he developed human antichimeric antibody (HACA). Among corticodependant patients (31), corticosteroids have been stopped after 3 or 6 months, 9 (29%) and 19 patients (61%) respectively. For 12 patients, corticosteroids were continued without reduction of dosages, six months after the introduction of infliximab.
Conclusions: Infliximab is the only therapeutic alternative for children who are non tolerant or non respondent to conventional treatment. Moreover, this treatment permits the use of decreased dosage of corticosteroids, limiting their side effects, especially on children growth. However, HACA occurrence could limit its use in a long-term disease.
Keywords: Infliximab, Inflammatory bowel syndrome, Pediatrics

PT-187 An assessment of professional practices about antifungal agents prescriptions in the department of conventional hematology at Nantes University Hospital

Véronique Sylvestre-Baron[1], Bénédicte B. B. Bernadac[1], Sylvie S. J. Jaccard[1], Laurent L. F. Flet[1], Philippe P. M. Moreau[2], Patrick P. T. Thomare[1]

[1]Hôtel Dieu Pharmacy, [2]Conventional Hematology, Nantes University Hospital, Nantes, France

Background and Objective: Invasive fungal infections represent a major threat for patients with haematological malignancies, with an important rate of morbidity and mortality. New triazole antifungal agents have recently been introduced to treat them but some resistances emerge. The aim of this study was to assess professional practices about antifungal drugs prescriptions according to Hematology Department guidelines and French recommendations.
Design: Three-month period (2006) retrospective observational cohort study including all patients treated with an antifungal agent.
Setting: Conventional Hematology Department, Nantes University Hospital.
Main Outcome Measures: Data were collected on patient medical files: pathology, antifungal treatments, dosage, treatment length, nephrotoxic associated drugs, clinical and biological parameters as weight, creatininemy, previous fungal infections, previous treatments with triazole antifungal drugs.
Results: Fifty-three patients (29 men and 24 women) received antifungal drugs (mean age: 53 years [22–68]) for 11.6 +/– 9.5 days. A hundred and four prescriptions were studied. Five patients died during this period (two deaths because of a Fusarium sp. and Aspergillus sp. septicaemia).

Chemotherapy indication was autologous Bone Marrow Transplant (BMT) (54%), leukaemia chemotherapy induction or consolidation (15%), leukaemia intensive chemotherapy (21%), myeloblastic allogeneic BMT (2%) and mini allogeneic BMT (8%).

Treatments were prophylactic (60%), empirical (13%) or curative (15% for Aspergillus sp but no for Candida sp infections); 8% of the prescriptions related to local candidosis and 4% remained unknown.

Although 66% of prescriptions were in accordance with internal guidelines concerned antifungal drug indication, 26% had wrong dosages e.g. no loading dose for voriconazole. Moreover, only 22% of the prescriptions were in accordance with French recommendations: neither voriconazole is approved in prophylaxis of aspergillosis in patients with autologous BMT nor antifungal drugs associations (ten prescriptions). Nevertheless, it may be a good way of medical management as hopeful patients outcomes have been obtained.
Conclusions: Hematology Department guidelines should be reviewed in accordance with French recommendations, department's ecology and the state-of-the-art about treatment of fungal infections in patients with haematological malignancies. The accordance to further recommendations should be regularly assessed as well as resistance emergence.

Reference

French guidelines for assumption of responsibility of Candida sp. and Aspergillus sp. invasive infections. French Society of Anesthesia and Reanimation, French Society of Infectious Pathology and French Society of Reanimation. May 2004

Keywords: Assessment, Antifungal agents, Hematology

PT-188 Pharmacotherapy of first-episode psychosis in the psychiatry clinics of the North Estonia Regional Hospital (NERH) and the Tartu University Hospital (TUH)

Jana Lass[1], Agnes Männik[2], Simon J. Bell[3]

[1]Pharmacy Department, North Estonia Regional Hospital, Tallinn, [2]Institute of Pharmacy, University of Tartu, Tartu, Estonia, [3]Faculty of Pharmacy, University of Helsinki, Helsinki, Finland

Background and Objective: Treatment guidelines provide recommendations for the evidence-based treatment of schizophrenia. Adherence to these guidelines is often sub-optimal. Our aim was to compare and contrast the pharmacotherapy of first-episode psychosis at the NERH and TUHs, with respect to both treatment location and evidence-based guidelines.
Design: Retrospective study. Case notes for consecutive patients with schizophrenia, schizotypal or delusional disorders (ICD-10) admitted to the NERH and TUH between September 2005 and September 2006 were retrospectively reviewed.
Setting: Psychiatry clinics of two tertiary care hospitals – NERH and TUH.
Main Outcome Measures: Outcome measures included the choice and daily dose of antipsychotics, incidence of antipsychotic polypharmacy and reasons for changes in therapy plan.
Results: 113 patients form NERH and 29 from TUH were included in the final analyses. Median age (SD) of the patients was 35(13.8) in the NERH and 39(15.2) in the TUH Patients were hospitalised for longer in the NERH than in the TUH, 31 (17.4) vs. 23(17.2). The most frequently prescribed antipsychotic was risperidone at both study locations – 37% of prescriptions in the NERH and 57% in the TUH. Conventional antipsychotics were administered twice often in the NERH than in the TUH. In the TUH olanzapine was administered in higher prescribed daily doses than in the NERH. The number of antipsychotics prescribed per patient was higher in the NERH than in the TUH −1.7 vs 1.3. The prevalence of antipsychotic polypharmacy was 13.3% among the patients in the NERH, whereas only one patient was treated with antipsychotic polypharmacy in the TUH.
Conclusions: Analyses revealed significant differences in the pharmacotherapy of first episode psychosis at the NERH and the TUH. Mechanisms to facilitate improved adherence to the evidence-based treatment guidelines should be investigated.

