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ABSTRACTS

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CAKUT: Ante/neonatal diagnosis

Abstract# P- SUN001
Congenital mesoblasticnephroma, Report of a case

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Objective: Congenitalmesoblasticnephromais a congenital renal neoplasia. Diagnosed in the first six months of life. Its clinical behavior is benign and the treatment is surgical.
Study To describe the case of a patient with congenital mesoblasticnephroma preterm and its diagnostic and therapeutic approach
Methods: We report the case of a 30-week preterm patient with a history of perinatal asphyxia, requiring advanced neonatal resuscitation (perinatal trauma), initially with hematuria box that subsequently joined abdominal mass and hypertension, so suspected renal trauma (renal hematoma) performing imaging studies, information describing the review is based on your medical history, prior parental consent.
Results: evidenced by renal ultrasonography enlarged right kidney with heterogeneous solid-looking lesion in the lower pole, with cystic areas suggesting dystrophic calcifications, suggestive of embryological renal tumor. It interconsultation child surgery, who performed right nephrectomy, Pathology confirmed the diagnosis of congenital mesoblasticnephroma
Conclusions: the importance of history is key to the diagnosis, all preterm neonate with a history of asphyxia and perinatal trauma suspected who this hematuria, hypertension and abdominal mass should suspect this disease, early diagnosis is important to define management and prognosis thereof, adequate renal ultrasound is essential for diagnosis.

Abstract# P- SUN002
The cause and outcome of fetal hydronephrosis

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Objective: Hydronephrosis is probably the most prevalent congenital abnormality detected prenatally by ultrasonography (1-5% of all pregnancies). The aim of this study was to determine the cause & postnatal outcome of fetal hydronephrosis.
Method: In this retrospective cohort study, 250 term infants with prenatally diagnosed hydronephrosis and the diagnosis were confirmed postnatally, were enrolled. The degree of hydronephrosis was defined as mild (6 to <10 mm), moderate (10 to <15 mm) or severe (>15) using anterior-posterior diameter of the renal pelvis in the third trimester. Postnatal sonography was performed 3-7 days after birth. Voiding cystourethrogram was performed in 6-8 weeks time. In the absence of vesicoureteral reflux (VUR), DTPA scan was performed to exclude obstruction. Follow-up period was 48 months. The events of interest were course (resolution, surgical intervention, and no change), urinary tract infection (UTI), hypertension, chronic kidney disease (CKD), and death.
Results: Of 250 cases with hydronephrosis, 135(54%) were mild, 84(33.6%) were moderate, and 31(12.4%) were severe. Hydronephrosis was caused by VUR in104(41.6%), ureteropelvic junction obstruction (UPJO) in 59(23.6%), ureterovesical junction obstruction in 27(10.8%), cystic diseases in 19(7.6%), posterior urethral valves in 2(0.8%), prune-belly syndrome in 1 (0.4%), and idiopathic in 38 (15.2%).During follow-up19 patients (7.6%) required surgical intervention while 177(70.8%) improved and 54 (21.6%)were with no change. UTI occurred in 93(37.2%) and 11(4.4%) patients developed CKD. The risk of CKD, UTI and surgery were greater in patients with severhydronephrosis ($P< 0.05$).
Conclusion: In this study VUR and UPJO were the most common cause of hydronephrosis. There was a meaningful relationship between the degree of hydronephrosis and postnatal problems (UTI, CKD & surgical intervention). But any degree of fetal hydronephrosis is at risk of postnatal pathology.

Abstract# P- SUN003
Outcome of ureterocele in antenatally detected duplex kidneys

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Objective: Ureteroceles are a common co-diagnosis in duplex kidneys. Management of such cases remains a challenge due to the significant comorbidity associated with ureteroceles. To assess the clinical outcome of ureterocele in antenatally diagnosed duplex kidneys to provide guidance on future management.

Method: Retrospective study of 39 patients identified antenatally with a duplex kidney in a single centre between 2007 and 2011. Clinical outcome including diagnosis of ureterocele was ascertained from local databases and clinical note review in postnatally confirmed duplex cases.
Results: During a 5 year period, 39 patients with antenatally suspected duplex kidneys were identified, 31 of which were confirmed postnatally (79%). Follow-up ranged from one to five years (mean 2.4). Ureterocele was found in twelve cases (39%). Average size was 20mm (range 9.9-27.0mm). Significant comorbidity was found in duplex kidneys associated with ureterocele; 92% had hydronephrosis, 58% urinary tract infection despite prophylaxis, 83% vesicoureteric reflux and 33% obstruction. All 12 ureteroceles (100%) required surgical intervention; eight endoscopic incisional puncture, one heminephrectomy, two bladder reconstruction surgery and one deflux injection.
Conclusion: Antenatal diagnosis of duplex kidneys remains useful in identifying patients at risk of long-term renal impairment. Those with concurrent diagnosis of ureterocele in particular remain a challenging problem and are likely to require follow-up for associated pathology and surgical intervention. Prenatal diagnosis allows the opportunity to plan management and counsel parents about the probable need for surgical intervention.

Abstract# P- SUN004
RISK FACTORS OF CAKUT- SYNDROME IN NEWBORNS

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Objective: One of the major problem of pediatric nephrology is early diagnosis of congenital obstructive nephropathy. CACUT-syndrome - one of the most severe disease, often leading to death due to the development of acute renal failure in newborns and chronic kidney disease in older children. The purpose of our research was to determine significant risk factors of CAKUT-syndrome.
Methods:2420 reports of autopsies newborns were studied, from which CACUT-syndrome was discovered in 36 cases (1,49%) - the main group (1 gr.). 1A gr. - children with congenital abnormalities of kidney and urinary tract (19 cases), 1B gr. - children with morphological signs of kidney damage, but without severe visible abnormalities (17 cases). The control group (30 pers.) - healthy newborns. 102 risk factors (of the mother and child) were studied in all groups with estimation of the importance of each of them on the attributive risk (AR).
Results: In the structure of renal disease in newborns 1A gr. were diagnosed: aplasia/hypoplasia/dysplasia (25%), hydronephrosis (16.7%), agenesis (8. 3%) of the kidney and others: doubling and horseshoe-shaped kidney, doubling of the ureters, urethra valve. Newborns of 1B group had: interstitial nephritis (25%) and others: pyelitis, epinephrit, nephrosis, uric-acid renal infarction. Depending on the value of attributive risk (AR) for 1A gr. the high risk group included 3 factors: chronic Herpes (AR = 49.8%), CMV infection (AP = 27.3%) and polyhydramnios in the mother during pregnancy (AR = 27,3%). For 1B gr. the most important risk factors were threat of premature birth in the second half of pregnancy (AP = 18.7%) and irregular an increase of fetus weight (AR = 16. 9%).
Conclusion: The most significant risk factors for development renal abnormalities in newborns are mother's chronic Herpes and CMV infection. This is proven by the high frequency of CACUT-syndrome in their babies.

Abstract# P- SUN005
Clinical course of 90 children with Multicystic Dysplastic Kidney diagnosed by fetal ultrasonography: A prospective study

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Objective: The benign course of unilateral multicystic dysplastic kidney (MDK) is already recognized. However, the long-term consequences of this anomaly upon the contralateral kidney (CK) remain to be investigated. The aim of this study was to describe the clinical course and serial ultrasonography (US) evaluation of 90 children with unilateral MDK, followed-up between 1999 and 2011.
Methods: All patients were non-surgically managed and submitted to a systematic protocol including periodic laboratory exams and serial US. The variables of interest were the presence of associated anomalies, estimated glomerular filtration rate, blood pressure, US findings and proteinuria. A survival analysis estimated the risk for arterial hypertension (AH) and chronic kidney disease (CKD).
Results: The median time of follow-up was 98 months, being 65% followed by at least 5 years. Malign transformation of the dysplastic kidney did not occur. Four children (4.4%) developed AH. The deterioration of renal function occurred in 3 patients, all of them at CKD stage 2. The survival analysis showed a probability of CKD and/or AH of approximately 8% at 75 months of age. Hyperfiltration and proteinuria were not detected. Regarding renal US, we performed a medium number of 7 exams per children. Involution of the MDK was observed in 74.4% of the patients. In 30 patients, the MDK disappeared. A progressive hypertrophy of the CK was also observed. However, this finding did not correlate with clinical complications or congenital anomalies in CK. On the other hand, we detected a tendency of slower involution of MDK in the case of hypertrophy of the CK.
Conclusion: The clinical course of unilateral MDK is benign and the non-surgical management is safe. However, there is a low risk of AH and/or CKD, especially for patients with congenital anomalies in the CK.

Abstract# P- SUN006
GFR estimation based on Cystatin C formulas in neonates

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Objective: The measurement of GFR is the best way to assess renal function. However GFR measurement is cumbersome and difficult especially in neonates. Serum creatinine as the most common used GFR marker has some problems. Cystatin c "another endogenous marker for GFR estimation" was evaluated in some studies for neonates. The aim of this study was to estimate GFR by cystatin based formulas in neonates and to find the relationship between them and Schwartz formula. To our knowledge, estimation of GFR by serum cystatin c in neonates was done for the first time in our study.
Methods and Results: Ninety nine neonates were included in this study. The mean serum creatinine and cystatin c was 0.56 mg/dl (0.2-1.56 mg/dl) and 2.11 gr/l (0.75-22 gr/l) respectively. GFR was estimated by Schwartz and 14 cystatin c based formulas separately. The GFR based on cystatin c formulas all were significantly correlated ($Pv<0.05$) but all except one of them were not correlated with Schwartz GFR ($Pv>0.05$). The only cystatin equation correlated with Schwartz formula was CysCrEq in which serum cystatin and creatinine was used concomitantly.
Conclusion: We concluded that all cystatin c formulas were correlated with each other significantly but none of formulas in which cystatinc was used singly were correlated with Schwartz formula. As serum

creatinine in the first week after birth reflects maternal values and cystatin does not pass through placenta, it is probable that cystatin c equations reflect neonatal GFR more precisely compared with Schwartz equation. This result needs to more studies with more cases and with gold standard techniques such as inulin clearance.

Abstract# P- SUN007

Outcomes and Predictive Factors of Antenatal Hydronephrosis

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Objective: Postnatal management of patients (PT) with isolated antenatal hydronephrosis (IAH) remains controversial.Toidentify the predictive factors of IAH in order to improve the postnatal management of these PT.
Methods: Clinical features and radiological results (first postnatal kidney ultrasonography (PKUS) done at the age of < 60 days, voiding cystourethrography [VCUG] and diuretics MAG3 renography [DR]), of 95 PT with IAH from January 1, 2007 to September 30, 2012 were analyzed. The outcomes of interest were presence of uropathy and surgical requirement. Predictive factors were assessed using multivariate logistic regression.
Results: The mean follow-up time was 27.8 +/- 17.5 months. Of 95 PT, (75 males, 79%), 47 (49%) had uropathy (27 ureteropelvic junction obstruction, 6 multicystic dysplastic kidney disease, 4 vesicoureteral reflux, 4 posterior urethral valve, 4 duplex kidney/ectopic ureter and 2 ureterovesical junction obstruction) whereas 48 (51%) had no uropathy (20 transient hydronephrosis, 28 persistent hydronephrosis). Twenty-six PT (27%) underwent surgery. VCUG and DR were performed in 81 (85%) and 69 (73%) PT, respectively. The median age at the first PKUS was 8 (interquartile range 12) days. The mean anteroposterior renal pelvic diameters (APD) of the first PKUS in PT with and no uropathy were 15.2 +/- 12.3 and 8.2 +/- 5.7 mm, respectively ($p = 0.001$). The numbers of severe hydronephrosis in the first PKUS, defined as hydronephrosis grades 3 and 4 based on the Society for Fetal Urology (SFU) grading, in PT with and no uropathy were 31 and 18, respectively ($p = 0.006$). Gender, sides of hydronephrosis, APD and SFU grading of the first PKUS were included in a multivariate model but APD of > 15 mm was the only predictive factor associated with uropathy (odds ratio [OR] 12.2, 95% CI 2.83 - 52.7, $p = 0.001$) and with surgical requirement (OR 8.1, 95% CI 2.2 - 29.5, $p = 0.002$).
Conclusion: The APD of the first PKUS is effective in predicting uropathy and surgical requirement in PT with IAH. Although SFU grading of the first PKUS may not be a significant predictive factor, the findings of low grade hydronephrosis in conjunction with APD of <15 mmin the first PKUS could justify a noninvasive postnatal follow-up.

Abstract# P- SUN008

Outcome of Unilateral Antenatal Hydronephrosis

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Objective: Renal pelvis dilatation accounts for 0.5 - 4.5% of all antenatal abnormalities. It is important to follow them postnatally as it associated with obstructive pathology and vesico-ureteric reflux. Our aim was to look at the antenatal hydronephrosis especially unilateral involvement and their management as opposed to local welsh guidelines. We also looked at the communication and effectiveness of action sheets available in place.
Methods: It was a retrospective analysis of medical case notes and clinical work station to gather information over 2 years covering two hospitals under one trust (2010-2011).
Results: The incidence of unilateral hydronephrosis detected antenatally over the 2 years was 31.4% (60/191). The number of infants available for analysis was only 74. Of which, 46 infants had unilateral (62.1%) distributed equally on either side. Based on the paper from Estrada and Carlos et al, 29 infants had mild, 13 had moderate and 4 infants had severe hydronephrosis. Nearly 2/3rds had either normal or transient hydronephrosispostnatally. The most common non obstructive lesion was Vesico-Ureteric reflux (VUR) and obstructive was Pelvic ureteric junction obstruction (PUJO). Interestingly, 9 patients had extra renal pelvis dilatation with only 2 as isolated abnormality. 45.6% patients were discharged after the first scan. The common reason for follow up was increasing size, cortical thinning or presence of other abnormality. Action sheet letter for postnatal scanning was available only in 50% infants. The postnatal scan was not done on time as recommended by the local guidelines in 50%. Only 2 patients had urinary tract infection and surgical intervention was needed in one with ureterocoele and other was pyleoplasty for PUJO. 8 patients did not receive any communication about the test results. 21.7% did not follow the Welsh guidelines. The most common reason being unnecessary micturitingcystourethrography (MCUG) in 6 patients.
Conclusion: Unilateral hydronephrosis is self resolving in most cases. It was recommended to attach the action sheets to mother's green file. In uncomplicated unilateral hydronephrosis, the scan timing could be relaxed to 3-4 weeks instead of 2 weeks.

Abstract# P- SUN009

Reference curves for fetal renal parameters in normal pregnancies

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Objectives: Advanced prenatal imaging is a powerful tool for evaluating fetuses with congenital anomalies of kidneys and urinary tract (CAKUT), however, reference values are not well established. We aimed to create reference curves for fetal renal volume, renal blood vessel Doppler indices and urinary production in normal pregnancies, and to examine the correlation between these different parameters.
Methods: Fifty-eight healthy women with a normal singleton pregnancy between 20 and 24 weeks of pregnancy were included in a prospective, longitudinal study. Both fetal kidneys were measured in 3 dimensions and a 3D renal volume was achieved. Two-dimensional kidney volume was calculated using the ellipsoid volume formula and the 3D-renal volume was calculated using the VOCAL-technique (Virtual Organ Computer-Aided analysis). In the renal artery we determined the peak systolic velocity (PSV), resistance and pulsatility index (RI and PI) and fetal heart rate and in the renal vein the maximal velocity (Vmax) and PI. To calculate fetal urine production, we achieved 3 subsequent 3D volumes of the fetal bladder during its filling phase. These volumes were calculated off-line by sonoAVC (Automated Volume Count). Urine production was calculated by the following formula: (V2-V1)x 60/x, where x= time interval between the 2 volumes.
Results: We observed a high correlation between the 2D and 3D renal volume measurements. There were no significant differences between the left and right 3D renal volumes. Fetal venous and arterial Doppler flow measurements in the left and right kidney did not differ significantly. The PSV in the renal artery increases in an almost linear way with gestational age, whereas little variability is observed for PI and RI. The Vmax in the renal veins also increases with gestational age, whereas little variation in PI is observed. Urine production increases gradually with gestational age with a large interfetal difference late in

gestation. We observed a good correlation between fetal urinary production, renal volume and renal artery PSV.
Conclusion: We provide reference curves for renal parameters in normal singleton pregnancies and found a good correlation between different measurements.