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Keywords: Pharmacotherapy, Mental health

PT-195 Assessment of rituximab use in refractory autoimmune cytopenia

Marisol Ucha[1], Inés Castro[1], M. Teresa Inaraja[1], Manuel Lite[2], **Amelia Troncoso**[1], Ramón Cuíña[1]

[1]Pharmacy Department, [2]Haematology Department, Meixoeiro Hospital, Vigo, Spain

Background and Objective: To evaluate the efficacy and safety of rituximab (RTX) for the treatment of refractory autoimmune cytopenia, including autoimmune hemolytic anemia (AHA) and immune-mediated thrombocytopenia (idiopathic thrombocytopenic purpura ITP and thrombotic thrombocytopenic purpura TTP)
Design: Descriptive, retrospective study based on rituximab prescriptions analysis. Patients were identified through medical reports delivered by compassionate use program. Data collection was made through the pharmaco-therapeutic profile and medical chart review
Setting: General Teaching Hospital (420 beds)
Main Outcome Measures: Patients who received any course of RTX for refractory immune cytopenia from January 2004 to May 2007 were evaluated. Data recorded included patients details, diagnosis, previous treatment, RTX schedule, number of courses and baseline hemoglobin (Hb) and platelet count (PQ) values. Effectiveness and tolerance were also considered. Response was evaluated according to criteria found in the literature: clinical symptoms resolution and a normal PQ count of 100.000/mm^3 for ITP/TTP or an Hb level >10 g/dL achieved and maintained for at least 3 months for AHA. Additional response criteria for AHA was an Hb increase >1.5 g/dL 1 month after the last dose of RTX.
Results: 11 patients (4 men), 54 doses RTX; average age 65 years (range 31–85). Diagnosis: AHA 7 (2 cases cold agglutinin disease), 3 ITP and 1 TTP. In 3 patients cytopenia (AHA) was associated with chronic lymphocytic leukemia. All patients had been previously treated with steroids and 8 had received 2 or more other treatment modalities (4 splenectomy, 7 immunosupressive agents, 7 intravenous immunoglobulin). Patients received 4–6 RTX infusions at a standard dose of 375 mg/m^2 once per week, in combination with steroids therapy in 10 cases. No serious infusion-related effects occurred, but 2 patients reported hematologic toxicity (fever and infection). All patients with AHA (7/7) and 2 patients with ITP (2/3) responded to the first course of RTX. One patient AHA had relapse after 29 months and responded to retreatment. ITP responders achieved durable response (16 and 3 months) and were offered second course of RTX after relapse (1 patients did not respond to retreatment). After 28 months follow-up, patient with TTP remained with acceptable PQ counts. Hb levels increased by a median of 3.5 g/dL (range 2–7,6) among the AHA responders. ITP + TTP responders achieved a median increase in PQ count of 172.500/mm^3 (range 67–188). Only responders who reached a 3 months follow-up were considered for response duration assessment: 5 AHA, 1 TTP, 3 ITP (1 retreatment). Median response duration was 17 months (range 4–29) for AHA and 16 months (range 3–31) for ITP + TTP
Conclusions: Most of the literature findings for RTX in this setting were related to small series or isolated case descriptions. Despite the common limitation of the number of patients, our results showed that RTX appears to be a promising agent for the treatment of refractory autoimmune cytopenia.

Keywords: Rituximab, Autoimmune hemolytic anemia, Immune-mediated thrombocytopenia

PT-200 Is aprepitant useful in high dose chemotherapy regimen in hematology?

Marion Lafaurie[1], Clément Hubert[1], Carole Fontenoy[1], Muriel Menanteau[1], Philippe Moreau[2], Patrick Thomaré[1]

[1]Unité de Pharmacie Clinique Oncologique, [2]Hématologie clinique, CHU Hotel Dieu, NANTES, France

Background and Objective: Chemotherapy-induced vomiting (emesis) can significantly affect patient's quality of life, leading to poor adherence with further chemotherapy treatment. 2006 ASCO's guidelines recommend the use of aprepitant associated with ondansetron and corticosteroid for emesis induced by high-dose chemotherapy regimen including cisplatin. The main purpose of this study is to determine if this antiemetic strategy could be effective on acute and delayed emesis in patients undergoing a high dose chemotherapy regimen in hematology.
Design: Prospective study among 30 patients receiving: melphalan 200 mg/m^2 or BEAM (carmustine 300 mg/m^2, etoposide 200 mg/m^2

for 4 days, cytarabine 400 mg/m^2 for 4 days, and melphalan 140 mg/m^2) both highly emetic chemotherapy.
Design of a scale to score personal risks factors (6 to 7: standard risk, 8 to 13: high risk)

Design of a therapeutic scheme following 2006 ASCO's guidelines, as follow.