Abstract# P- SUN010
Correlation between prenatal imaging and postmortem findings in pregnancies terminated for renal malformations

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Objective: To evaluate the agreement between prenatal ultrasound diagnosis and postmortem findings (pathological investigation (PI) and/or virtual necropsy (VN)) in pregnancies terminated for renal malformations.
Methods: All terminations of pregnancy (TOP) performed for renal malformations between august 2008 and January 2013 in our tertiary centre were retrospectively analyzed. The level of agreement between prenatal imaging findings and final diagnosis after postmortem investigations was examined.
Results: After exclusion of chromosomal anomalies (n=9) and cases without postmortem investigation (n=13), 48 cases were included for analysis. In respectively 26, 5, and 17 cases a PI, a VN or a combination of both was performed. Mean gestational age at termination was 21.6 weeks (SD: +/-5). When a renal malformation was the main indication for TOP (32/48), there was a full agreement in 78% of cases (25/32). Minor additional findings were found in 19% (6/32). In only one case the final diagnosis was adjusted because of major additional findings (3%). There were no cases of full disagreement.
When TOP was performed for another major malformation with associated renal anomalies (16/48), there was a full agreement in 75% (12/16). Minor additional findings were found in 6.25% (1/16). Additional findings leading to adjustment of the final diagnosis were found in 18.75% (3/16). We had no cases of full disagreement.
Conclusion: We observed a high correlation between the prenatal ultrasound and postmortem findings in our group of pregnancies terminated for severe renal pathology. Fetal autopsy remains important to reveal additional major and minor malformations leading to a correct final diagnosis. The added value of virtual necropsy for renal malformations is rather limited.

Abstract# P- SUN011
CLINICAL PROFILES OF ANTENATAL HYDRONEPHROSIS AT DR. SOETOMO HOSPITAL SURABAYA INDONESIA

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Objective: The increased use of maternal-fetal ultrasound has led to early detection and management of congenital anomalies of the kidney and urinary tract (CAKUT), including antenatal hydronephrosis (ANH). This study was aimed to describe the clinical profiles of children with ANH.
Methods: In this retrospective cohort study, the records of 55 ANH patients referred to Division of Nephrology Department of Child Health of Airlangga University/Dr. Soetomo Hospital Surabaya Indonesia between April 2007 and March 2013 were reviewed. Specific ultrasound findings (the presence of renal, ureteral, and bladder involvement) were recorded. The events of urinary tract infection (UTI), surgical intervention, hypertension, chronic kidney disease (CKD), and death were recorded.
Results: A total of 55 children (40 males (72.7%), 14 females (25.5%), 1 disorder of sex development (1.8%)) was included. Fourteen (25.5%) patients had mild hydronephrosis, 15 (27.3%) had moderate hydronephrosis, and 26 (47.3%) had severe hydronephrosis. Ureteropelvic junction (UPJ) stenosis occurred in 12 (21.8%) patients, ureterovesico junction (UVJ) stenosis in 3 (5.5%) patients, while 2 (3.6%) patients had UPJ-UVJ stenosis, 12 (21.8%) patients had other causes, and 26 (47.3%) patients with unknown etiology. UTI occurred in 20 (36.4%) patients. Nephrostomy was done in 4 (7.2%) patients, ureter implantation in 2 (3.6%) patients, pyeloplasty in 2 (3.6%) patients, and ureteroscopy, ureteroplasty and nephrectomy each in 1 (1.8%) patient. Hypertension was found in 6 (10.9%) patients. Baseline normal GFR was found in 37 (67.3%) patients with no patients showed worsening GFR during follow-up. Four (7.3%) patients died during the period.
Conclusion: The clinical profiles of ANH in our series were heterogenous with encouraging long-term outcome despite high risk of UTI.

Abstract# P- SUN012
RENAL FUNCTION EVALUATION IN PAEDIATRIC CONGENITAL SOLITARY KIDNEY

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Objective: The aim of the study was to analyze, in a cohort of children with congenital solitary kidney (CSK), the correlation between Scr, ScysC, the eGFR calculated based on SCr and ScysC and sonographic renal length adjusted for the height (USlength/h), with the gold standard GFR, measured by DTPA (DTPA-mGFR).
Methods: In 55 children (mean age 7+/-5 years) with CSK, ultrasonography (US), assessment of SCr and ScysC and DTPA renal scan were simultaneous performed. SCr-eGFRs were calculated using Schwartz' formula; SCysC-eGFRs was calculated using Filler, Grubb, Bo kenkamp and Zappitelli's equations; SCRSCysC-eGFR was calculated with Zappitelli's equation. DTPA-mGFR was performed using Gates' method. Pearson and Spearman's coefficients were used to verify the existence of a linear correlation between the variables.
Results: Mean DTPA-mGFR was 130+/133 ml/min/1.73m^2. Median SCr was 0,47 mg/dL; median SCysC was 0,98 mg/L and median Schwartz SCr-eGFR was 143 ml/min/1.73m^2.
A significant statistical correlation was found between SCr and DTPA-mGFR ($p=0.033$; $r=0.29$) and no significant correlation was observed between SCysC and DTPA-mGFR or between eGFRs and DTPA-mGFR. However, Schwartz SCr-eGFR seems to have the best performance.
A significant correlation was also observed between DTPA-mGFR and USlength/h ($p=0.018$; $r=0.33$).
Conclusion: Our results show that SCr and Schwartz SCr-eGFR are effective in the evaluation of renal function, while SCysC is not a reliable marker in children with CSK. Furthermore, US is a promising method to use in the follow-up of these children.

Abstract# P- SUN013
The exploration of appropriate population for postnatal ultrasound screening for congenital anomalies of the kidney and the urinary tracts

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Objective: The purpose is to assessthe prevalence of congenital anomalies of the kidney and urinary tract (CAKUT)in high-risk infants and find out the optimal objects of postnatal US screening.
Methods: BetweenJun.1st, 2010 and May.31th, 2012 urinary US wereperformed on 4044 cases 0-6 months-old high-risk infants at their routinehealth checks after birth in MinHang Maternal and Child Health Hospital. Caseswithan unilateral anterior-posterior renal pelvicdiameter (APPD) of 5-14.9mm or bilateral APPD of 5-9.9mm on the first postnatalUS, US follow-up was performed per 3-6 months. Cases with an unilateral APRD >= 5 mm or bilateral APRD >= 10 mm or other types of CAKUT would be referred to Children's Hospital of Fudan University forfurther examinations and treatments.
Results: 374 cases (9.3%) were observed having CAKUT, and themost frequent anomaly was pyelectasis (362 cases), and the proportionof moderate, mild and severe degree was 74.86%, 21.81% and 3.31%, respectively.Of whom, 263 cases got followed, 204 cases recovered, 13 cases reversed, 14 caseswere persistent and 4 cases deteriorated. 2 cases were prompted to surgicalintervention with the diagnosis of PUJO. 12 cases were found to have other typesof CAKUT, such as solitary kidney(3 cases), ectopic kidney(1 case), renaldysplasia(1 cases) and so on. Among current criteria for high-risk infants indomestic, premature and premature with low birth weight(LBW) were relativerisk factors of CAKUT. Meanwhile, 10.7% cases had antenatal CAKUT.
Conclusion: This study demonstrated a 9.3% prevalence of CAKUT in high-risk infants,which was higher than that in healthy infants and should be taken seriously. Itis suggested to apply routine postnatal US screening to high-risk infants and infantswith antenatal CAKUT. This work was supported by the grants from Ministry ofChinese Science and Technology [2011CB944001].

Abstract# P- SUN014
Antenatal Renal Pelvis Dilatation: Does the presence of risk factors predict the need for later surgery

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Objective: As techniques in antenatal screening advance, detection of foetal anomalies is increasing. Evidence on association of antenatal renal pelvis dilatation (RPD) with long term morbidity is conflicting. The West of Scotland has a well defined guideline for antenatal referral and postnatal follow up of RPD. We audited infants born between 2009-2011 with RPD to determine critical RPD dimensions and the importance of predefined risk factors found on ultrasound.
Methods: The Princess Royal Maternity has 6,500 deliveries a year. Data on all patients with antenatal detected RPD was prospectively entered into a database with RPD measurements and the presence of 8 predefined risk factors as per local guideline (calyceal dilatation, ureteric dilatation, ureterocele, oligohydramnios, bladder wall thickening, lack of urine in bladder, parenchymal abnormality or bilateral findings). The guideline defines high risk infants as those patients with RPD>15mm and/or the presence of risk factors. Postnatal imaging and follow up data was collected from a single tertiary site to determine prognostic indicators for postnatal surgery.
Results:63 patients were identified as having RPD>10mm; 42 male and 21 female (2:1). 14 infants required surgery 6 (28%) female 8 (19%) male. Of these, 12 were high risk and 2 low risk with no risk factors and RPD<15mm however both had risk factors identified on first postnatal scan. 11 high risk cases had risk factors most frequently calyceal dilatation and ureteric dilatation. 8 cases had breakthrough UTI on trimethoprim prophylaxis. 1 case had a UTI not on prophylaxis with RPD>15mm. 31 patients remain under follow up; 26 high risk(84%) 5 patients low risk(16%).
Conclusion: Presence of risk factors and RPD>15mm was the strongest indicator for requiring surgery. In both low risk infants with no risk factors who required surgery, calyceal and ureteric dilatation were present on first postnatal scan. This study highlights the importance of identifying risk factors as predictors of need for surgical referral in infants with antenatally detected RPD.

Abstract# P- SUN015
Development of a systematic approach for the management of Antenatal Hydronephrosis in Children

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Objective: Antenatal hydronephrosis (ANH), defined as dilatation of the fetal renal pelvicalycealsystem, is the most common solid organ anomaly detected by antenatal ultrasound. 10% of all cases and up to one-third of severe cases of ANH require surgery to prevent deterioration in renal function. Ultrasound is employed as a non-invasive method of systematically monitoring hydronephrosis progression and the need for surgery post-natally, yet there is no clear consensus on evaluation criteria for intervention. The two most common sonographic methods for evaluating ANH post-natally are: 1) The Society for Fetal Urology grading system (SFU), which is a semi-quantitative method for assessing the degree of hydronephrosis and effects on parenchymal damage; and 2) measurement of anteroposterior diameter of the renal pelvis (APPD), which is arbitrarily subdivided into mild, moderate, and severe categories based on measurement thresholds. The goal of this study is to evaluate the accuracy of these two systems for predicting surgery at baseline (i.e. first post-natal ultrasound within 90 days) and over time, and to determine whether combining features of both systems improves their predictive value.
Methods: The study is a retrospective chart review of patients diagnosed with ANH and referred to The Hospital for Sick Children between 2003 and 2010. Only patients with first postnatal ultrasound within the first 3 months of life, initial visit within the first 6 months, and minimum 1 year follow-up were included. Patients with renal malformations were excluded. Clinical data and ultrasound reports were extracted from Electronic Patient Chart (EPC). Ultrasound images stored on Picture Archiving and Communication System(PACS)were reviewed by 2 independent observers for SFU grading. Primary outcome is surgical intervention (i.e. pyeloplasty, nephrostomy, ureteral reimplantation, ureterostomy).
Results: 1191 patients were eligible and 533 met the inclusion criteria. Mean age at first postnatal ultrasound was 22±21days (median 14 days). Mean age at first clinic visit was 74±47 days (median 67 days). Mean age at surgery was 466 ± 628 days (min 10; max 3409 days).Preliminary data on a subset of patients (N=306) having their first post-natal ultrasound obtained within 90 days of life were analyzed to determine the accuracy of APPD and SFU grading at baseline for predicting surgery. Within this subset of 306patients, 244 (79.7%) were male and 62 (20.3%) female. 180 patients had unilateral hydronephrosis (134 left-sided,43.8%; 46 right-sided,15%) and 126 had bilateral (41.2%). Mean APPD measurement at baseline was 11.4±8 mm(range 1-50). SFU grading of the first post-natal ultrasound on 306 patients with images on PACS showed: grade 0 (6%); grade 1 (15%); grade 2 (36%); grade 3 (23%); grade 4 (20%). Among 87 patients who ultimately had surgery, 60 (68.9%) had moderate to severe hydronephrosis by APPD measurement (APPD≥12mm) while 77(88.5%) patients were graded with moderate to severe hydronephrosis by SFU grading (SFU grade3-4). A proposed new

grading system combining both methods (Group 1: APPD <12 mm + SFU 0-2; Group 2: APPD< 12 mm + SFU 3-4; Group 3: APPD≥12mm + SFU 0-2; and Group 4: APPD≥12mm+ SFU 3-4) revealed at baseline ultrasound that among 87 patients that ultimately had surgery, 11% were in Group 1, 22% in Group 2, only 1 patient in Group 3 and 65% in Group 4. Logistic regression showed no statistical significance between APPD and SFU grading performed at baseline for predicting surgery (APPD: OR0.13, CI 95% 0.073-0.22 ; SFU: OR 0.069, CI 95% 0.033-0.144).The proposed new grading system combining both systems did not show improvement in accuracy for predicting the need of surgery at baseline, in comparison to SFU and APPD (OR 0.09, CI 95% 0.043-0.19).
Conclusion: These preliminary data suggest that at baseline postnatal ultrasound neither APPD or SFU grading alone or a new grading system combining both methods, are good predictors of the need for surgery. Future analyses will be aimed at determining whether accuracy for predicting the need for surgery is improved by evaluating these methods at different post-natal ages or by considering interval changes in APPD and/or SFU over time.

CAKUT: Developmental biology, genetics

Abstract# P-SUN016
Genetic Polymorphisms in Toll-like Receptors among Pediatric Patients with Renal Parenchymal Infections of Different Clinical Severities

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Objective: Although several studies have suggested single gene defects or variations in the genes associated with host immune response could confer differences in susceptibility to urinary pathogen invasion, no studies have examined the genetic polymorphisms in various toll-like receptors (TLRs) that activate innate immune responses in pediatric renal parenchymal infections of different clinical severities, namely acute pyelonephritis and the clinically more severe disease, acute lobar nephronia.
Methods: Patients who fulfilled the diagnostic criteria for acute pyelonephritis (APN) and acute lobar nephronia (ALN) without underlying diseases or structural anomalies, except for vesicoureteral reflux (VUR), were enrolled. Genotyping of the single nucleotide polymorphisms (SNPs) in the genes encoding TLR-1, TLR-2, TLR-4, TLR-5, and TLR-6 was performed by matrix-assisted laser desorption/ionization time-of-flight-based mini-sequencing analysis.
Results: A total of 16 SNPs were selected for genotyping. Analysis of 96 normal and 48 patients' samples revealed that only four SNPs had heterozygosity rates >0.01. These SNPs were selected for further investigation. Hardy-Weinberg equilibrium was satisfied for the observed genotype frequencies. Statistically significant differences in the genotype frequency of *TLR-2* (rs3804100, T1350C) between controls and ALN or (APN+ALN) combined group were identified using the recessive model with the correction for multiple-SNP testing. Further genotype pattern frequency analysis in *TLR-2* SNPs (rs3804099 and rs3804100) showed significantly reduced occurrence of the rare allele homozygote (CC+CC) in the no-VUR subgroup of APN and ALN cases.
Conclusion: As the inflammatory responses in ALN patients are more severe than those in APN patients (higher CRP levels, longer duration of fever after antibiotic treatment), these findings suggest that the genetic variant in *TLR-2* (rs3804100, T1350C) may protect the host from severe urinary tract infections as ALN.

Abstract# P-SUN017
FXR expressed in mesangial cells and induced apoptosis

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Objective: Farnesoid X receptor (FXR) is a member of nuclear receptor superfamily. FXR is highly expressed at liver, intestine, adrenal gland and kidney. It participates in regulation of glucose and lipid metabolism, as well as hepatic regeneration. But its role in kidney especially mesangial cells is not clear. In this study, we focus on the effect of FXR in mesangial cells.
Methods: In the cultured mouse mesangial cells line, we detected the expression of FXR using PCR and Western blot analysis. Using luciferaes reporter assay experiment, we defined the transcriptional activity of FXR. MTT, heochest staining and flow cytometry experiments help to detect the apoptosis of mesangial cell.
Results: In the present study, in the cultured mouse mesangial cells line, we detected the expression of FXR. Using luciferaes reporter assay experiment, we found that GW4064 and chenodeoxycholic acid (CDCA), both are agonist of FXR, can increase the promoter activity of FXR in mesangial cells. FXR agonists decreased viability of mesangial cells both in time dependent and dose dependent manner by MTT detection. Using heochest staining and flow cytometry we found the cells show apoptosis with FXR agonists treatment. And the protein level of cleaved caspase3/9 were increased obviously by FXR agonists.
Conclusion: FXR expressed in mesangial cells and have activity of transcriptional regulation. Activated by agonist, FXR induced apoptosis of mesangial cells. The present study helps determining a new mechanism of mesangial cells injury and related nephropathy.