Day 1: Aprepitant 125 mg per os 1 h before chemotherapy
Ondansetron 8 mg IV 30 min before chemotherapy
Methylprednisolone (MP) 90 mg IV 30 min before chemotherapy
Days 2 and 3: Aprepitant per os 80 mg
Methylprednisolone per os 12 mg b.i.d.

For the BEAM strategy, this treatment is given on day 1 (carmustine) and on day 6 (melphalan).

The course of corticosteroid was reduced on purpose for, in hematology, patients have previously received large doses of corticosteroids.
Setting: Hematology ward in Nantes teaching hospital.
Main Outcome Measures: Strategy was considered efficient if no vomiting or emesis grade 1 or 2 occurred, according to the Common Terminology Criteria for Adverse Events v.3.0 of the National Cancer Institute (USA) from day 1 to day 5.
Results: Primary results are promising. Of 22 patients (12 scored high risk, 6 standard risk), 13 followed BEAM course, 9 melphalan high dose. No acute emesis occurred. Only one patient (scored 10) vomited on days 2 and 3 after MP tablets were given (midday).
Even if our study does not focus on nausea, we notice that eleven patients required additional treatment (metoclopramide 10 mg up to t.i.d) to control delayed nausea from day 2 of aprepitant course.
Conclusions: The association of aprepitant, ondansetron and methylprednisolone seems to be efficient in preventing high-dose chemotherapy-induced emesis (acute and delayed) used in hematology as well as in oncology.

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Keywords: Aprepitant, Emesis, Hematology

PT-201 Use of anti-TNF-alfa in rheumatoid arthritis

Maria Del Pilar Vicente-Sanchez[1], Carolina Aurora Apezteguía-Fernández[1], Nuria Ibañez-Heras[1], Noelia Garrido-Peño[1], Marta Arteta-Jimenez[1]

[1]Pharmacy, Hospital Universitario de Getafe, Getafe, Spain

Background and Objective: To analyze the use of TNF-alfa inhibitors in rheumatoid arthritis diagnosed patients in a 600 bed hospital.
Design: Retrospective study of patients with anti-TNF-alfa during year 2006. The following data were compiled: age, sex and anti-TNF-alfa prescription including dosage and duration of treatment.
Setting: Hospital Universitario de Getafe.
Main Outcome Measures: Dosage and duration of treatment.
Results: A total of 69 patients were included. 51 patients (73.91%) received just one anti-TNF-alfa drug, 17 (24.64%) needed two lines of treatment and 1 (1.45%) of them needed three.
Patients who were treated with just one drug had a median age of 46.5 years and those who required two lines of treatment had a median of 55.5 years.

The first line drug was etanercept in 37.68%, infliximab in 31.19% and adalimumab in 30.43% of patients. Second option was etanercept in 37.68%, adalimumab in 31.88% and infliximab in 30.43% of patients.

The average duration of treatment with etanercept as forward edge was 463 days. The treatment was suspended in 42.31% of patients.

When infliximab was used as first line, average duration was 578 days, and treatment was interrupted in 22.7%. With adalimumab, average duration was 435 days and treatment was interrupted in 33% of patients.
Conclusions: Those of our patients who need an only one treatment line are younger than those who need 2 or 3, due to the chronic and progressive course of the disease. Etanercept is used as much in first option (followed by infliximab) as in second one (followed of adalimumab), although these differences are not statistically significant and it would be necessary to make a study including more patients.

The duration of treatment with infliximab is the longest, as this was the first drug available. Regarding treatment failure, etanercept shows the greatest percentage. This should be taken into account when establishing first line treatment.

PT-217 Topical cidofovir for the treatment of plantar warts: case report

Amelia Troncoso[1], Ramon Cuiña[1], Juliana Alvarez[1], Cristina Vazquez[1], Maria Teresa Inaraja[1], Francisco Allegue[2]

[1]Pharmacy, Hospital Meixoerio, [2]Dermatology, Hospital Meixoeiro, Vigo, Spain

Background and Objective: Plantar warts are hyperkeratotic lesions on the plantar surface caused by infection with Human papillomavirus. Lesions caused by warts are commonly refractory to therapy and may become large and painful in immunodeficient patients. Cidofovir is a cytidine analogue with activity against a broad spectrum of DNA viruses. It is indicated for the treatment of cytomegalovirus retinitis in patients with acquired immunodeficiency syndrome and without renal dysfunction.

We describe a case of plantar warts that was treated with topical cidofovir in a highly immunodeficient patient.
Design: Case report, evaluation and discussion based in clinical chart and literature review.
Setting: Pharmacy department, General Teaching Hospital.
Main Outcome Measures
Plantar warts regression, which was evaluated on the basis of change in overall surface area of the treated lesions compared with baseline.

To evaluate the organoleptics properties of the galenic formulation.
Results: A 29 years old woman, who received kidney transplant in 1996, presenting plantar warts refractory to conventional therapy since last four years. She was treated with topical 3% cidofovir cream twice daily. The treatment was authorised as compassionate use by the national regulatory agency on drugs. The glomerular filtration rate (GFR) was monitored in order to detect nephrotoxicity due to cidofovir.
The 3% cidofovir ointment was compounded as follows:

- Cidofovir 75 mg/ml 5 ml vial …….. 20 ml
- Anhydrous Lanolin …….. 5 g
- Beeler base …..sufficient to produce 50 g

It was packaged and labelled in a light-resistant containers and we assumed an expiration date of 3 months based on the duration of treatment and published studies. The quality controls of organoléptics properties were made according to the Good Manufacturing Practice (GMP)

After 10 weeks of therapy the patient did not show any improvement and developed severe local erosion, so treatment with cidofovir was withdrawn. Two weeks later this local erosion disappeared spontaneously. No systemic side effects were observed.