Abstract# P-SUN018
Expanding the Mutation Spectrum for Fraser Syndrome: Identification of a Novel Heterozygous Deletion in FRAS1

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Objective: Fraser syndrome (FS) is a rare autosomal recessive inherited disorder characterized by cryptophthalmos, laryngeal defects and oral clefting, mental retardation, syndactyly, and urogenital defects. Mutations in the *FRAS1*, *FREM2*, and *GRIP1* gene have been identified causing FS. So far, 26 mutations have been detected in *FRAS1*. The mutational spectrum includes nucleotide substitutions, splicing defects, a gross insertion, and small deletions/insertions.
Methods and Results: A family presented to our department in 2012 for genetic counseling because of an abnormal pregnancy in 2005. Prenatal ultrasound of the fetus showed renal agenesis on the left side and a multicystic dysplastic kidney on the right side. The fetus was

stillborn at 29 weeks of gestation. Post mortem investigations additionally showed bilateral anophthalmia, bilateral cleft lip and palate, tracheal stenosis, and anal atresia type II. Retrospectively, we made the clinical diagnosis of FS and initiated genetic analysis. While molecular examination of the fetus was ongoing, the mother became pregnant again. Ultrasonography of the second fetus showed bilateral cleft lip and palate. Post mortem investigations after induced abortion showed syndactyly between the fingers and the toes and an atresia of the epiglottis. Because of poor DNA quality of the first fetus, direct sequencing was then performed in the parents and identified a novel heterozygous mutation (p.Glu3449GlyfsX2) in the father. The mother did not show any causative mutation in *FRAS1*, but presented with multiple homozygous polymorphisms. Array-CGH was additionally performed and revealed a heterozygous interstitial deletion on chromosome 4q21.21 containing *FRAS1*. Array-CGH and mutational analysis of both fetuses showed that the fetuses were carrier of both mutations.

Conclusion: Here we report the first case of a family with two patients with FS due to a deletion and a novel mutation in *FRAS1*. To date, large deletions of the *FRAS1* gene have not yet been described. Therefore, they seem to be a rare cause for FS but should be considered in patients with a single heterozygous mutation. Our findings expand the spectrum of causative mutations in FS.

Abstract# P-SUN019

First evidence of NPHP9 null-mutations in humans resulting in renal-pancreato-hepatic dysplasia

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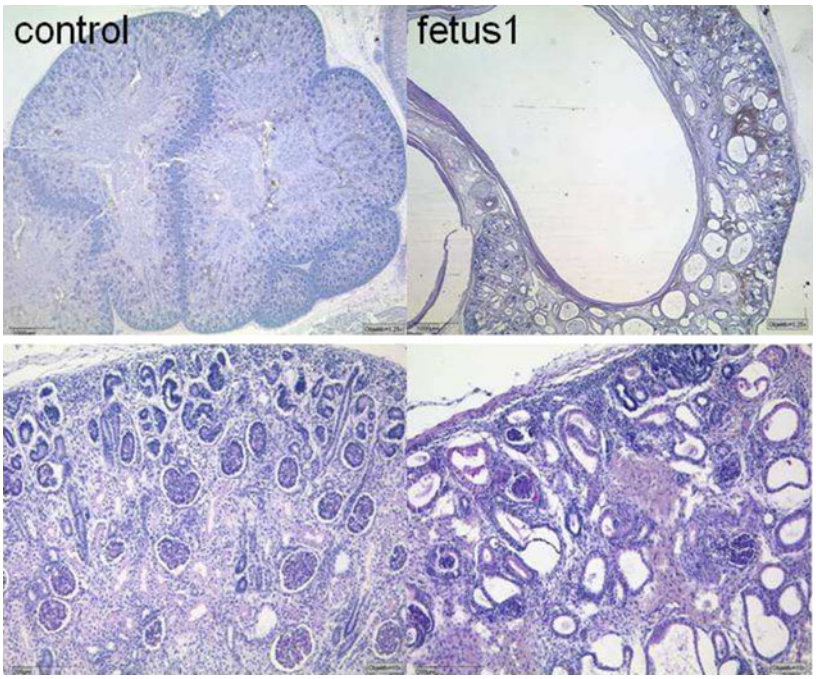
Objective: Ciliopathies display a broad spectrum of phenotypes ranging from rather mild manifestations to lethal multisystemic syndromes, most of them sharing cystic kidneys as a common feature.
Methods: We here present a consanguineous family with three affected foetuses showing an early embryonic phenotype with enlarged cystic kidneys (see Figure), ductal plate malformation, liver and pancreas dysplasia as well as developmental heart disease. Whole-genome analysis for linkage by homozygosity mapping resulted in two peaks on chromosome 9 and 17 (max. LOD score was 3.6). One of the most interesting candidate genes was Nek8 (NPHP9), a kinase involved in ciliary dynamics and cell cycle progression. Single hypomorphic point mutations in NPHP9 have previously been identified to cause human nephronophthisis and juvenile cystic kidney disease in jck mice.
Results: In all affected foetuses we indeed identified the homozygous nonsense mutation c.1795C>T (p.Arg599X) in exon 13 of the NPHP9 gene leading to a premature stop codon. In Western blotting analysis using lysates from the fetal fibroblasts and age-related controls, we confirmed complete loss of NPHP9-protein expression in the affected patients. Furthermore, we showed a dramatic decrease in NPHP9 mRNA-expression which was reversed by treatment with cycloheximide confirming nonsense-mediated decay. In the cultured fibroblasts derived from these foetuses we found reduced expression levels of the classical ADPKD genes, PKD1 and PKD2 as well as high levels of c-MYC each of which are known to promote cystogenesis and proliferation. We furthermore linked NEK8 with NPHP3, another NPH protein known to cause a very similar phenotype in case of null-mutations. Both proteins interact and activate the Hippo effector TAZ. Accordingly, TAZ target genes such as Birc5 and ITGB2 are significantly downregulated in the fetal fibroblasts.
Conclusion: Taken together, this is the first evidence of NPHP9-null mutations in humans resulting in a multisystemic embryonic lethal phenotype in contrast to the known missense mutations in nephronophthisis. Intriguingly, at the same time, a NPHP9 knockout-mouse modell confirmed analogous findings in mice.



Abstract# P-SUN020

Enalapril Treatment in Early Life Causes Lifelong Progressive Renal Injury in the Kidneys of Adult Male Rats

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Objective: Interruption of the renin angiotensin system (RAS) during the period of ongoing nephrogenesis produces renal histological abnormalities and functional defect. We have previously shown that the RAS block even after the completion of nephrogenesis induces renal injury in young male rats. However, at present there is a lack of studies as to long-term renal effects exposed to blockade of the RAS after the achievement of nephrogenesis. The aim of the present study was therefore to determine the longstanding renal consequences of early postnatal RAS inhibition after the completion of nephrogenesis in adult male rats.
Methods: Newborn Sprague-Dawley male pups were given enalapril (30 mg/kg/day) or vehicle by orogastric tube between the ages of 2 and 4 weeks postnatally. Body weight, blood pressure (BP) and renal alterations were determined at 6 and 12 months, respectively.
Results: Pups in the neonatallyenalapril-treated rats weighed less than rats in the control group between 16 days and 5 weeks of age and more than those between 14 weeks and 12 months ($P< 0.05$). Mean BP levels in the enalapril-treated rats were not different from the controls at 6 months; however, they were higher than the LC group at 12 months ($P< 0.05$). At 12 months, apoptotic renal cortical cells were increased in the enalapril-treated rats, compared to the controls ($P< 0.05$). The enalapril-treated group showed increased glomerulosclerosis and tubulointerstitial fibrosis at 6 and 12 months ($P< 0.05$). In the immunoblotting and immunohistochemistry, neonatallyenalapril-treated rats showed increased intra-renal expression of matrix metalloproteinase (MMP)-9 and decreased angiotensin II receptor type (AT) 1 at 6 months ($P< 0.05$). At 12 months, the expressions of tissue inhibitor of MMP-1 and plasminogen activator inhibitor-1 were increased and AT2 expression was decreased in the kidneys of neonatallyenalapril-treated rats ($P< 0.05$).
Conclusion: Our findings suggest that angiotensin II inhibition even after the completion of nephrogenesis can induce deferred systemic hypertension and progressive renal damage in adult male rats.

Abstract# P-SUN021

ARE PAX2 GENE POLYMORPHISMS ASSOCIATED WITH THE GRADE OF RENAL PELVIC DILATATION IN CAKUT PATIENTS?

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Objective: Several studies support a role for PAX2 gene in kidney organogenesis. Therefore, this study aimed to investigate the correlation between PAX2 polymorphisms and the grade of renal pelvic dilatation (RPD) in a Brazilian sample of CAKUT patients.
Methods: This study included 259 healthy controls and 60 patients prenatally diagnosed with CAKUT and followed up at the Pediatric Nephrology Unit of the Federal University of Minas Gerais, Brazil. A detailed antenatal renal ultrasound (US) was performed at 28 weeks of gestational age. RPD was considered to be present if the maximum anteroposterior diameter (APD) of the renal pelvis was equal to or greater than 5 mm on prenatal US. Patients with CAKUT were stratified in two groups: APD equal or higher 15 mm (n=29), and APD<15 mm (n=31) on prenatal US. Patients and healthy controls were submitted to intravenous puncture to collect peripheral blood for genetic analysis. DNA was extracted from peripheral blood lymphocytes according to the method described by Lahiri and Nurnberger (1991). For allelic discrimination we used the made-to-order TaqMan (Applied Biosystems) probes to PAX2 rs11190693, rs2077642, rs6421335, rs4244341 and rs11190698 SNPs. Allelic discrimination analysis was performed at a Real time PCR device. Case and control samples were randomly arranged in plates with at least 20% of genotypes retyped as quality control. The SNPs used were chosen based on the HapMap database with a selection criterion of r2>0.8 and minor allele frequency (MAF)>0.2. The study followed the Declaration of Helsinki and was approved by the local Ethics Committee. Differences between genotype distribution and allele frequency were tested by chi-square analysis. The level of significance was set at $p<0.05$.
Results: The allelic and genotype frequencies of the studied SNPs for the PAX2 gene did not differ between CAKUT patients with APD equal or higher 15 and APD<15 mm on prenatal US. Similar results were found when we compared these case groups to controls.
Conclusion: There was no association between the frequency of polymorphisms of PAX2 gene and the grade of RPD detected during fetal screening by ultrasonography in CAKUT patients. Further studies with larger CAKUT samples are needed to support our preliminary results.Financial support: CNPq, FAPEMIG, CAPES

Abstract# P-SUN022

A novel infantile variant of nephronophtisis associated with Koganocculomotor apraxia and normal brain imaging

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Objective: Nephronophtisis (NPHP) is a group of genetic diseases responsible for end stage renal disease (ESRD) in childhood. Most of the responsible genes (> 10 described so far) reside in the epithelial cilium, which manifests in many organs including: kidney, retina, biliary duct and brain.
Results: we have identified 4 members of an extended Bedouin family with a high rate of consanguinity. They all presented in infancy (mean: 4+/-1 months) with failure to thrive. Renal insufficiency was associated with normal sized echogenic kidneys, hypertension and hyperkalemia. One renal biopsy at age 13 months revealed chronic tubulointerstitial nephritis. During a mean follow up period of 4-15 years there has been no progression to ESRD (eGFR: 34 +/- 4 ml/min/1.73m^2 in 3 and normal in 1). No hepatic or retinal involvement was found. However, a developmental regression leading to psychomotor retardation and losing expressive verbal skills was observed in all children. The children had hypotonia which evolved into muscle tone spasticity thereafter. Cranial nerves examination showed occulo-motor apraxia (Cogan-type: head thrusting to initiate horizontal eye movement from straight position). Deep tendon reflexes were exaggerated with bilateral extensor plantar responses. The patients were able to walk on broad base and ataxic. However, specific cerebellar function tests were normal. Kyphoscoliosis in different severity was evident. Brain MRI was negative in 3/4 tested children. Genetic analysis ruled out any linkage to 13 candidate genes (NPHP1, to-13).
Conclusion: this is a novel variant of NPHP, with renal and striking neurologic involvement, but lack of correlates in brain MRI.

Abstract# P-SUN023

Identification and characterization of de novo gene variants in congenital anomalies of the kidney and urinary tract (CAKUT)

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Objective: Congenital anomalies of the kidney and urinary tract (CAKUT) constitute the principal cause of end-stage renal disease in children. They comprise a range of structural malformations, including renal agenesis, renal hypoplasia, cystic and non-cystic kidney dysplasia, duplex collecting system, and ureter abnormalities. While often CAKUT arises sporadically, the occurrence of syndrome phenotypes and familial clustering suggests a strong genetic link influencing disease origin. Currently, several genes have been linked to CAKUT pathogenesis; however the genetic aetiology for many CAKUT phenotypes remains unclear.
Methods: A unique cohort of CAKUT families encompassing the complete CAKUT spectrum was recruited through collaborations within the EURenOmics project. We are employing next generation sequencing approaches to identify novel genetic causes for CAKUT. Focus will be on whole-exome sequencing in severe cases, with the hypothesis that in a substantial part of these cases *de novo* variants underlie disease aetiology. An *in vitro* IMCD3 (murine inner medullary collecting duct) spheroid assay and an *in vivo*zebrafish model will be used to analyse expression patterns and to knockdown and/or overexpress the identified genes and variants for further functional characterization.
Results: Here, we demonstrate the genetic variants identified in a family affected with kidney dysplasia under the *de novo* hypothesis.
Conclusion: The identification of novel gene defects underlying CAKUT pathogenesis will enhance our knowledge on the molecular networks controlling kidney development and the disease phenotypes. Characterization of the complex genotype-phenotype relationships within CAKUT will improve the DNA diagnostics toolbox for CAKUT patients and their relatives, facilitating early diagnostics, prognostics, and ultimately improvement of treatment strategies.

Abstract# P-SUN024

Environmental Factors and Fetal Urinary Malformations

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Objective: Incidence of urinary malformations is high in humans. Both intrinsic and extrinsic factors may be associated with the etiology of various kinds of urinary malformations, in which environmental factors have drawn more and more attention of researchers. The development of kidneys and other urinary tract organs also follow the natural rule of gene-environment-lifestyle interaction.
Methods: Based on recent original publications and the experience with the disease of our group, we systematically reviewed the environmental associated aspects of maternal and fetus factors, as well as genetic factors, which might be involved in urinary malformations.
Results: Incidences of urinary malformations are high. Urinary malformation is associated with low birth weight, maternal diseases, placental insufficiency, maternal drug exposure, and maternal exposure to environmental pesticides.Living environment, socio-economical factors and genetic factors may also influence the incidence of urinary malformation.
Conclusion: Understanding the influence of environmental factors to the development of renal system and the urinary malformation is of pivotal importance in better adjusting to the environment so as to further improve life quality.

Abstract# P-SUN025

Prevalence of HNF1B gene mutations in children with clinical phenotype of polycystic kidney diseases

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Objective: Hepatocyte nuclear factor 1 beta (gene *HNF1B*) is an essential transcription factor for kidney, liver and pancreas development. Mutations in *HNF1B* are known to cause broad spectrum of kidney pathology including cystic kidney diseases. It has been demonstrated recently, that one patient can harbour mutations of two different cystic kidney diseases genes ("oligogenic disease pattern"). The aim of our study was to analyze the prevalence of *HNF1B* gene anomalies in a large cohort of children with clinical phenotype of autosomal dominant a recessive polycystic kidney diseases (ADPKD and ARPKD; *PKD1*, *PKD2* and *PKHD1* genes) to identify patients with more than one mutated gene.
Methods: We used direct sequencing and MLPA to diagnose mutations in *HNF1B* gene in cohorts of children with clinical phenotype of ADPKD (n=68) and ARPKD (n=27).
Results:*HNF1B* gene heterozygous mutation combined with *PKD1* gene heterozygous mutation was detected in 1 case (prevalence 1.5% in the ADPKD cohort). Due to family history of ADPKD the patient was diagnosed presymptomatic with polycystic kidney at the age of 2 years. His father and paternal grandmother are also showing polycystic kidneys. The patient is 9 years old now and has normal renal function, normal blood pressure and normal glucose metabolism.
Conclusion: We report a low prevalence of combined gene mutations in children with polycystic kidney diseases and surprisingly mild phenotype in the patient with combined defect in *PKD1* and *HNF1B* gene. *The study was supported by grants NT11402 and MZ NT11457.*

Abstract# P-SUN026

Early Postnatal Gentamicin Treatment Reduces Glomerular Number In Extra uterine Growth Restricted Wistar Rats.