The colour, texture and smell organoleptics characters were complied with GMPs.

Conclusions: There are not formal studies of optimal formulations or treatment regimens and further studies are needed to elucidate the role of cidofovir in treatment of plantar warts. The immunodeficiency of the patient and the large wart area could be related with the failure to the treatment.

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PT-227 Safety of platinum salts skin testing

Julie Fillon[1], Francoise Baud[1], Berangere Belmonte[1], Annie Becker[1], Francisque Leynadier[2], Isabelle Debrix[1]

[1]Pharmacy Department, [2]Allergology Department, Hopital Tenon, Paris, France

Background and Objective: Hypersensitivity reactions (HR) to platinum salts can be serious and should lead to interrupt chemotherapy regimen. Skin tests may be used to confirm diagnosis of HR. Usually, these tests are prick tests and intradermal tests performed with diluted solutions of platinum salts. There is no standard solutions for these drugs, which local toxicity depends on concentration.

The main objective of this study was to assess the safety of platinum salts skin tests performed in our hospital.

The secondary objective was to assess their efficacy to verify the allergic nature of the reactions observed.

Design: Pilot study of skin tests preparations between January 2004 and June 2007.

These preparations were dilutions (1/10, 1/100, 1/1000) of a primary platinum salt solution, which concentration was roughly the one used in the chemotherapy regimen of most patients. The compatibility of platinum salts with dilution solvent was checked, and all solutions were prepared extemporaneously in a centralised cytotoxic drug preparation unit, in order to protect handlers.

Setting: Allergology department and pharmacy department in a university Hospital.

Main Outcome Measures: Skin tests results: positive if a papule appeared, negative if there was no reaction, local toxicity if an irritative reaction happened.

Results: 11 patients with clinical symptoms of HR with a chemotherapy regimen containing platinum salts were explored by skin tests.

Drugs assessed were: oxaliplatin (9 patients), cisplatin (4), and carboplatin (1).

No patient developed local toxicity.

Tests results were positive in 5 cases (4 oxaliplatin and 1 cisplatin), and negative in 6 cases.

3 patients received both cisplatin and oxaliplatin skin tests: 2 patients had a single positive reaction with no cross reaction between the two drugs, and the third had no reaction.

In 4 cases, tests results and clinical history of hypersensitivity mismatched.

Conclusions: This study shows that these skin test solutions were safe. Their efficacy was judged correct: 5 positive reactions confirmed the diagnosis of hypersensibility for 5 patients. The main limit of the results is the absence of control subjects. These tests allowed to explore 11 patients' HR, and to help oncologists to choose the more appropriate treatment for them. Stability studies are still needed to assess the pharmaceutical quality of these diluted solutions. These preparations have now been standardized in our hospital.

Keywords: Platinum salts, Hypersensitivity reaction, Skin tests

PT-237 Measuring compliance with antibiotic prophylaxis guidelines at a Belgian university hospital

Lien Huenaerts[1], Steven Simoens[1], Bart Meyns[2], Freddy Penninckx[3], **Ludo Willems**[4]

[1]Research Centre for Pharmaceutical Care and Pharmaco-economics, Katholieke Universiteit Leuven, [2]Division of Cardiac Surgery, [3]Division of Abdominal Surgery, [4]Hospital Pharmacy, University Hospitals Leuven, Leuven, Belgium

Background and Objective: Guidelines regarding appropriate use of prophylactic antibiotics have been implemented at University Hospitals Leuven. However, the degree of compliance with these guidelines is unknown. The aim of this study is to develop a method to quantify compliance with antibiotic prophylaxis guidelines and to apply this method to the clinical areas of appendectomy and heart valve surgery.

Design: A retrospective case series was carried out of all prophylaxis episodes related to appendectomy and heart valve surgery at University Hospitals Leuven between August 2001 and February 2007.

Four grades of compliance with antibiotic prophylaxis guidelines were identified: grade 1 compliance, reflecting administration of the antibiotic proposed by the guidelines in a dosage within 80–120% of the recommended dosage; grade 2 compliance, defined as the administration of the antibiotic proposed by the guidelines in a dosage outside 80–120% of the recommended dosage; grade 3 compliance, referring to the administration of an antibiotic equivalent to the antibiotic proposed, but not mentioned by the guidelines; and grade 4 compliance, representing any other antibiotic prophylaxis scheme.

Setting: Divisions of Abdominal and Cardiac Surgery, University Hospitals Leuven.

Main Outcome Measures: The percentage of prophylaxis episodes that satisfy each grade of compliance with antibiotic guidelines.

Results: Prophylaxis guidelines relating to appendectomy (1,191 episodes) recommend administration of three times cefazolin 2 g and a single dose of metronidazol 1.5 g. The proportion of episodes that satisfied grade 1, 2, 3 and 4 of compliance with guidelines amounted to 5%, 58%, 6%, and 30%, respectively. Cefazolin 2 g and metronidazol 1.5 g was used in 257 episodes.