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Objective: Nephrogenesis is the process that leads to the formation of nephrons and ceases around the 36th week of gestation in man, without the possibility of additional formation later in life. A lower number of nephrons is associated with an increased risk at chronic kidney disease later in life. In the Netherlands, 8% of all children are born preterm, and many are treated with drugs and/or suffer from extra uterine growth restriction (EUGR) that may potentially reduce nephron formation. In this study we investigated the impact of gentamicin and ceftazidime on kidney development, alone and in combination with EUGR.
Methods: Wistar rats were allocated with either normal litter size (12 pups) or an increased litter size (20 pups), resulting in EUGR. Both cohorts were divided in control and intervention groups where animals

were administered vehicle, 4 mg/kg gentamicin or 5 mg/kg ceftazidimeip at postnatal day 2-8. At day 8 and 35, animals were sacrificed and kidneys were collected. Day 8 kidneys were examined for mRNA expression in a selection of targets, proliferation, apoptosis and general histopathology. Total glomerular count (estimated using stereology) and glomerular generation count were performed in kidneys collected at day 35.
Results: Gentamicin treatment in combination with EUGR resulted in 20% less glomeruli compared to sham treatment. No clear distinctions were noted in mRNA expression levels, glomerular generation count or general histopathology. The proliferation/apoptosis balance is currently under investigation.
Conclusion: Early postnatal gentamicin treatment in combination with EUGR tends to decrease the total glomerular number in Wistar rats, of which the pathways were not clarified yet. The long-term clinical sequelae need further study.

Abstract# P-SUN027
Dysfunctional pathways in polycystic kidney disease: Therapeutic targets

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The polycystic kidney diseases (PKD) are a group of disorders associated with progressive loss of renal function, cysts and/or fibrosis of the biliary tract, and variable extra-renal manifestations. Investigations by numerous groups over the past decade have led to the characterization of *PKD1*, *PKD2*, and *PKHD1*, as the major disease genes involved in the autosomal dominant and autosomal recessive forms of PKD, respectively; defined signaling pathway abnormalities that drive disease pathogenesis in these disorders; and identified targets for novel therapeutic approaches. This presentation will provide an overview of the PKD-related pathways and the impact of targeted interventions on disease progression in PKD experimental models. These pre-clinical studies have set the stage for recent clinical trials in adults with ADPKD, and hold therapeutic potential for children with ADPKD, as well as ARPKD. In addition, PKD model systems are well suited to explore the complex interactions among the pathways disrupted in PKD-related kidney and liver disease. The ultimate goal is to translate these insights into more effective therapeutic strategies for future clinical trials in children, as well as adults with PKD.

Abstract# P-SUN028
Clinical features and mutation of NPHP5 in two Chinese siblings with Senior-Loken syndrome

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2 Department of Paediatrics, the third Affiliated Hospital, Guangzhou, P. R. China
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Senior-Loken syndrome (SLSN) is a rare syndromic form of nephronophthisis that is associated with retinal dystrophy. Up to now, 7 genes (*NPHP1-6* and*NPHP10*)are associated with SLSN; *NPHP5* mutation is known to cause classical SLSN (SLSN5). Here we report two sisters (II-4, II-5) with SLSN5 from a Chinese Han ethnic family. Both affected sisters exhibited leber's congenital amaurosis and juvenile nephronophthisis that progressed to end stage renal disease by the age of 16 years and 9 months (II-4), and 12 years and 9 months (II-5). Sequence analysis showed a homozygous truncate mutation, c.1090C>T (p.R364X), in *NPHP5* in the patient tested (II-4). This mutation is predicted to intruduce a new open reading frame that results in a truncation of the C-terminal 235 amino acids of nephrocystin-5 and losing function of it. Both parents carry a single heterozygous mutation in the same position. Homozysous deletion of *NPHP1* was not found in this pedigree.

Abstract# P-SUN029
Role of Autophagy in Obstructive uropathy

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Objective: Urinary tract obstruction results in obstructive uropathy characterized by epithelial atrophy and nephron loss leading to renal failure. Understanding the mechanisms of tubular atrophy may help reduce the incidence of end-stage renal disease.
Methods: Using mouse models of congenital UPJ obstruction and unilateral ureteral obstruction (UUO), we tested the hypothesis that, in response to obstructive injury, a stress-responsive transcription factor FoxO3a induced renal epithelial autophagy and subsequent tubular atrophy.
Results: We showed that autophagy, a lysosomal degradation pathway was enhanced in obstructed and atrophic renal tubules of mouse kidneys with congenital UPJ obstruction and UUO indicated by the accumulation of autophagosomes and high level of autophagy protein LC3-II. Autophagy was accompanied by the increase of activated FoxO3a localized to the nuclei of tubular epithelial cells. Co-infection of IMCD3 cells with adenoviruses expressing constitutively activated FoxO3a (caFaxO3a) and GFP-LC3 resulted in a significant increase in the formation of GFP puncta that represented autophagical vacuoles under both nutrient abundant and depleted conditions. Autophagic cells displayed cell atrophy. Pathway focused PCR array indicated higher expression of Atg4, Atg9 and Sqstm1 in cells infected with adenovirus expressing both caFoxO3a and GFP-LC3 compared to cells infected with adenovirus expressing GFP-LC3 alone, indicating the activation of autophagic pathway by caFoXo3a. Furthermore, deletion of FoxO3a caused a reduction of autophagic protein LC3-II in the kidneys.
Conclusion: Our results suggested the importance of FoxO3a in mediating epithelial autophagy and tubular atrophy. Further understanding of molecular regulation in autophagy may identify therapeutic targets to reduce tubular atrophy and nephron loss.

Abstract# P-SUN030
Ontogeny of the circadian molecular clockwork in the rat kidney

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Objective: Most physiologic processes exhibit day/night rhythms driven by the circadian clockwork, including kidney functions such as water and electrolyte homeostasis. Circadian expression of numerous genes critical for these functions (e.g. αENaC, SGK1 and NHE3) has been demonstrated. The central molecular clockwork appears to develop gradually during early postnatal life. We sought to describe the development of the circadian gene expression patterns in the kidney.
Methods: Pregnant SD rats and their pups were housed under 12/12h light-dark cycles and constant temperature with free access to food and water. Offspring (7/group) were sacrificed at 4 hour intervals on embryonic day 20 and 1, 4 and 12 weeks postnatally. Gene expression

patterns were profiled by real-time rtPCR for the canonical clock genes, Clock, Bmal1, Rev-Erbα, Per1, Per2, Cry1 and the kidney specific clock-controlled genes α ENaC, Sgk1 and NHE3. Circadian rhythms were assessed by cosinor analysis.

Results: Rev-Erbα and Per2 gene expresion exhibited significant circadian rhythms at all time points. BMAL1, Per1, Cry1 and SGK1 were expressed constantly on embryonic day 20 but developed significant circadian rhythmicity within the first postnatal week. Rhythmic expression increased in amplitude and showed a phase shift at 4 and 12 weeks. Rhythms of Clock, α ENaC, and NHE3 were observed at neonatal age, phase-shifted in the first postnatal week and were lost for αENaC and NHE3 at 12 weeks.

Conclusion: Our findings demonstrate a complex time course of development of the canonical molecular clock genes during early postnatal life in rats. Clock-controlled tubular genes show divergent patterns of circadian rhythmicity, with amplitudes increasing in some and dampening in others. We postulate that circadian tubular functions emerge in early postnatal life from integration of internal and external cues.

Abstract# P-SUN031

The role of perlecan in the kidney development of intrauterine growth restriction rat

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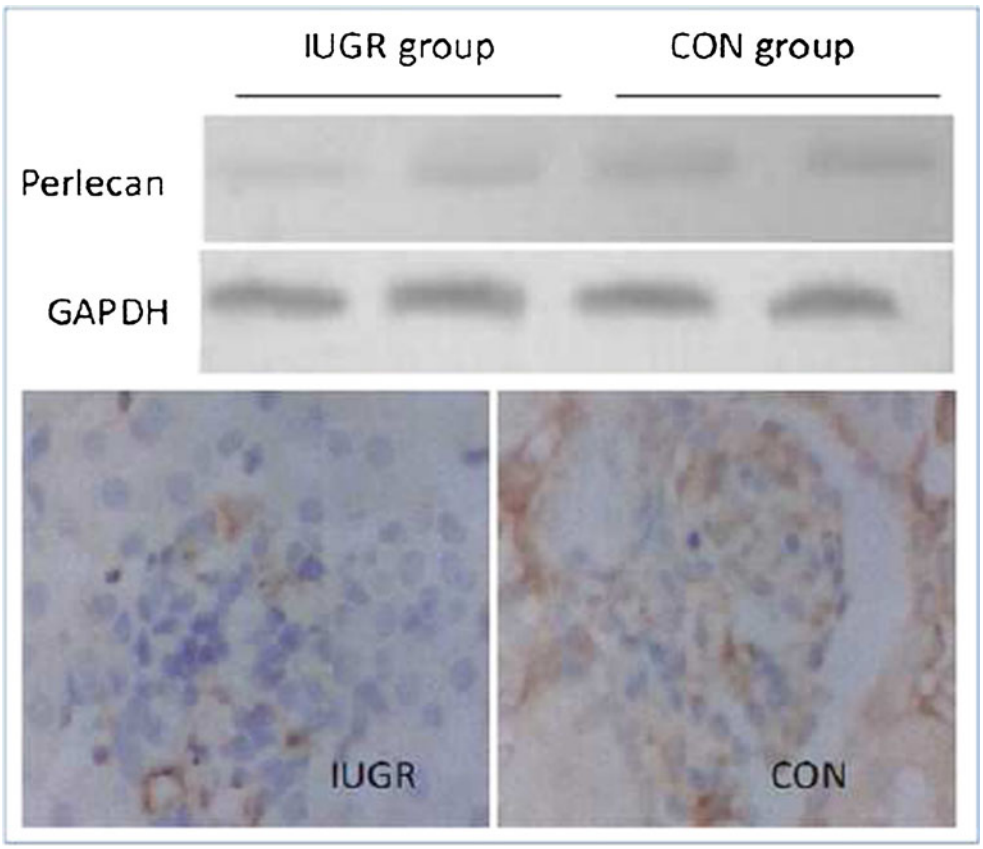
Objective: The detailed pathogenic mechanism for the abnormal nephrogenesis in intrauterine growth restriction (IUGR) is largely unknown. Perlecan is a multi-domain extracellular matrix proteoglycan that plays a crucial role in tissue development and organogenesis. The current study was to investigate the expression pattern of perlecan in the kidney of IUGR rats to explore the potential pathogenesis of abnormal nephrogenesis in IUGR.

Methods: To induce IUGR model, a low-protein isocaloric diet, consisting of 6% protein, to the IUGR group throughout the entire pregnancy while the control group were supplied with conventional feed (22% of protein). The resulting newborn rats with body weights two standard deviations below the average were assigned to the neonatal IUGR rats (IUGR group). Sixteen newborn and postnatal four-week rat's kidney were harvested (n=8 per group). Kidney tissues of newborn rats from IUGR and CON group were subjected to Western Blot. Immunohistochemistry was performed to detect perlecan expression level and site. For postnatal four weeks, real-time PCR was used to quantitate the mRNA expression level of perlecan.

Results: Theoffspring of maternal isocaloric protein restriction dam were significantly lighter than controls (CON vs IUGR,6.75±0.35g vs 4.84±0.38g, P<0.01=. Nephron number in IUGR group in postnatal four weeks was decreased by about 30% compared with control rats (CON vs IUGR group, 3666±2889 vs 26333±1603, P<0.01=. Significant decreased protein expression of perlecan was found with western blot and immunohistochemistry between IUGR and CON newborns' kidney. Although lower expression of perlecan in IUGR newborn kidney, no difference of perlecan mRNA level was detected in postnatal 4 weeks' IUGR kidney compared with control rat (CON vs IUGR, 0.45±0.008 vs 0.45±0.005,P>0.05).

Conclusion: Perlecan expression was significantly decreased in IUGR newborns' kidney. When kidney development was completed, there was no difference between IUGR and CON group in postnatal 4 weeks. The expression pattern of perlecan in IUGR kidney suggests that it may involved in the abnormal development of IUGR kidney and further study is needed to uncover the action mechanism.



Abstract# P-SUN032

RENAL ABNORMALITIES IN FAMILY MEMBERS OF INDIVIDUALS WITH CAKUT

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Objective: Congenital abnormalities of the kidney and urinary tract anatomy (CAKUT) are common in children and occur in 1 out of 500 newborns Most cases of CAKUT are sporadic and some of them have a positive family history. The genetic causes for the nonsyndromic forms of CAKUT are unknown. The objectives of this study are to determine whether CAKUT occur in familial patterns and to identify if phenotypical variability of renal malformations exists in affected families.
Methods: The medical files of CAKUT patients were retrospectively reviewed, and renal and urinary tract abnormalities were recorded for all affected relatives.
Results: We rewieved1166 patients with CAKUT. Out of these patients,103 (47 males, 56 females) (8.8 %) patients with the mean age of 3.1 +/- 3.7 years had their relatives with kidney or urinary tract abnormalities of whom 54 (52.4 %) were first degree relatives. The most common abnormalities were vesicoureteral reflux in 46 (44.7 %), ureteropelvic junction stenosis in 20 (19.4 %), ectopic kidney in 18 (17.5 %), unilateral renal agenesis/hypoplasia-dysplasia in 6 (5.8 %) and multycystic dysplastic kidneys in 5 (4.8 %). Thirteen patients were diagnosed prenatally. Consanguinity was present in 26 (25.2 %) family. The most common abnormalities in relatives were vesicoureteral reflux in 30 (29.1 %), unilateral renal agenesis in 25 (24.3 %) and ureteropelvic junction stenosis in 15 (14.6 %). Same urological abnormalities, of which the most common abnormality was vesicoureteral reflux, were observed in 32 patients and their relatives.
Conclusion: Some forms of congenital anomalies of the kidney and urinary tract abnormalities have a familial pattern, involving incomplete and variable penetrance. Molecular genetic studies will give important details of urinary tract morphogenesis in the near future. Family members of CAKUT should be informed and followed carefully fort he possible urinary tract abnormalities.

Abstract# P-SUN033

Rare variants in children with a solitary functioning kidney - THE KIMONO-GENE STUDY

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Objective: The KIMONO-GENE study is designed to identify rare genetic variants that predispose to congenital anomalies of the kidney and urinary tract (CAKUT) using high-throughput genetic strategies. We recently demonstrated that rare genic copy number variations (CNVs) account for up to 20% of patients with renal agenesis or hypodysplasia. Here we propose to investigate the role of rare CNVs and point mutations in three genes implicated in familial forms of CAKUT (HNF1B, PAX2, and DSTYK) in children with a solitary functioning kidney derived from the KIMONO cohort study.
Methods: Genome-wide genotyping for CNV analysis was performed with the IlluminaOmniExpress platform (730,525 markers). To identify rare pathogenic CNVs, we used genetic matching based on ethnicity and genetic background using genotyping data from >25,000 controls. Sanger sequencing of HNF1B, PAX2 and DSTYK was performed to search for deleterious point mutations in all patients without pathogenic CNVs. Allelic frequencies were compared to about 6,500 individuals from the exome variant servers and to 78 healthy controls matched by ethnicity and geographic origin.
Results: The KIMONO-GENE cohort included 81 children with a solitary functioning kidney (males: 64%). Clinical phenotypes were unilateral renal agenesis (n=28; 35%), multicystic dysplastic kidney disease (n=30; 37%), renal hypodysplasia (n=9; 11%), vesicoureteric reflux (n=9; 11%) and obstructive nephropathy (n=5; 5%). Thirty-seven (45%) children had additional CAKUT, whereas 26 (32%) children had extra-renal anomalies. Nineteen children (23%) had a positive family history for CAKUT. Preliminary analyses indicate that in a large fraction of patients the disease is caused by either rare copy number variations that disrupt genes or by point mutations in HNF1B, PAX2, and DSTYK.
Conclusion: This first phase of the KIMONO-GENE study indicates that we can provide genetic diagnosis in a substantial fraction of children with a solitary functioning kidney. Future directions will include whole exome sequencing in all patients who do not carry rare pathogenic CNVs or mutations in HNF1B, PAX2, or DSTYK, to identify novel genes predisposing to CAKUT.