Prophylaxis guidelines applying to heart valve surgery (2,182 episodes) recommend administration of cefazolin 14 g. The proportion of episodes that satisfied grade 1, 2 and 4 of compliance amounted to 68%, 31% and 1%, respectively. Grade 3 does not apply to heart valve surgery as no equivalent antibiotics were identified.

The difference in compliance with prophylaxis guidelines between both surgical procedures could be explained by differences in infectious pathology, the peri-operative adaptation of the antibiotic regimen by the abdominal surgeon, and the use of a second regimen related to the severity of the appendicitis. A case can be made for combining grade 1–3 compliance with respect to appendectomy, resulting in a higher compliance rate.

Conclusions: Our proposed method to measure compliance needs to be validated by future research. The method can be applied to different surgical procedures, thereby stimulating surgeons to explain differences in compliance between procedures and promoting the development of instruments to enhance compliance. Closer interaction with surgeons is required to further develop the measurement of compliance with antibiotic prophylaxis.

Keywords: Antibiotic prophylaxis, Compliance, Guidelines

PT-240 Non-specific immunoglobulins for immune neonatal thrombopenia

Nuria Ibañez[1], Maria del Pilar M. P. Bautista[1], Ana Maria A. M. Iglesias[1], Roberto R. Ortiz[2], Javier J. Sanchez-Rubio[1], Maria del Carmen M. C. Giron[1], Marta M. Arteta[1]

[1]Pharmacy, [2]Pediatry, Hospital Universitario de Getafe, Madrid, Spain

Background and Objective: Non-specific human immunoglobulins are being used at the moment in neonatal population for treatment of immune thrombopenia. The dosis commonly used varies between 400 mg/kg and 1 g/kg from one to five days. Corticoids and platelet transfusions can be used jointly.
To study the effectiveness and safety of non-specific human immunoglobulins in a neonatal unit for treatment of immune thrombopenia.
Design: Retrospective study of neonatal patients diagnosed with immune thrombopenia during 2006 and treated with non-specific human immunoglobulins. A revision of clinical histories is made and following data are collected: sex, gestational age, born weight, age at the moment of infusion, administered dose and duration of treatment, use of corticoids and platelet transfusions, number of platelets/μL before infusion, at 24, at 48 hours of initiate the treatment and at discharge. Possible adverse reactions is also considered.
Setting: Hospital Universitario de Getafe.
Main Outcome Measures: The effectiveness and safety of non-specific human immunoglobulins for treatment of immune neonatal thrombopenia.
Results: Three children were included in the study, two of them were males. Thrombopenia was diagnosed from probable alloimmune origin, including positive confirmation study in one of the cases. Gestational ages ranged from 38 + 2 to 39 + 1 weeks. Born weight ranged between 1.850 kg and 2.720 kg. Immunoglobulin treatment was initiated between first and sixth day of life. Administered dose varies between 400 mg/kg/day and 1 g/kg/day from two to five days. All children needed platelet transfusions, while only one of them was treated with corticoids. The number of platelets/μL before infusion of immunoglobulins, at 24 hours, at 48 hours and at discharge was: children 1: 41,000, 23,000, 81,000 and 116,000 platelets/μL. Children 2: 34,000, 22,000, 18,000 and 303,000. Children 3: 19,000 and 25,000 platelets/μL 24 hours after initiation of treatment, there were no analytical data at 48 hours, but number of platelets at discharge was 355,000. No adverse effects were observed in any children.
Conclusions: Although eventually the three children recovered the number of platelets, it can not be concluded that this was due to immunoglobulin treatment, because it is overlapped with administration of platelet transfusions and corticoids. A higher number of patients is required
to evaluate efficacy and safety of non-specific human immunoglobulins in treatment of neonatal thrombopenia.
Keywords: Immunoglobulins, Thrombopenia, Neonatal

PT-262 Sildenafil use evaluation for pulmonary hypertension in paediatric patients

Begona Feal Cortizas[1], Luis Margusino Framinan[1], Marta Calvin Lamas[1], Ines Raposo Sonnefeld[2], Isabel Martin Herranz[1]

[1]Pharmacy Department, [2]Paediatric Cardiology Unit, Juan Canalejo Hospital, La Coruna, Spain

Background and Objective: Pulmonary hypertension (PH) is one of the most difficult childhood disease to treat. In Spain, oral sildenafil has recently been approved in adults to treat PH, but it′s an off-label drug for children (its utilization must be derived to "compassionate use", which requires a prior National Health Authorities approval for every children), and an oral suspension must be formulated at the pharmacy department for them. The objective of this study is to analyse the use of oral sildenafil for PH in paediatric patients.
Design: 4 years retrospective study. 100% paediatrics patients with oral sildenafil for PH. Clinical data review.
Setting: Paediatric Cardiology Unit and Pharmacy Department (1 pharmacist) in a paediatric hospital (300 beds), in a large general teaching hospital (1450 beds, 15 pharmacists).
Main Outcome Measures: Patient data (diagnosis, age, weight). Treatment description (dose, length of treatment). Treatment effectiveness: peripheral arterial oxygen saturation and six-minute walk test. Treatment security: side effects registered.
Results: 15 children (8 girls). Age: 3 months to 17 years, median 7.3 years. Diagnosis: 13/15 PH secondary to surgery due to congenital heart disease and 2/15 primary PH.