Abstract# P-SUN034

The Significance of PAX2 expression in the ureter epithelium of the children with vesicoureteric reflux

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This work was supported by the grants from Ministry of Chinese Science and Technology (2011CB944001)

Objective: The aim of this study was to investigate the PAX2 expression in children with vesicoureteric reflux and try to find the role of PAX2 in the mechanism of VUR.
Methods: Paraffin sections of 26 primary VUR patients abnormal ureters and 3 normal ureters were done with immunohistochemistry method in Children Hospital of Fudan University from 2007 to 2010. We investigated the expression of PAX2 in VUR patients by immumohistochemistry. To identify the immunophenotype of cells, double immunohistochemistry was performed using cytokeratin18 (CK18), shown to be an immunocytochemical marker of ureter epithelium cells, as the second primary antibody. In order to better understand the role such PAX2 expression changes in VUR patients, we evaluated ureter epithelial cell apoposis status by TUNEL together with the expression of uroplakin III (UPIII) by immumohistochemistry. Images were analyzed with microscope Leica and Qwin software.
Results:PAX2 expression was showed in the ureter epithelium cells in all sections of VUR patients, there was no obvious PAX2 but CK18 expression on the ureter epithelium in the control group,PAX2 positive cell was significant than the control group[(43.48±15.13)%vs(0.056 ±0.026)%,P < 0.0001].Tunel staining showed apoptosis cell in ureter epitheliumof VUR patients was higher than control group [(44.83 ±11.76)%vs(7.33±1.52)%,P<0.01].Normal ureters showed a continuous uroplakin III staining in the ureter epithelium umbrella cells,while VUR patients ureters showed discontinuous one.
Conclusion: The results indicated that PAX2 does still express in primary VUR patients,it was may due to the urothelial epithelium cells still under differentiation. Our findings provide support for the suggestion that the ureter epithelium cells of VUR patients were premature,which may lead to the urinary tract anti-reflux mechanism defects in VUR patients,resulting in reflux occurs.

GN: Alport syndrome

Abstract# P-SUN035

A comparison of phenotypic features in patients of X-linked and autosomal recessive Alport syndrome

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Objective: To further improve the recognition of Alport syndrome.
Methods: Patients with COL4An (n=3, 4 or 5) mutations, admitted in Department of Pediatric, PekingUniversityFirstHospitalduring 2005 to 2009, were retrospectively studied. The clinical and ultrastructural characteristics were compared between male patients with X-linked Alport syndrome and patients with autosomal recessive Alport syndrome.
Results: There were 54 male patients with X-linked Alport syndrome and 14 patients with autosomal recessive Alport syndrome. Compared to male patients with X-linked Alport syndrome, in patients with autosomal recessive Alport syndrome, episodic gross hematuria was prominent (P<0.001). Family history was also different between the two groups (P=0.016). However, there was no significant difference in age of identification of symptoms, initial manifestations, levels of proteinuria, extrarenal signs and ultrastructural glomerular basement membrane changes between the two groups.
Conclusion: There were some features that distinguish patients of X-linked and autosomal recessive Alport syndrome.

Abstract# P-SUN036

Differential diagnosis of Alport and Thin Basement Membrane Nephropathy.

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Objective: Alportsy (AS) and thin basement membrane nephropathy (TBMN) are caused by mutations in the Col4A3, Col4A4 and Col4A5 collagen type IV genes. Early differential diagnosis is crucial for the treatment, however clinical manifestation occurs only at a later age. Our aim was to evaluate the feasibility of different molecular genetic approaches for the differential diagnosis of AS and TBMN.
Methods: We investigated 20 COL IV nephropathy families. The renal biopsies led to diagnoses of AS in 7 families, and of TBMN in 6 families. In 7 others, the diagnosis of familial hematuria (FHU) was based on the clinical symptoms.We examined the cosegregation pattern of hematuria with STR markers and LOD score analysis. We performed mutation screening with High Resolution Melting (HRM) and Sanger sequencing of COL4A5 linked families. As an alternative method we sequenced all A3-A4-A5 genes by new generation sequencer. Gene enrichment was performed by the AmpliSeqamplicon based target enrichment system.
Results: A linkage to the Col4A3/Col4A4 genes was identified in 5 families (FHU in 3, AS in 2 families, 25%, LOD score range: 0.20-3.51). The XL-AS pattern of inheritance seemed likely with Col4A5 in 9 families (45%, LOD: 0.43-4.20); we found 4 mutations by HRM and sequencing in this group. In 2 FHU families, the linkage to chromosomes 2 and X was precluded. Additionally we found 10 new mutations by the new generation sequencing method.
Conslusion: Knowledge of the genetic background of Col IV nephropathy is essential to avoid the misdiagnosis of FHU and early AS. Linkage analysis of collagene type IV nephropathy patients is a cheap convient method for family analysis, however it is often uninformative in small families. HRM analysis and conventional sequencing were more time consuming and costly while it identified less mutations than new generation sequencing.

Abstract# P-SUN037

Novel mutation in COL4A5 1365_1373delTCCAGGCCC Causes Alport syndrome in a Chinese family

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Objective: To determine the genetic abnormality of a Chinese family with gross hematuria but the normal IV collagen fluorescence in nephridial tissue.
Methods: The genomic DNA of the pedigree was analyzed. Genomic DNA was extracted, then hybridization and sequencing.
Results: We found a novel indel mutation of 1365_1373delTCCA GGCCC in X Chromosome.This mutant was verified in the other family member.
Conclusion: The new found mutant of IV collagen with normal fluorescence but showing the Alport symptom.

Abstract# P-SUN038

Genetic testing of Mongolian children with Alport syndrome

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Objective: Genetic analysis provides the only conclusive diagnosis of the Alport syndrome at the moment. Previously no genetic testing was employed to detect mutations in the *COL4A5* gene in Mongolian patients with Alport syndrome.
Methods: We studied 4 unrelated Mongolian patients in whom the diagnosis of Alport syndrome was suggested by clinical presentation and family history of hereditary kidney disease. Patient genomic DNA was extracted from nucleated cells from peripheral blood using an established method. The mutation analysis in the *COL4A5* gene using systematic screening of entire coding regions of the gene was performed at the Seoul National University Research Center.
Results: The age of patients at the time of genetic testing varied between 2 and 7 years old. The study revealed hemizygous and heterozygous mutations in the *COL4A5* gene in all 4 patients.
Conclusion: The genetic testing of mongolian pediatric patients with clinical presentation and family history suggesting Alport syndrome, detected mutations of *COL4A5* gene. Further studies needed to identify more patients with Alport syndrome and determine the mode of transmission in order to improve prognosis and genetic counseling.

Abstract# P-SUN039

Use of paraffin-embedded renal section for immunofluorescence staining in Alport syndrome

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Objective: To establish the diagnostic technique of X-linked Alport syndrome(XLAS) by immunofluorescence staining of type IVcollagen α5 chains on paraffin-embedded renal sections.
Methods: 4 patients with X-linked dominant form of AS(3 males and 1 females) were retrospectively analyzed,who were admitted between April,2012 to January,2013. AS was diagnosed according to clinical symptoms,family history,pathology,immunofluorescence staining of type IVcollagen chains on renal. Normal portions of renal tissue from 4 patients with renal duplication were used as controls.Type IV collagen α5 chains were stained by indirect immunofluorescence staining method on paraffin-embedded renal sections. Three antigen retrieval

methods, including microwave treatment,pepsin digestion and microwave treatment plus pepsin digestion were first used in the controls, to find the best antigen retrieval method for type IV collagen α5 chains.The results were compared with immunofluorescence staining on fresh frozen sections from the same set of cases to evaluate the methodology.
Results: The type IV collagen α5 chains immunofluorescence stain were negative on formaldehyde-fixed tissue and paraffin-embedded sections preceded by microwave treatment or pepsin digestion epitope retrieval alone, but the paraffin-embedded renal sections preceded by microwave treatment after pepsin digest 10minutes, type IV collagen α5 chains showed continuous linear pattern along glomerular basement membrane on sections from the controls, negative for X-linked dominant male AS patients, intermittent linear pattern for X-linked dominant female AS patient. The same results as immunofluorescence on frozen tissue.
Conclusion: XLAS can be diagnosed by immunofluorescence staining of type IV collagen α5 chains on paraffin-embedded renal sections.Moreover,it can make those Previously suspect XLAS diagnosis by clinicopathology or renal biopsy electron microscope to be definite,which is a useful technique for diagnosis of XLAS.

Abstract# P-SUN040
Clinicopathological study of Children Alport syndrome and distribution features of type IV collagen in Alport patients

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Objective: To analyze Clinicopathological of children Alport syndrome and different tissue distribution characteristics of type IV collagen in Alport patients.
Methods: 20 patients with AS of southwest China were Retrospectively reviewed,the clinical data were collected. The distribution of type IV collagen α chain in renal and skin tissue were detected by indirect immunofluorescence assay.
Results: Most of children showed microscopic hematuria associated with proteinuria as Initial symptoms. The levels of protein in 24h urinary was higher in patients with isolated proteinuria than that of hematuria with proteinuria (P <0.05). The findings by light microscope Mostly revealed mild to moderate mesangial proliferative glomerulonephritis (MsPGN)(15/20). Ultrastructure studies showed laminating ,splitting of glomerular basement membrane (GBM) in 16 specimens(basket-weaving in 1) and Variable thickning,thinning of GBM in 1.Based on the different AS genotypes' immunofluorescence characters of type IV collagen αchains in base membrane,15 patients (75%) were diagnosed as X-linked dominant inherited AS (XLAS),and 5 patients still not yet determine the inherited types according to the deletion of type IV collagen α5 chains. 3 children with AS were also detected of collagen type IV α5 chain in Epithelial basement membrane (EBM) ,the results of immunofluorescence staining were negative in 1male (XLAS) and normal in 2 females(one's mother exhibited discontinuous or mosaic pattern in the immunofluorescent staining of the epidermal basementmembrane,the patient was presumed as carrier of XLAS. the other couldn't be defined inherited type).
Conclusion: In southwest of China, the clinical manifestation were variegated in children with Alport syndrome, microscopic hematuria associated with proteinuria appeared in most patients. Light microscope change mainly showed MsPGN. The detection of type IV collagen α chain in renal or skin tissue was an efficient and reliable method for the X-linked variant of the AS diagnosis.

Abstract# P-SUN041
Using of competitive fluorescence multiplex PCR in the molecular diagnosis of X-linked Alport syndrome

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Objective: Alport's syndrome (AS) is a clinically heterogeneous hereditary nephritis. Approximately 85% of AS is X-linked (XLAS) and due to mutations in COL4A5 gene. Nearly 90 gross deletions of COL4A5 gene have been reported. The conventional techniques used for the detection of such rearrangements are time consuming, with low throughput analysis. The aim of the present study was to evaluate the ability to detection of deletion and duplication genotypes of *COL4A5* and COL4A6 genes using competitive fluorescence multiplex PCR.
Methods: DNA samples from 22 unrelated Chinese patients (14 males and 8 females) with clinically suspected of XLAS and 4 healthy controls were analyzed. We used competitive fluorescence multiplex PCR to coamplify COL4A5 gene and four reference genes in a single reaction. When a mutation involved in exon 1 of COL4A5 gene, the same method was used to coamplify COL4A6 gene and three reference genes in a single reaction. Any copy number loss suggested by this method was verified by electrophoresis of corresponding PCR amplified products or DNA sequencing to exclude possible DNA variations in the primer regions.
Results: Of the 22 patients, 4 patients had large deletions removed the5'part of both *COL4A5* and *COL4A6* genes, 2 had large deletions of comprising more exons of COL4A5 gene, and 2 had large deletions involving a single exon of COL4A5 gene. No duplication was found.
Conclusion: Our results show that competitive fluorescence multiplex PCR is a good alternative to classical techniques for deletion and duplication genotyping. This method is well suited to measuring gene copy numbers.

Abstract# P-SUN042
The clinical and pathological features of children with Alport syndrome that was onset of nephrotic syndrome

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Objective: To analyze the clinical and pathological features of children with Alport syndrome (AS) that was onset of nephrotic syndrome (NS).
Methods: To retrospective analyze 2 cases of Alport syndrome diagnosed in our hospital, in order to improve the level of clinical diagnosis.
Results: Of the 2 cases, 1 were female and 1 male. The patient's age was 3 and 14 years old. The major clinical manifestations were edema, proteinuria (>50mg/Kg/d) ,microscopic hematuria, and normal renal function. The clinical diagnosis is nephrotic syndrome (primary nephritic type NS). The urine protein was still positive after 8 weeks enough prednisone treatment. Of the 2 patients, all showed mesangial proliferative Glomerulonephritis (MsPGN) under the light microscope. For immunofluorescence, there was IgM as the dominant deposition in 2 patients, All showed slightly thick glomerular basement membrane (GBM) pathological changes under electron microscope. High-frequency hearing, eye slit lamp and eye ground were no abnormal. 2 cases had positive family history of microscopic hematuria. They were diagnosed as Alport syndrome with abnormal skin α 5 chain in collagen type IV distribution. Until now the urine protein has persisted for 1 ~ 2 years.
Conclusion: According to the references, the major clinical manifestations were hematuria and proteinuria ,nephrotic syndrome (29.8%). So the differential diagnosis is more important,especially in steroid-resistant nephrotic syndrome .The immunofluorescence test of α chain in collagen IV should be used as an important diagnostic method.

Abstract# P-SUN043
Analysis of proteinuria in Chinese male patients with Alport syndrome undergoing ACEI/ARB therapy

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Objective: Alport syndrome (AS) is a hereditary nephritis characterized by hematuria, proteinuria, progressive renal failure, and specific ultrastructural lesions of the glomerular basement membrane (GBM). In recent years, ACEI/ARB are recommended for the treatment of children with AS. Here we show the retrospective observational data from Chinese male patients with AS undergoing ACEI/ARB treatment.
Metholds: Up to 74 male patients with AS from 71 families, undergoing ACEI/ARB therapywere included in this analysis. Clinical and laboratory data (how the diagnosis was made, renal parameters before and after ACEI/ARB therapy such as, 24 hours proteinuria, urine protein and creatinine ratio, urine microalbumine and creatinine ratio, serum creatinine, creatinine clearance, hearing loss, eye symptoms, death of all cause, and side effect of medicines). Data were updated via outpatient follow-up.
Results: The mean age of all patients was 10.9±5.0 years (minimum 2.6 years old, maximum 28 years old), the mean age at start of ACEI/ARB therapy was 7.9±4.8 years (minimum 1year old, maximum 24years old), and the mean time of follow-up was 2.5±1.9 years (minimum 0.5 year, maximum 8.6 years). 46% (22/48) patients were detected with hearing loss. 12.5% (6/48) patients present with eye symptoms. The proteinuria of 53% patients was over 1 g/24h. In all, 2 (3%, age 17 and 22 years old) of the patients died from ESRD, 9 (12%, mean age 13.7±5.1) patients showed an impaired creatinine clearance, 57 (77%) patients presented with proteinuria, and 6 (8%) with microalbuminuria. The proteinuria was decreased greatly after one year treatment with ACEI/ARB and kept stable during follow up for four years with treatment compared with it was before treatment (1.75±1.51g/24 hour VS 1.18±1.21 g/24 hour). No significant side effects were observed.
Conclusion: ACEI/ARB treatment can reduce the proteinuria of patients with Alport syndrome without significant side effects. However, the only double-blind, randomized, placebo-controlled, multicenter phase III tria l of ACEI in AS has just started in 2012, we hope it can provide more reliable and comprehensive information for the treatment of patients with Alport syndrome.