Sildenafil doses ranged from 0.3 mg/kg/8 h to 50 mg/8 h; median length of treatment was 19.5 months (1 month–4.3 years). 8 children have used the oral suspension formulated and monthly dispensed at the Pharmacy Department. Other treatments: spironolactone (10), furosemide (8), captopril (4), acenocoumarol (2), aspirin (2), ranitidine (2) and propranolol (1).

9 patients have experimented clinical improvement and are on treatment. Sildenafil was withdrawn in 3 patients because it was indicated to ameliorate the effects of inhaled nitric oxide withdrawn. 2 patients died. No data available in 1 patient.

Only 1 patient experimented occasional headache.

Mensual treatment cost range from 40–624 €/patient.

Conclusions: Oral sildenafilo seems to be a safe and effective therapy for paediatric patients with pulmonary hypertensión. Due to the lack of an oral formulation for paediatrics patients, it should be elaborated at the pharmacy department.
Keywords: Sildenafil, Pulmonary hypertension, Paediatric patients

PT-271 Treatment of an eye-disseminated invasive aspergillosis

Sonia Martelli[1], Clémence Moiron[1], Emmanuelle Papy[1], Xavier Arrault[1], Philippe Arnaud[1]

[1]Pharmacy, Bichat Claude Bernard hospital, Paris, France

Background and Objective: We will describe the case of a bi-pulmonary transplant women who developed an invasive aspergillosis located in the lungs and the brain. She received intravenous voriconazole during 14 days. She was then diagnosed with an Aspergillus endophthalmitis. Even though a dual therapy consisting of caspofungin and posaconazole was initiated, the patient underwent a partial vitrectomy. This therapeutic failure could be explained by a late diagnosis and insufficient vitreous and aqueous humor penetration of the systemic drugs.
Design: A retrospective analysis of an endophthalmitis management.
Setting: Clinical Unit in a French Teaching hospital
Main Outcome Measures: To secure a high ocular concentration, the ophtalmologist recommended voriconazole intravitreal injections. His prescription was based on several case reports.
Results: We found articles dealing with animal testing: one concluded that voriconazole was a safe intravitreal agent which may be injected in human eye. Another study described the successfull use of intra-ocular voriconazole to treat a fungal endophthalmitis: it allowed a significant improvement in visual acuity and the patient's recovery. However, further studies are needed to assess the optimal dosage and frequency of administration. We prepared voriconazole syringes under a horizontal laminar air flow hood, as follows:

– preparation of a 10 mg/mL solution with 19 mL of water for injection and dilution in 9 mL of water for injection, to obtain a 1 mg/mL solution

– we sampled 0.3 mL of this solution in a 1 mL syringe, which was closed with an occluder, labelled and refrigerated.

Since we had no data regarding stability, it was administrated extemporaneously.
Conclusions: Intravitreal injections failed to prevent deterioration. Had they been introduced precociously, they might have been more efficient. An early diagnosis and prompt management might improve the extremely poor visual prognosis of this devastating condition. Were are currently studying the preparation stability.

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Keywords: Fongal endophthalmitis, Intravitreal, Voriconazole

PT-273 Security and effectiveness of tenofovir/didanosine associated to a protease inhibitor

Maria Eugenia Martínez Núñez[1], Javier Sánchez-Rubio Ferrández[1], Noelia Garrido Peño[1], Carolina Apezteguía Fernández[1], Belén Hernández Muniesa[1], Marta Arteta Jiménez[1]

[1]Pharmacy Service, Hospital Universitario de Getafe, Getafe, Spain

Background and Objective: In 2003 professionals were alerted about an elevated frequency of early virological failure in patients treated with tenofovir (TDF) and didanosine (ddI) associated to lamivudine. In 2005 similar results related to the administration of TDF and ddI, in association with a non-nucleoside reverse transcriptase inhibitor (NNRTI) were notified. Therefore similar events can be observed when TDF and ddI are co-administered in combination with other antiretroviral classes, such as protease inhibitors (PI). Subsequent pharmacokinetic studies have shown that TDF when co-administered with ddI increases ddI plasma concentrations leves by up to 40–60%, with a higher risk of didanosine-related adverse events, like pancreatitis and lactic acidosis. The administration of a reduced dose of didanosine (250 mg) to avoid over-exposure to didanosine may also contribute to a higher rate of virological failure and emergence of resistance at early stage. The objective of the study is to asses the rate of virological failure in patients treated with TDF and ddI associated to a PI.
Design: Retrospective study of patients VIH + treated with TDF/ddI/PI in the period between October of 2003 and April of 2007. The data were collected from clinical records. The main outcome was the development of virological failure, defined as detectable plasma viral load (PVL) after 24 weeks, or repeated detection of HIV-RNA after virological suppression. The determination of the PVL was made following the PCR technique, with a limit of detection of 200 copies/ml (device COBAS AMPLICOR®).
Setting: Pharmacy Service.
Main Outcome Measures: Development of virological failure.
Results: Seven patients were included (six male) with an average age of 36.4 (SD = 5.6) years, with 2.4 (SD = 0.78) previous treatments (all treatment-experienced patients), and an average duration of 22 (SD = 13.9) months with tenofovir/didanosine/ritonavir-boosted PI. Two cases of virological failure were reported, whose antiretroviral regimens respectively included a dose of 400 mg and 250 mg of ddI. One of them was associated to the lack of adherence. No serious adverse events were reported and no treatment was suspended by this cause.
Conclusions: The combination tenofovir/didanosine/PI can be a safety and effective alternative in treatment-experienced patients.
Keywords: HIV, Viral load, Antiretroviral therapy, Highly active

PT-278 Evaluation of drotrecogin alfa use for severe sepsis in an intensive care unit of a Portuguese general hospital

Erica Viegas[1], **Patricia Cavaco**[1], Nadine Ribeiro[1], Fatima Falcao[2]

[1]Pharmacy Department, S. Francisco Xavier, CHLO, [2]Faculty of Pharmacy Lisbon University, Pharmacy Department CHLO, Lisbon, Portugal

Background and Objective: To audit the use of drotrecogin alfa (activated), considering the National Institute for Clinical Excellence (NICE) Guidance.
Design: Retrospective study conducted from January 2004 to May 2007; NICE Guidance on Drotrecogin alfa for severe sepsis review.
Setting: Medical intensive care unit ward in a general hospital
Main Outcome Measures: The patient's mortality at 28 days; the time of administration of the treatment in relation to the onset of severe sepsis; whether or not the patient received the full 96-hour infusion, and if not, why not; the micro-organisms isolated and the presence of absolute contraindication.
Results: During the study period 27 patients had prescription for drotrecogin alfa for sepsis syndrome; 48.1% were male and the mean age was 58.7 years (range 16–83 years). All patients had proven infection: 66.7% had pneumonia (n = 18), 22.2% pyelonephritis(n = 6), 3.7% soft tissue infection(n = 1) and 7.4% abdominal infection(n = 2). The main isolated micro-organisms were Klebsiella pneumonia(n = 3), Escherichia coli(n = 2), Pseudomonas aeruginosa(n = 1), Enterococcus faecium(n = 1), Staphylococcus aureus(n = 2), Legionella pneumophila(n = 1), Proteus vulgaris(n = 1), Enterococcus faecium(n = 1), Klebsiella oxytoca(n = 1). All patients started treatment within 24 h of the onset of severe sepsis. The treatment was not completed in one patient due to adverse events. Contraindications were present in 4 patients: platelet count $<30.000 \times 106/L$ (n = 2), age under 18 years (n = 1) and major surgery (n = 1). The mean organ failures was 3.5 (range 2–5 organs). Adverse reactions were present in 7 patients: thrombocytopenia (n = 3), pancytopenia (n = 1), bleeding (n = 1) and elevation of activated partial thromboplastin time (n = 1). Mortality at 28 days was found to be 37% (n = 10).
Conclusions: Despite the presence of some contraindications, in most patients drotrecogin alfa was used according to current guidelines. Nevertheless, since APACHE II score was not determined, the real risk of death is unknown and there can be no extrapolation to literature results. Upon these findings, a systematic evaluation of APACHE II score must be implemented in order to optimize patient selection and the risk-benefit ratio, improving the use of drotrecogin alfa.

Reference

Drotrecogin alfa (activated) for severe sepsis, National Institute for Clinical Excellence (NICE) Guidance, September 2004

Keywords: Drotrecogin alfa, Sepsis, Audit

PT-279 Clinical practice: dosage reduction of anticancer chemotherapy

Charles Aurélie[1], Fillon Julie[1], Japkowicz Maxime[2], Becker Annie[1], Lotz Jean-Pierre[2], Debrix Isabelle[1]

[1]Pharmacy, [2]Oncology, Hôpital Tenon APHP, Paris, France

Background and Objective: It is necessary to focus on side effects for pharmaceutical analysis. Dosage reductions are commonly used in cancer chemotherapy. However, little is known concerning the way these reductions are performed in clinical practice. The objectives were to evaluate the incidence, the reason and the percentage of dosage reduction.
Design: Prospective four-week study during which we analysed prescriptions with dosage reductions.
Setting: Pharmacy and clinical oncology department in a Paris university hospital.
Main Outcome Measures: We focused on prescriptions with dosage reduction and we recorded :

- Patient information
- Cancer localisation
- Chemotherapy regimen
- Dosage reduction characteristics (date, reduction percentage, reason)

The toxicities were classified according to the NCI-CTC criteria (grade 1 to 4).

Individual interviews were performed in order to assess how physicians decided the reduction ratio.
Results: 406 patients (53% women; mean age 57 years) have been treated during that period. Diagnosis majority were breast (25%), colorectal (22%) and lung (16%) cancer.
66 patients required a dosage reduction (incidence 16%). Hematological toxicities were the main cause of reductions (69%). The hematological toxicities observed were thrombopenia (35%), neutropenia (25%) and neutropenia-thrombopenia associations (40%). The toxicities observed were grade 3 (48%) or 4 (42%).

The other major causes of reductions were neurological (7%) and gastrointestinal (5%).

The average percentage of reductions was between 15% and 20%.

The individual interviews have shown that physicians didn't base the dosage reductions on literature results (established criteria) but on their own clinical practice (experience).
Conclusions: 16% of the prescriptions showed a decrease of the regimen.

Even if there is few literature, clinical trials recommend a decrease of 25% of the usual dosage of the drugs. The percentage in practice is lower than the one defined by clinical trials.