Abstract# P-SUN044
X-linked Alport Syndrome in Children: Clinical and Pathological Features

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Objective: To analyze the clinical and pathological characteristics of X-linked Alport syndrome in children.
Methods: Information gathered from the clinic and pathology in 62 cases from March 1989 to August 2012.
Results: Four autosomal recessive Alport syndromes (AR-AS) and 58 X-linked Alport syndromes (XL-AS) in all. Of the XL-AS, 47 were boys 7.8 +/- 3.9 years old (0.8-16 years) and 11 were girls 4.9 +/- 2.7 years old (1.9-11years). Microscopic haematuria and/or albuminuria was seen in 70.2%males and 45.5%females. Gross haematuria was seen in 29.8% males and 54.5%females. Upper respiratory tract infection causes haematuria or proteinuria in 82.1%males and 83.3%females. There was no significant difference in gender with positive family history, impaired renal tubular proteins, hytertention, impaired renal function, hearing loss, ocular abnormalities or renal pathological changes under light microscopy. However, significant differences in gender was found in the proportion of typical changes of the glomerular basement membrane with widely thickening or thinning and dense layer torn or stratified under electron microscope. Proteinuria in XL-AS males, but not in XL-AS females and AR 鈥?AS patients progressed significantly with age (R=0.501, p=0.000). Five cases that we followed showed worsening renal function year after year, and they developed ESRD before 16 years of age. Twenty-seven cases were detected for a3 or a5 chain in renal or skin since 2008, two of them were diagnosed with AR-AS and the others were XL-AS.
Conclusion: XL-AS was mainly inherited, and XL-AS males mainly performed in typical changes of GBM. Proteinuria increased remarkably with age, with much more severe prognosis in XL-AS males. The detection for a3 or a5 chain in renal tissue or skin is helpful to diagnose Alport syndrome and confirm inheritance modes.

Abstract# P-SUN045
ALPORT SYNDROME: THE EFFECTS OF SPIRONOLACTONE ON PROTEINURIA AND URINARY TGF-beta1

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Objective: Alport syndrome (AS) is a progressive hereditary glomerular disease. Recent data indicate that aldosterone promote fibrosis mediated by the transforming growth factor-b1 (TGF-b1) pathway. This may worsen proteinuria in many chronic renal diseases. Spironolactone (SP) antagonises the pro-fibrotic effect of aldosterone and reduces proteinuria. The aim of this study was to evaluate the efficacy of SP in reducing proteinuria and urinary TGF-b1 excretion in proteinuric AS patients.
Methods: The study involved 10 children with AS, normal renal function and persistent proteinuria (> 6 months; uPr/uCr ratio >1). SP 25 mg once a day for six months was added to their previous treatment with ACE inhibitors with or without angiotensin-II receptor blockade. Urinary and blood samples were examined every month. Urinary TGF-b1 levels were measured twice before and three times during SP treatment. Plasma renin activity (PRA) and serum aldosterone levels were also measured. In 8 patients uPr/uCr was also assessed after nine months and twelve months of SP treatment.
Results: After the beginning of SP therapy, all patients showed a significant decrease in uProt/uCreat ratio (mean from 1.77+/-0.8 to 0.86+/-0.6; $p<0.001$) and urinary TGF-b1 levels (mean from 104+/-54 to 41+/-20 pg/mgCreatinine; $p<0.01$), which started after the first 30 days of treatment and remained stable throughout the period of SP administration. PRA remain unchanged, and serum aldosterone increased from mean 105+/-72 pg/ml to 303+/-156 pg/ml ($p<0.001$). The only side effect was the onset of gynecomastia in an obese boy. After one year of therapy, uPr/uCr remains low (mean 0,82 +/- 0,48).
Conclusion: The addition of SP to previous treatment with ACEI with or without ARB significantly reduced proteinuria. This was mediated by a decrease in urinary TGF-b1 levels and was not associated with any major side effects.

GN: SLE, ANCA associated nephritis

Abstract# P-SUN046
Lupus's Mortality in Children's Hospital 1. Viet Nam

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Objective: We studied the clinical characteristics and the causes of death in children with systemic lupus erythematosus (SLE).
Methods: We present 21 death cases in SLE patients followed in the Nephrology-Department over a 5 year period (from 2005- to 2010).
Results: A total of 21 of 207 patients died (16 female, 5 male). The median age was 13.1 years. The duration of disease varied from 2 weeks to 85 months (mean 18.8 months). The main cause of hospitalization was infection in 76% (57.1% of cases with pneumonia.). The causes of death were infection in 52.3% of cases, active disease manifestation in 38.1% (33.3% of cases with left ventricular failure suggestive of myocarditis) and complication of treatment in 9.6% of cases.
Conclusion: There was a high death rate in children with SLE in our hospital. Many factors contributed to death in SLE patients: lupus nephritis was the major contributory factor observed in all cases. Infection and lupus myocarditis were significant causes of death in SLE patients.

Abstract# P-SUN047
The performance of the new SLICC criteria for the classification of SLE in children

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Objective: The Systemic Lupus International Collaborating Clinics (SLICC) have recently suggested a new set of criteria for the classification of SLE. We aimed to compare the sensitivity and specificities of the ACR criteria and the new SLICC criteria among pediatric SLE patients.
Methods: Three main lupus centers from Europe were included in this study. One of these centers was mainly a pediatric nephrology center from UK whereas one was a pediatric rheumatology center from Italy and the last one was a mixed one from Turkey. Features present at onset in childhood-onset SLE (cSLE) patients, diagnosed and followed by these three departments between January 2000 to December 2012 were retrospectively analyzed. For the specificity analysis, patients admitted to the respective departments, in whom ANA was deemed necessary by the caring physician in the diagnostic work-up were included as controls. PASW 18,0 for Windows was used for statistical analysis.
Results: Both criteria were analyzed in 154 cSLE patients with a mean age at disease onset of 12,7 years and 95 controls with a mean age of 8,6 years. In the overall group, the sensitivity and specificity of the ACR criteria were 76,6% and 91,6% respectively and that of the SLICC criteria were 98,7% and 82,1% respectively. Four hemolytic uremic syndrome (HUS) patients and four juvenile dermatomyositis (JDM) patients met the SLICC criteria whereas 22 lupus nephritis fell to meet the ACR criteria.
Between the three centers there were marked differences among certain clinical features. On the other hand when we compared our results with the reported prevalances of the criteria in adults, renal involvement, neurologic findings, hemolytic anemia, positive titers for ANA and anti-dsDNA were more frequent among children whereas chronic skin lesions were less ($p<0,005$).
Conclusion: In this pediatric cohort SLICC criteria performed better, was more sensitive ($p<0,001$), had fewer misclassifications, but was less specific ($p=0,016$). The specificity of the SLICC criteria was jeopardized with the HUS and JDM cases. The prevalance of certain criteria were significantly different between adults and children, this may necessitate further revision in pediatrics.

Abstract# P-SUN048
CD8+ Treg cells are associated with decreasing disease activity after intravenous methylprednisolone pulse therapy in childhood lupus nephritis with heavy proteinuria

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Objective: Regulatory T (Treg) cells play a crucial role in expansion of autoreactive cells and associate with disease activity of systemic lupus erythematosus (SLE). We focus on the effect of CD8+Treg cell after intravenous methyl-prednisolone (IVMP) pulse therapy.
Methods: From April 2009 to April 2011, we studied forty patients with active class III/IV childhood lupus nephritis (LN) with heavy proteinuria receiving IVMP therapy for five days. Peripheral blood mononuclear cells (PBMCs) and renal tissues were obtained and followed up. Clinical data and disease activity were assessed.
Results: After IVMP, we found significant increase in both C3 and C4 levels, decrease in anti-dsDNAAb, daily urine protein loss and activity of LN by SLEDAI-2k in childhood LN. There was a definite increase of both CD4+CD25+FoxP3+ and CD8+CD25+Foxp3+Treg cells numbers, intracellular IL-10 and granzyme B in CD8+FoxP3+Treg cells from PBMCs. Reverse correlation was detected between serum anti-C1q antibody and CD8+FoxP3+Treg cells in PBMNCs ($r=-0.714$, $P<0.01$) before IVMP. After IVMP, decreasing serum anti-C1q antibody accompanied with increasing CD4+FoxP3+Treg cells. In vivo, a few of both CD4+FoxP3+ and CD8+FoxP3+Treg cells in renal tissue of LN patients before IVMP by double immunohistochemical stain. Follow-up renal biopsy specimens in ten cases after IVMP revealed less CD3+ interstitial lymphocyte infiltration but definitely more CD4+FoxP3+, CD8+FoxP3+Treg and CD8+granzyme B+ cells. Renal activities of LN by SLEDAI-2k were significantly higher than those in two weeks after IVMP ($P<0.01$). In vitro, IVMP-treated CD8+CD25+ Treg cells directly suppressed CD4+ T cell proliferation and induced CD4+CD45RO+ cell apoptosis. CD8+Treg cells also reduced interferon-r response in PBMCs to major peptide autoepitopes from nucleosomes after IVMP therapy. siRNA of FoxP3 significantly suppressed granzyme B expression and decreasing CD8+CD25+Treg cell induced CD4+CD45RO+ cell apoptosis.
Conclusion: CD8+FoxP3+Treg cells restored after VMP therapy and played an important role of immune modulatory effect in controlling autoimmune response in LN.

Abstract# P-SUN049
Clinical And Pathological Features Of Antineutrophil Cytoplasmic Antibody Associated Glomerulonephritis In Children

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Objective: To characterize the clinical manifestations, renal histopathological findings and outcome of antineutrophil cytoplasmic autoantibody (ANCA)-associated glomerulonephritis in children.
Methods: The clinical manifestations, renal histopathological findings and outcome were studied in 5 children with ANCA-associated glomerulonephritis. Serum pANCA/MPO-ANCA and cANCA/PR3-ANCA were tested by enzyme-linked immunosorbentassays(ELISA).
Results: (1) The mean age at onset was 9.2+/- 2.8 years (range 5.5 to 12.2 years). Of the five patients, three were female. These patients presented with the following symptoms at onsent: pale in 2, edama, microscopic hematuria and recurrence fever in 1 each. (2) Four of five

patients were positive for pANCA/MPO-ANCA, one was positive for cANCA/PR_3-ANCA. (3) Microscopic hematuria in all cases, proteinuria in 3(one of three reached the standard of nephrotic syndrome). Edema and oliguria in 3, hepertension in 1. Two of the five patients presented renal failure at the time of diagnosis. Four of five patients had glomerular crescents formation(7.7% and 62.9%, respectively). Four of five patients had glomerlar sclerosis (7.7% to 85.7%Tubular atrophy was observed in 4 patients, interstitial inflammation in 4.The immunofluorescent staining revealed a pauci-immune pattern in 5 cases. (4) Four patients who received pulse methylprednisolone and cyclophosphamind(CTX), then followed by oral prednisone got clinic remission with ANCA(-) , ANCA(+/-) and ANCA(+) in one each after followed-up for 6 to 18 months. One patient with renal failure was given up treatment after the diagnosis was made.
Conclusions: ANCA measure and renal biopsy were the key to the diagnosis of ANCA associated glomerunephritis in children. The patients may benefit from early diagnosis, early and long-term steroid and CTX treatment to prevent relapses.

Abstract# P-SUN050
A multicenter clinical retrospective analysis on lupus nephritis in Chinese children

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Objective: We assessed the epidemiological and clinicopathologic characteristics, treatment and prognosis of lupus nephritis (LN) in Chinese children, in order to lay a foundation for standardizing the protocol of diagnosis and treatment of pediatric LN in China in the future.
Methods: This is a multicenter, retrospective and chart review study of children with LN at 26 tertiary hospitals in China, between January 2005 and December 2010. The impact of age, AKI and cytotoxic drugs on patient outcome were evaluated.
Results: A total of 788 questionnaires with complete data were evaluated, including 169 boys and 619 girls. The mean age at the time of disease onset was 10.9+/-2.90 years. The mean SLEDAI was 13.5+/-5.53. The top three most commonly clinical classification of these 788 LN cases were nephrotic syndrome (49.7%), acute nephritis(19.9%) and isolated proteinuria (12.6%). A total of 549 children underwent renal biopsy, the most frequent renal histopathological finding of LN was class IV in 285 patients, class II in 66 and class V+IV in 57. There was no significant difference between age<10 years group (n=316) and age>10 years group (n=472) in SLEDAI score, renal pathological types and prognosis. 242 children with LN were complicated by AKI, when compared with the non-AKI group, the former had older onset age and higher SLEDAI score. The difference in renal pathological types between these two groups was statistically significant (P=0.000). In the patient with the same renal pathological type, the prognosis of patients with AKI was significantly poorer than that of non-AKI group. In the induction phase, CTX and MMF were equally efficacious in the patients with the same pathological type (P>0.05). 482 children with LN had follow-up records, in the 35 patients with disease deterioration, 6 patients were shifted to dialysis and 7 patients died.
Conclusion: AKI was identified as a risk factor for poor outcome in pediatric LN, and renal biopsy should be actively performed in the LN children with AKI. In the induction phase, the efficacy of CTX and MMF has no significant difference. We have to strengthen the follow-up of childhood LN.

Abstract# P-SUN051
Meta-analysis of mycophenolatemofetil versus cyclophosphamide for severe proliferative lupus nephritis

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Objective: To evaluate the efficacy and safety of mycophenolatemofetil and cyclophosphamide in treatment of severe lupus nephritis.
Methods: The data of PubMed , EMBASE, Cochrane Library , CNKI were retrieved to search the studies about the randomized controlled clinical trials (RCTs) in the treatment of severe lupus nephritis by mycophenolatemofetil or cyclophosphamide. Meta-analysis was made to assess the complete remission, partial remission, total remission, infection, leucopenia, gastrointestinal symptoms, amenorrhea, death rate and relapse.
Results: Twelve RCTs in which included 925 patients were collected. Meta-analysis showed that compared with the cyclophosphamide, mycophenolatemofetil was more effective in complete remissions total remission.
Conclusion: The current limited evidence suggests that mycophenolatemofetil is more effective and safe than traditional protocols in treatment of severe lupus nephritis.

Abstract# P-SUN052
Clinicopathological Analysis of Lupus Nephritis in Children based on 28 Years Renal Biopsy Data a Single Center

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Objective: To analyze the epidemiological and clinicopathological characteristics in children with lupus nephritis (LN).
Methods: A retrospective study was done on pediatric renal biopsy database of our center performed from Jan. 1984 to Dec. 2011. All of these patients were diagnosed as LN and under 14 years old.
Results: Of 127 children, 27 were male and 100 were female, accounting for 40.7% (127/312) of secondary glomerular diseases. Mean onset age was 8.9+/-2.5 years and mean age at the diagnosis was 11.3+/-2.2 years. Class G+A (49.6%) was the predominant histopathological class of LN in children, followed by class G(A/C) (14.2%). The manifestations mainly was comprised by nephritic syndrome (50.4%), hematuria and/or proteinuria (23.6%), acute glomerulonephritis (18.1%).The most common histopathologicaltype of children with acute glomerulonephritis and hematuria and/or proteinuria was G+A. Of 3 acuter apidly progressive glomerulonephritis, 2 were class G(A/C) and one was class G(A).
Conclusion: LN was the most common secondary glomerular disease in children performed renal biopsy. The incidence of LN in children was increased rapidly after school age and reached the highest in adolescence. The mainly manifestations were nephritic syndrome, hematuria and/or proteinuria and acute glomerulonephritis. Class G+Awas the predominant histological type of LN in children. There is a correlation between clinical features and renal histopathological class on some degree, not fully parallel. It is better to combine the clinical manifestations and pathological class to direct clinical treatment and estimate prognosis for children with LN.

Abstract# P-SUN053
The Clinical Characteristics and the Radiological Syndromes in 12 children with Neuropsychiatric Systemic Lupus Erythematosus

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Objective: To study the specific clinical characteristics and the radiological syndromes in neuropsychiatric systemic lupus erythematosus, (NPSLE).
Methods: The clinical data and radiological images of twelve children with NPSLE in Shengjing Hospital of China Medical University from January 2005 to January 2013 were analyzed retrospectively.
Results: 12 cases were children with severe Systemic Lupus Erythematosus. Positive CT findings were found in 2 of 3 patients. Positive MRI findings of NPSLE were found in 10 of 11 patients. MRI findings of NPSLE were the following:A total of 6 patients were with diffuse lesions, long T1 and long T2 signal were intensive in cerebral hemisphere , bilateral caudate and cerebellar hemisphere, hyper-intensity on DWI and EPI. Of all the cases, 2 cases with encephalatrophy,and one case with cerebral hemorrhage . 4 cases were with focal lesions, long T1 and long T2 signal was intensive in 2 cases of cerebral hemisphere , one case of brainstem,and one case of cerebellar hemisphere.
Conclusion: The severity of radiological syndromes were not the same to the severity of clinical characteristics.ACL positive might be be related to NPSLE , cases with severe Systemic Lupus Erythematosus were more probably to suffer from NPSLE .Early diagnosis of NPSLE and evaluation of post-therapeutic effect might be provided by CT or MRI, however definite diagnosis of NPSLE should be made in combination with the clinical characteristics of the disease.