The choices of reduction percentage were not standardized. Recommendations for dosage reductions are still needed.
Keywords: Dosage reduction, Anticancer chemotherapy, Toxicity

PT-294 Interdisciplinary approach to dose adjustment in patients with renal impairment in secondary care

Liekweg A, Hinnerkort A, Ebeling G, Braband S, Dreischulte T, Heilenkötter K, Sander S, Schiffmann S, Schrimpff U, Siems M, Wagner K, Weiland T, Zeigermann G, Melzer S

Hospital pharmacy of the Asklepios Kliniken Hamburg GmbH

Background and Objective: As part of a unit dose dispensing system, patient medication profiles are routinely entered in an electronic database. Medication profile and laboratory data are accessible online by clinical pharmacists. The project was conducted in order to optimise pharmacotherapy in patients with renal impairment and to integrate the clinical pharmacist in the therapeutic team.
Setting: Unit-dose supplied wards ($n = 73$) in four Asklepios hopitals in Hamburg with approximately 1800 patients per day. The project was conducted in cooperation with clinical pharmacists, physicians and the laboratory department over a period of 2.5 months (12/06–02/07).
Programm description: Clinical pharmacists receive a list of all patients with an estimated glomerular filtration rate (eGFR) < 30 mL/min/1,73 m^2 (MDRD) from the laboratory department on a daily basis. They screen medication profiles daily with regard to apparently inappropriate dosing of renally excreted drugs ($Q_o < 0.5$). Critical cases are reported to physicians by phone or entry in medical case notes. Following an interdisciplinary discussion with the physician the drug dose or dosing interval is either adjusted, the medication is stopped or paused or an alternative is started. During the pilot phase the number of altered medications as a result of pharmacists' recommendations was documented.
Results: A prevalence of 5% of patients with a eGFR < 30 mL/min/1.73 m^2 was found in the examined setting. During the pilot phase 1088 of 5013 prescribed drugs (21%) were renally excreted or considered nephrotoxic. Antibiotics (26%), antidiabetics (7%), diuretics (25%) or NSAIs (11%) were predominantly involved. Overall, 225 of 318 pharmaceutical recommendations (71%) were accepted and acted upon by physicians.
Conclusion: The number of recommendations demonstrates the importance of this service in optimising pharmacotherapy. Clinical pharmacists' contributions in matters of dose adjustment in patients with renal impairment is well received by physicians especially in non-nephrologic departments. The new service was found to be feasible in daily practice and has become part of the clinical routine.

DI-37 Patinfo-rheuma: development of web-based patient information leaflets about drugs used in rheumatic diseases – a multidisciplinary approach

Kirsten K Viktil[1], Camilla Bjørnstad[2], Anne Glennås[3], Frank Jørgensen[4], Kristin Larssen[2], Knut Midthaug[5], Terje Nordengen[6], Marianne Wallenius[7]

[1]Diakonhjemmet Hospital Pharmacy and Department of Pharmacotherapeutics, Diakonhjemmet and University of Oslo, Oslo, [2]Hospital Pharmacy, Hospital Pharmacy North, Tromsø, [3]Department of Rheumatology, Diakonhjemmet Hospital, Oslo, [4]Hospital Pharmacy, Hospital Pharmacy West, Bergen, [5]NRF, Norwegian Rheumatism Association, [6]NPF, Norwegian Psoriasis Association, Oslo, [7]NTNU, Norwegian University of Science and Technology, Trondheim, Norway

Background and Objective: The sources and availability of drug information for patients are growing, e.g. through the internet and official patient information leaflets (PILs). However, the quality of the information on the internet might be questioned. Furthermore, PILs are not standardized, the layout is not reader friendly and the information covers all approved indications for the drug, some of them not relevant for rheumatic patients. Also, over the years various information leaflets for drugs have been developed in the departments of rheumatology in Norway. These are not standardized and the accessibility is limited.

The objective was to develop a system for producing and maintaining reader friendly patient information leaflets about antirheumatic drugs, which takes the quality assurance aspect into account, and is easily accessible for the users.

Design: Development project, consensus method.

A national multidisciplinary project group was set up in December 2005, with members from the Social leagues (two members), pharmacists' organization (four) and rheumatologists' organization (two). Mandate and regulations were approved by the organizations, as well as a legal disclaimer.

The pharmacists make a draft for each drug which is e-mailed to all the members of the group. Based on the comments a revision is made followed by another hearing until consensus is reached. The rheumatologists approve the leaflet.

Setting: National multidisciplinary consensus including patients associations

Main Outcome Measures: Establishment of a dedicated website. Number of leaflets published.

Results: A web address for publication of the leaflets is set up on the home page of the Norwegian Society for Rheumatology: www.legeforeningen.no/nrf. There is a link to this address on the home pages of the Social leagues and the Norwegian Association of Hospital Pharmacists.

During the first year 60 different drug leaflets have been developed and published on the web site. It is possible to search by trade name, generic name and groups of drugs such as "antiinflammatory drugs", so the numbers of hits adding up to 87.

Conclusions: This national multidisciplinary approach has made it possible to develop a system for making patient information leaflets about anti-rheumatic drugs, which are standardized and easily accessible.

Keywords: Patient information leaflets, Drugs in rheumatic diseases, Multidisciplinary