Abstract# P-SUN054
Lupus Nephritis in Egyptian Children; a 12-year Experience

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Objective and Methods: We retrospectively evaluated the clinical features, histopathological patterns, treatment modalities, and outcome of children and adolescents with lupus nephritis (LN), followed in Pediatric Nephrology Unit, Mansoura University Children's Hospital between January 2000 and December 2012.
Results and Conclusions: Out of 162 patients diagnosed with systemic lupus erythematosus, LN was reported in 104 (64%), they were 12 males (21%) and 82 females (79%). The mean age at presentation was 12.5 ± 3.2 years, the mean duration of follow up was 2.9 ± 0.28 years (range 2 months – 12 years). Hematuria was present in 56 patients, proteinuria in 96 (15 of them were in nephrotic range), while hypertension was documented in 26 patients. Renal biopsy was done in 101 patients; diagnosis of class II, III, IV, V were 24%, 24%, 38%, and 3% respectively. 2nd renal biopsy was indicated in 44 patients (follow up in 38, lupus flare in 5, no response to therapy in 1 patient), while the third one was needed in only 10 patients. Steroids were the commonest initial medications used in 99 children (37 alone and 62 with others) and cyclophosphamide was used in 47 patients. At the date of the last visit; out of patients who continued follow up , 61.5% had complete remission, 29.5% still had active disease, 1% had end-stage renal disease, and 8% died.

Abstract# P-SUN055
Antiphospholipid antibody and childhood lupus nephritis in Chinese

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Objective: To investigate the prevalence of antiphospholipid antibody (aPL) and the relationship of aPL with clinicopathological characteristics of childhood LN in Chinese.
Methods: The data of aPL tested and renal biopsy were retrospectively analyzed in 50 children with LN , consisting of 11 boys and 39 girls from 1997 to 2010.
Results: The mean age of included patients was 11.8±2.1 years. All patients were tested for lupus anticoagulant (LA) and anticardiolipin (aCL), and 31/50 cases tested for anti-β2 GP I antibody (anti-β2 GPI). The positive rate of aPL was 88.0%. No significant difference was observed in the prevalence of nephrotic proteinuria, macroscopic hematuria, hypertension, or renal failure between aPL-positive and aPL-negative group (P>0.05). Our results suggested lower incidence of hypertension in LA-positive children LN(37.5%) than in LA-negative ones(80%). There was also no significant difference in the pathological type according to ISN/RPS criteria between groups (P=0.322). Children with class V lupus nephritis were all aPL antibody-positive cases. Glomerulus microthrombosis was found in 9 out of 44 cases, mostly aPL-positive (8/9) , 77.8%(7/9) of the patients with TMA was class IV LN. Four children were complicated with thrombosis, two after pulse methylprednisolone treatment, one after central venous catheterization.
Conclusion: There was a higher positive rate of aPL in childhood LN. No significant association was found between aPL and the clinicopathological characteristics of childhood LN. aPL is probably a major cause to induce glomerulus microthrombosis. Pulse methylpredniolone and central venous catheterizaition can be the inducement of thrombosis.

Abstract# P-SUN056
Dynamic Analysis of the immunological characteristics of children with lupus nephritis

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Objective: To investigate the correlation between immune indicators (immunoglobulin, complement, lymphocyte subsets) and SLEDAI score of lupus children, and provide the basis for clinical treatment. In children with lupus nephritis, the immunological characteristics and the imbalance of lymphocyte subsets were observed in the process of diagnosis and treatment. Analysis the SLEDAI score and immunological parameters differences between the conventional drugs and combined immunodeficiency groups, to provide the theoretical direction for lupus treatment.
Methods: A retrospective analysis was made of 42 children diagnosed as lupus nephritis(LN) including 22 cases received DNA immune adsorption treatment and 20 cases received traditional treatment from January 2005 to December 2011 in our hospital. The immunological characteristics and SLEDAI score were observed at the diagnosis, 1 month,3 months, 6 months of treatment and then once half a year. The healthy control group including 11 healthy subjects,5 males and 6 females;average age of 10.5+/- 1.21 years.
Results: We select 42 patients ,of which 11 cases were male, 31 cases were female. average age: 11.7 +/- 1.89; renal biopsy in 32 cases. B-cell levels of preliminary diagnosis were significantly higher than treatment 1 month, 3 months,6 months,1 year,2 years (P<0.05). With the course of treatment and mitigation, the mean value of B cells declined; Each period of treatment, the percentage of B cells still significant higher than the control group(P <0.01). The percentage of CD8+cell in children with SLE is significantly higher that in the healthy control group, the differences were statistical significance (P<0.05).The percentage of CD8+ cells in the preliminary diagnosis was significantly higher than that in the treatment of one month,threemonths,six months, (P <0.01), later has been downward trend, compared with the preliminary diagnosis, the percentage still high (P<0.01) CD4+cells in preliminary diagnosis were no significant

differences compared with the healthy control group , but the level after the treatment of one month, three months later was significantly lower than the preliminary diagnosis and the healthy control group, the percentage significantly decreased (P<0.01). CD4+/CD8+ratio decreased significantly (P<0.01);The levels of immunoglobulin in preliminary diagnosis patients with SLE were significantly higher than the healthy control group; complement C3,C4 were significantly lower than the healthy control group, the differences were statistically significant (P <0.05). The value of complement were significantly increased after treatment.At the same time, the immunoglobulin indicators dynamic declined; Abnormal indicators of lymphocyte subsets reached the peak up to 3-6 months of treatment,and then slowly become normal indicators. After immunoadsorptiontreatment, ANA, ds-DNA and the level of immunoglobulin had obvious decreased(P<0.01). There were no differences in the complements of C3 and C4 between immunosorbenttreatmentand traditional treatment (P>0.05). Compared the lymphocyte subsets between this two groups , there were no differences in the complements of the lymphocyte subsets between this Two groups . Our study also find that there will be a downtrend in the numerus of natural killer cells, the complements of C3 and C4 after the treatment of three years later . The level of immunoglobulin IgG and IgA crosscurrent.Consider three years most children reach puberty, lupus has a tendency to relapse.

Conclusion: It is patency immunologic derangement in the SLE children ,which is more severity than adult. Along with controling of the disease, immunologic derangement will be recovery quickly. At the beginning of the course ,intensive therapy helps to control disease and subsequent treatment from this study ,we can search for several sites which should intensification therapy or adjuvant therapy, that we can be work more handy to the treatment.

Abstract# P-SUN057

Both propylthiouracil and methimazole can induce anti-neutrophil cytoplasmic antibody-associated vasculitis in children: two cases report

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Objective: Propylthiouracil(PTU) and methimazole(MMI) are the most commonly used anti-thyroid agents . Several cross-sectional and prospective studies in adults have demonstrated that PTU could induce anti-neutrophil cytoplasmic antibody (ANCA) associated vasculitis. Two cases in this study proved that both PTU and MMI could induce ANCA-associated vasculitis in children.

Methods: A retrospective investigation of two cases was conducted to define the clinical features and outcomes in children with ANCA-associated vasculitis related with anti-thyroid treatment. Clinialdatas of two cases , including symptoms, signs, serum marker and pathology of renal biopsy, were reviewed.

Results: Patient A , 8 years old girl , had been treated with MMI for two years and presented gross hematuria without other signs of systemic vasculitis. Patients B,12 years old girl, was referred to our center owing to massive pulmonary hemorrhage and severe dyspnea. She had taken PTU for two years and started to complain of arthralgia, myalgia and skin rash 2months before admission. Both of them showed normal GFR and patient A presented nephrotic range proteinuria and significant hematuria while patient B only had slight microscopic hematuria without proteinuria. The titer of anti-myeloperoxidase(MPO) respectively was 135.4RU/ml and 290RU/ml (normal range<20RU/ml) for patient A and B. The characteristics of pathology of renal biopsy were similar: necrosis lesions and fibrocellular crescents were observed in some of glomeruli, and immunoglobulin deposits in mesangial area also could be seen. After admission, the anti-thyroid medications were withdrawn immediately and the patients were given methylprednisolone pulse therapy followed by oral glucocorticoid and mycophenolatemofetil (MMF).Both of the patients improved dramatically after treatment and sustained stable in the follow-up time

Conclusion: Both PTU and MMI can induce ANCA-associated vasculitis in children. The titer of MPO is related with the activity and severity of the disease.The outcomes of anti-thyroid drugs induced ANCA-associated vasculitis may be better than that in the primary ones.

Abstract# P-SUN058

Clinic features of microscopic polyangiitis in 18 children

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Objective,Methods and Results: 18 children with microscopic polyangiitis (MPA) who were admitted to our hospital during the last ten years were subjected to this study. The diagnoses of 13 cases were confirmed by renal biopsy. For the other 5 cases, diagnoses were based on manifestations and serological changes. Of the 18 patients, 14 were primary MPA, included three males and eleven females, the median onset age was 8.8 years (1.9~16.8 years); four were anti-thyroid drugs (ATD) related MPA, all were females, the onset ages were 12.5 years to 16.2 years. All of the 18 MPA patients had renal involvement, 16 of them had hematuria together with proteinuria. Renal biopsies were performed in 13 cases (including 10 primary MPA patients and 3 ATD related ones). Fibrinoid exudation and/or necrosis of glomerular capillary were seen in all biopsy specimens. Crescents and segmental/globe sclerosis were found in 92.3% and 84.6% of these cases, respectively. Of the 13 cases, 3 reached the diagnosis of crescentic nephritis. 88.9% (16/18) patients had extra-renal organ(s) involvement, most commonly, 88.9% (16/18) normocytic normochromic anemia. Both pulmonary and central neural systems involvement were seen in 16.7% (3/18) patients. Rash was only seen in one patient. Fever was not seen. P-ANCA positive were seen in 88.9% (16/18) patients and MPO in 93.3% (14/15) patients. Both P-ANCA and MPO positive were seen in 81.8% (9/11) of all the detected patients. 50% (9/18) patients had received steriods plus cyclophosphamide pulse therapy for more than three months. Varying degrees of remission had been achieved in 88.9% (8/9) of these cases.

Conclusion: In conclusion, both primary and ATD related MPA had female predominance in children. Renal was most commonly involved, followed by anemia. Central nerveous system involvement is not rare among these patients. Fever and rashes which is common in adult MPA patients were not so common in children. Renal biopsy revealed typical changes of MPA. The efficacy of steroid plus cyclophosphamide treatments was seen in these patients.

Abstract# P-SUN059

Immunoadsorption – A new treatment strategy in severe forms of membranous lupus nephritis

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Objective: Membranous lupus nephritis is rare in children. Proteinuria often reaches a nephrotic range. First degree treatment is based on ACE inhibitors and angiotensin receptor blockers together with salt restriction diet. Immunosuppressive treatment with calcineurin inhibitors or mycophenolicmofetil has been reported, but often fails to prevent disease progression towards chronic renal failure.

Immunoadsorption allows relatively specific and effective clearance of circulating immunoglobulins.
Methods and Resulsts: *We report an 11 year-old girl*, 34 kg, with a pure membranous lupus nephritis resistant to treatment with enalapril (20 mg/day), losartan (50 mg/j) and thiazide diuretics, over a five-month period. As nephrotic syndrome persisted (proteinuria 10 g/L), ten sessions of immunoadsorption have been performed over a 13 day period using a central venous catheter. Proteinuria decreased dramatically during these 13 days (4500 mg/mmol$_{\text{urinary creatinine}}$ on D0; 256 mg/mmol on D5 and 35 mg/mmol on day 10. In order to stabilize remission she received two perfusions of rituximab (375 mg/m^2) on D11 and D41 inducing B-cell depletion. B-cell repletion occurred after three months and RTX was reinjected once. The patient has a stable remission with a low residual proteinuria of 30 to 50 mg/mmol after four months and a negative proteinuria from four months to one year after immunoadsorption despite complete B-cell repletion and persistent anti-dsDNA titers.
Conclusion: A complete resolution of treatment resistant nephrotic range proteinuria seems to be possible using immunoadsorption in membranous lupus nephritis. In order to prevent disease relapse rituximab might be an interesting treatment strategy in this setting. Prospective controlled studies are needed to confirm this treatment modality.

Abstract# P-SUN060
Clinical features and outcome of childhood onset ANCA-associated vasculitis: a French nationwide study

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Objective: Data on anti-neutrophil cytoplasmic antibody (ANCA)-associated vasculitis are scarce in children. The current study aimed at describing the clinical features and long-term outcomes of childhood onset ANCA-associated vasculitis (AAV).
Methods: This is a retrospective French multicenter study involving patients in whom AAV was diagnosed before the age of 18 years. Inclusion criteria were 1) granulomatosis with polyangiitis (GPA) or microscopic polyangiitis (MPA) according to diagnostic criteria of the European League Against Rheumatism/Paediatric Rheumatology European Society, and 2) ANCA positivity. Patient and renal survival were analyzed.
Results: Among 66 children included, 80% were female, 40% had GPA and 60% MPA, 75% children were pANCA+ and 25% cANCA+. The average incidence of reported cases over a 25-year period was 0.22 per million children/year, increasing from 0.09 in the 1986-1990 period to 0.43 in the 2006-2010 period. Median age at diagnosis was 11 years, and median time to diagnosis was 3 months. Initial symptoms included fever, deterioration of general condition, skin lesions (40%), arthritis (45%), pulmonary (50%) and renal involvement (85%). Clinical features were similar between GPA and MPA with the exception of upper airway impairment (28%) specific of GPA. Ninety percent of patients achieved remission after induction treatment. After a median follow-up of 5.2 years, 4 patients (6%) died, corresponding to a mortality rate of 1.2 per 100 person-years, and 22 patients (33%) developed ESRD. Median renal survival was 8 years. In multivariable Cox regression, lower glomerular filtration rate at diagnosis, diagnosis delay >1 month, and non Caucasian origin were associated with occurrence of ESRD. Patient and renal outcome did not significantly differ between GPA and MPA.
Conclusion: Childhood onset AAV is characterized by female predominance, delayed diagnosis, frequent renal involvement, and a high remission rate. Pediatricians should be made aware of the early diagnosis and treatment of this disease.

Abstract# P-SUN061
Effectiveness of Intravenous Cyclophosphamide Treatment in Children with Lupus Nephritis

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Objective: The aim of the study is to evaluate the short and long-term efficacy of intravenous pulse cyclophosphamide (IV Cyc) treatment in children with lupus nephritis (LN).
Methods: The medical records of 28 patients (8 male, 20 female) with LN who received IV Cyc treatment between 1999-2011 were investigated retrospectively. Mean age was 12.2±2.2 (9-12) years. Cyc was administered in 500 mg/m^2/dose monthly for 6 months and quarterly thereafter in 21 patients. Remaining 7 patients received only the initial monthly pulses for 6 mounths. Mean follow up duration was 62.7±49 (6-204) months. Renal remission was defined as existence of normal urinary sediment and serum creatinine level along with protein excretion <500mg/day. Extrarenal remission was defined as disappearance of nonrenal findings. Relapse was defined asincrease in serum creatinine and/or proteinuria more >500mg/day.
Results: Fifteen patients (53.5%) had Class 4 LN. Renal remission was obtained in 21 (75%) patients within mean of 11.5 months and 12 of them were in remission at the sixth month. Extrarenal remission was obtained in 25 (89.2%) patients. Relapse was observed in 9 (42.8%) patients. Mean time to relapse was 30±24 (3-72) months. Presence of hypertension, delayed remission, Class 4 LN were more frequent, besides activity and chronicity indices were higher among the patients with relapses, yet these relationships were not statistically significant ($p>0.05$). At the end of the follow up duration, 21 patients were in renal remission, 24 in extrarenal remission, 4 had end-stage renal disease (ESRD). One patient died due to complications of renal failure. ESRD and death were related to elevated serum creatinine levels at presentation ($p=0.047$). Severity of proteinuria, existence of hypertension, neurological involvement, Class 4 LN, and higher activity and chronicity indices were not related to poor prognosis ($p>0.05$). Side effects of IV Cyc were detected in 39.2% of patients. The most frequent side effect was neutropenia (21.4%).
Conclusion: IV Cyc was determined as effective and reliable with minimum side effects to obtain renal and extrarenal remission in pediatric LN. The presence of high serum creatinine at presentation was found to be a poor prognostic factor.

Abstract# P-SUN062
Comparison of mycophenolate v. cyclophosphamide for the treatment of lupus nephritis

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Objective: The standard of care for pediatric systemic lupus erythematosus nephritis (SLEN), class III to class V, is cyclophosphamide (CTX) combined with corticosteroids. IV CTX has many associated adverse effects including bone marrow suppression, hemorrhagic cystitis, and gonadal toxicity. Some studies have described the effectiveness of mycophenolatemofetil (MMF) for maintenance therapy in SLEN. Few studies have looked at MMF as an induction therapy

for SLEN. No significant differences have been established between the two with regards to efficacy but have shown MMF has fewer side effects than CTX. Most studies have been conducted in adults, with limited data in children.To determine if MMF is an effective alternative for induction and maintenance treatment of SLEN compared to CTX.To evaluate improvement in proteinuria and renal function in patients who received MMF v. those who received CTX.To evaluate serologic improvement between groups based on serum dsDNA and complement levels
Methods: Patients ages 2-21 years with SLEN, histologic class III-V that were treated with MMF or CTX in the last 5 were evaluated retrospectively. Two sample t-tests were conducted to determine if mean protein/creatinine ratio, serum creatinine, C3, C4, and hematocrit after induction and after maintenance periods were significantly different in those receiving MMF compared to those receiving CTX.
Results: Data was available for 12 children, 7 females and 5 males (mean age 18.5+/- 2.65 years). Mean age of onset, determined by date of initial renal biopsy was 14.3 +/- 2.39 years. 5 patients were African American, 4 Caucasian, 1 Asian and 2 unknown. dsDNA results were classified as normal (<1:10), low (1:10-1:80), moderate (1:160-1:320) or high (> 1:640). 4 patients received MMF and six received CTX for both induction and maintenance therapy. Two patients received CTX induction and switched to MMF for maintenance.All groups had significant improvement in dsDNA. No significant differences were found in kidney function or disease activity measurements for the two groups.
Conclusion: MMF offers an alternative, effective, induction and maintenance therapy for treatment of children with SLEN.

Abstract# P-SUN063
Clinical features in pediatric systemic lupus erythematosus: a comparative analysis of different age groups

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Objective: Children represent 10-20% of all systemic lupus erythematosus (SLE) patients. The clinical features vary with age. We aim to investigate the correlations between pubescent status, age at disease onset, and the manifestations in pediatric SLE.
Methods: In this single-center study form Shanghai,CHINA, we compared the initial clinical manifestations and laboratory findings of pediatric SLE patients from 2008-2011. Patients were divided into three groups based on age at disease onset: Group A with age £ 8 years old (prepubescent), while group B with age of 8–13 (pubescent) and group C with age of 13–18 (post-pubescent). Initial clinical manifestations and laboratory findings were analyzed.
Results: Fifty-five patients were enrolled in the study including 9 of prepubescent group, 36 of pubescent group and 10 of post-pubescent group. The mean values of disease duration from onset to diagnosis were 4.3 months (range: 0.25-36). The rash, anemia and fever were the most common manifestations at presentation. It was noted the high frequency of renal and hematological involvement in the pediatric population (renal manifestation, 72.7%; hematological involvement 65.5%). The prepubescent patients had higher SLEDAI score than the pubescent and post-pubescent patients at onset ($p<0.05$). Ten patients (18.2%) had NPSLE manifestations on initial diagnosis of SLE with high frequency in young-age onset patients. SLE was diagnosed earlier in the patients with fever, anemia or hematuria, and it was diagnosed later in the patients with arthritis and/or arhthragia. A few non-classical manifestations could be misdiagnosed in pubescent and post-pubescent SLE patients.
Conclusion: The prepubescent patients of lupus could have an severe clinical features including NPSLE and the comparable frequent renal involvement. Fully attention should be paid to the young age-onset lupus patients. And SLE should be promptly considered in the differential diagnosis of an adolescent with unexplained organ involvement associated with fever, rashes or anemia.

Abstract# P-SUN064
Systemic Lupus Erythematosus Nephritis in Cambodian Children: a single-center case series review

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Objective: To determine clinical characteristics and treatment response in children diagnosed with systemic lupus erythematosus (SLE) nephritis at Angkor Hospital for Children (AHC) in Siem Reap, Cambodia
Methods: Retrospective chart review of children treated at AHC from 2001 to March 2013 for SLE nephritis. SLE nephritis was defined as SLE + either increased creatinine level or abnormal urinalysis (UA).
Results:

Gender	24 Female (92%)
Age at onset of SLE Nephritis	11.8 yr (±3.1)
Renal ultrasound performed	9 (35%)
Abnormal renal ultrasound findings	6 (67%)
Hypertension	15 (58%)
Prednisone immunotherapy only	3 (12%)
Prednisone + Chloroquine immunotherapy	12 (46%)
Multi-drug immunotherapy	11 (42%)
Remission	6 (23.1%)
Lost to follow up	7 (26.9%)
Death	5 (19.2%)
Treatment	**Number (%)**
Prednisone	26 (100%)
Chloroquine	18 (69%)
Cyclophosphamide	8 (31%)
Methotrexate	2 (7.7%)
Anti-hypertensive	15 (58%)
NSAID	13 (50%)
Aspirin	2 (7.7%)

Conclusion: This is the first reported case series discussing children with SLE nephritis in Cambodia. Majority of cases were female which is consistent with data reported in other countries. All patients received prednisone as first-line therapy, with chloroquine as the second adjunctive therapy. Of the 6 cases that went into remission, 5 (83%) required only prednisone and chloroquine therapy, perhaps indicating milder disease activity. To determine best treatment options and length of therapy, protocols need to be established based on severity of disease activity.

Complement disorders: Diagnostics

Abstract# P-SUN065
Dense deposit disease, case report

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Objective: Membranoproliferative glomerulonephritis (MPGN) is a rare type II glomerulopathywhich is characterized by the presence in Pathology homogeneous dense deposit along the basement membrane. It usually occurs in young adults aged 5-15 years with no gender predilection. To describe the case of a patient with nephrotic syndrome with torpid whose histopathological diagnosis is a type II membranoproliferative GMN, besides the clinical approach and management.
Method: This is a 13 years, with initial symptoms 6 years of hematuria, edema and nephrotic range proteinuria with no personal history of receiving management for nephrotic syndrome with steroids according to protocol with little response to treatment which is added cyclosporin presenting progressive deterioration of renal function, renal biopsy performed reporting proliferative glomerulonephritis type I, continuous use of cyclophosphamide, with little response was performed so that new renal biopsy mesangiocapillary GMN type Mostros II or dense deposit, then start mycophenolatemofetil in successive examinations carried out, the patient is currently asymptomatic and renal function remained stable.
Results: We describe the findings of renal biopsies, it is important to note that since the patient was torpid rebiopsiada where evidenced the dense deposit disease.
Conclusion: The patient with nephrotic syndrome and torpid, is very important to consider the performance of new renal biopsy to determine the histopathological diagnoses and establish current management adjustments.

Abstract# P-SUN066
Coexistence of atypical HUS with MPGN and ANCA associated vasculitis

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Objective: The simultaneous presence of multiple immune mediated diseases in a single host is rare. The implications of such coexistence relating to the disease pathogenesis and treatment are not well understood. We describe two cases of renal failure with immune mediated overlap conditions.
Methods: Two boys aged 8 years (case 1) and 10 years (case 2) presenting with renal failure secondary to glomerulonephritis are described. Based on the clinical features, a detailed immunological work up and kidney biopsy was performed to arrive at diagnosis. Immune mediated renal dysfunction was present in both cases. Screening for other coexisting auto immune phenomenon was performed based on suspicious clinical features.
Results: Case1 presented with renal failure and D- hemolytic uremic syndrome (D-HUS) with low serum C3. Renal biopsy revealed MPGN type 1.The child improved following treatment with plasma infusions and steroids. Case 2 presented with ANCA positive vasculitis. Renal biopsy was suggestive of focal mesangioproliferative glomerulonephritis. Disease course was further complicated by D-HUS with low serum C3. Factor H antibody was positive. Complete renal recovery was documented following treatment with IV rituximab, steroids, cyclophosphamide and plasmapheresis.
Conclusion: Screening for the presence of coexisting auto-immune diseases is imperative to identify covert immune mediated pathologies and for successful overall management of such cases.

Abstract# P-SUN067
A case of DEAP-HUS

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Hemolytic uremic syndrome (HUS) is characterized by hemolytic anemia, thrombocytopenia and renal dysfunction. Approximately 10% of HUS cases are classified as atypical HUS because they do not show vomiting and diarrhea. More than half of the cases of atypical HUS are caused by complement abnormalities. In particular DEAP-HUS (deficiency of CFHR proteins and CFH autoantibody positive) has attracted attention due to the production of autoantibodies and its unique onset mechanism. A four-year-old male was treated by a local physician for vomiting and diarrhea. Laboratory examinations revealed anemia, thrombocytopenia and renal dysfunction. He was referred to our hospital, where he was revealed to have low complement levels (C3, 50mg/dl; C4, 27mg/dl and CH50, 52U/ml). No verotoxin was detected in his diarrhea. We diagnosed him with atypical HUS and started plasma therapy. He received three plasma infusions and five plasma exchanges, and his anemia, thrombocytopenia and renal dysfunction were resolved in 30 days. We next investigated his atypical HUS subtype. We detected CFH autoantibodies by an ELISA method. We then confirmed the expression of CFHR proteins by a Western blotting analysis, which detected CFHR3 but not CFDH1. Furthermore, we investigated the CFH, CFI and thrombomodulin genes for mutations by a direct sequencing method and examined the CFHR gene by a MLPA method. No mutations were detected by direct sequencing, but homozygous deletion of the CFHR1 gene was revealed by the MLPA. We diagnosed the patient with DEAP HUS. He is now six years old, and has not experienced any recurrence of HUS.

Abstract# P-SUN068
DEPA-HUS in Chinese brothers presenting with recurrent HaemolyticUraemic Syndrome

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Objective: DEAP-HUS (Deficiency of complement factor H-related) plasma proteins and Autoantibody Positive form of Heamolyticureamic Syndrome) represents a relatively new subtype of haemolyticureamic syndrome (HUS). We report two Chinese brothers who suffer from this condition in Hong Kong.
Method: Retrospective review of a10-month old baby of non- consanguineous parents presented with influenza A with acute kidney injury (AKI) (oliguria and creatinine of 500umol/L), microangiopathichaemolyticanaemia (Hb of 6.9g/dL), thrombocytopenia (50x10^9/L), high lactate dehydrogenase (1000 U/L) and low C3 level(0.42g/L). He was managed with haemodialysis and had full recovery of his kidney function in 2 weeks. 3 months later, he developed another similar episode of AKI with roseolainfantum. His condition improved with plasma exchanges and dialysis but had renal impairment afterwards.(eGFR of 32ml/m2/min). He remained well until the 2 years later where again he developed the third episode of AKI with influenza. He responded to plasma exchanges with gradual recovery of kidney function back to baseline. His younger brother also had similar presentation of acute kidney injury with viral illness at 7 months of age and had full recovery of his kidney function after plasma exchanges and temporary haemodialysis.
Results: DEAP-HUS work up was done in view of recurrent and familial occurrence of HUS. Anti-factor H antibody was tested positive in the index patient (antibodytitre of 450, normal <100). Heterozygous

chromosomal deletions on chromosome 1 was found on the complement factor H-related (CFHR) 1 gene, CFHR 3 gene and CFH (complement factor H) gene in both the patient and his younger brother. Their father carries heterozygous deletions of CFHR1 gene and CFH gene and mother carries different heterozygous deletions of CFHR 1gene.

Conclusion: We report two brothers who developed DHEA-HUS. They developed auto-antibody to factor H which resulted in repeated AKI. Both patients responded to plasma exchanges and renal replacement therapy. However, the optimal therapy for prevention of recurrent AKI in DEAP-HUS is yet to be defined.

Abstract# P-SUN069

Budd-Chiari syndrome as the presenting symptom of familial thrombotic thrombocytopenic purpura

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Hypercoagulability states leading to major vessel thrombosis should be ruled out in cases of Budd Chiari syndrome (BCS). Thrombotic thrombocytopenic purpura (TTP) usually causes a thrombotic microangiopathic (TMA) state. TTP may be due to acquired or congenital defects in ADAMTS13, which cleaves vWFmultimers. A 10 year old boy was admitted because of headache, jaundice, epistaxis and macrohematuria. Physical examination revealed purpura, ascites and hepatomegaly without splenomegly. Laboratory examination showed: thrombocytopenia, hyperbilirubinemia, mildly elevated liver enzymes, mild renal insufficiency and elevated LDH. PTT was normal, but INR was increased and D-dimer was elevated. Urinalysis: proteinuria and hematuria. Blood smear showed schistocytes. Serum-to-ascites albumin ratio was 1.8, suggestive of portal hypertension. The child's Hgb rapidly dropped by 3 g/dL. CT and venography revealed evidence for BCS, with complete hepatic vein obstruction and portosystemic venous collaterals. An angiographic thrombolytic attempt was unsuccessful. Coagulation factors analysis showed no evidence for thrombophilia. ADAMTS13 antigen levels were found to be very low at < 3%. The child was initiated on plasma therapy, cryoprecipitate and heparinization, with rapid improvement. Two other affected members in the extended family, who experienced TTP-like episodes during childhood or pregnancy, were also found to have very low ADAMTS13 levels. The child has been since treated with fresh frozen plasma infusions and enoxaparin. He experienced several TTP relapses. Liver biopsy shows evidence of BCS, without cirrhosis. This is the first description of familial TTP presenting with BCS, a major vessel thrombosis.

abstract# p-SUN070

Persistently low complement c3 in a child with post-infectious glomerulonephritis (pign). case report

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Objective: Our objective in this rare case of a 10 yr old male child with clinical diagnosis of post-infectious glomerulonephritis (PIGN) is to highlight that failure of C3 complement to return back to normal levels after 12 weeks following PIGN does not exclusively indicate other diagnosis.

Method: The patient had a regular follow up at our outpatient pediatric nephrology clinic. At each visit, full physical examination was performed including measurement of BP. In addition, urine analysis, kidney function test, serum electrolytes, full blood count and levels of serum C3 were requested. Further investigations for other causes of hypocomplementemia, including renal biopsy were done.

Results: Regular C3 measurement revealed 25mg/dl, 24mg/dl, 24mg/dl, 47mg/dl and 51mg/dl at 3, 4, 6 , 9 and 12 months respectively (normal 80-175mg/dl). C4 was normal at 20mg/dl (11-35mg/dl), ASOT 190 iu/ml, serum creatinine levels were between 0.6mg/dl- 1mg/dl. ANA, ANCA, Hepatitis B and C profiles were negative; urine analysis always had minimal proteinuria and hematuria. Renal biopsy was done 9 months after diagnosis and following agreement of parents, the core biopsy specimen was examined by light and electron microscopy and showed findings that were consistent of resolving PIGN.

Conclusion: Prolonged hypocomplementemia (low C3) beyond 12 weeks after post-infectious glomerulonephritis does not preclude the diagnosis. Other types of glomerulonephritis with low complement C3 should be considered, and finally the renal biopsy in such cases remains essential and the gold standard method for the definite diagnosis.

Abstract# P-SUN071

Complement activation in Typical Hemolytic Uremic Syndrome

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Objective:Typical Hemolytic Uremic Syndrome (HUS) is associated with gastrointestinal infection caused by Shiga toxin- (Stx) producing E. Coli. The role of the different complement pathways has not been extensively studied in Stx-associated HUS. Therefore, the aim of this study was to evaluate the activation of the classical and alternative pathways of complement during the acute phase of Stx-HUS.

Methods: Prospective and longitudinal study including 18 patients diagnosed with Stx-HUS (m/f: 8/10; 32.4 +/- 5.4 months-old) as well as 6 age-matched healthy controls. Blood samples were collected daily between admission and discharge from hospital and the levels of C3 and C4 measured by nephelometry and of C3c by immunofixation in serum, whereas the plasma levels of Bb and Sc5b-9 were determined by ELISA.

Results: The levels of C3 and C4 at admission were comparable to those of controls (133.6 +/- 10.5 vs 127.8 +/- 9.0; 26.9 +/- 2.9 vs 22.4 +/- 1.7 mg/dl, respectively). At admission, levels of Bb, Sc5b-9 and C3c were significantly increased in all patients as compared to controls (6.9 +/- 1.3 vs 1.3 +/- 0.2; 651.2 +/- 130.9 vs 334.8 +/- 40.6 ug/ml and 24.9 +/- 4.4 vs 12.3 +/- 1.4 % of C3, respectively, $p<0.05$). Elevated concentrations of Bb normalized by day 10, but levels of Sc5b-9 remained elevated until discharge (18 +/- 3 days). Levels of Bb were higher in oliguric patients (n=13) vs non-oliguric patients (n=5) (6.8 +/- 1.1 vs 3.3 +/- 0.4 ug/ml). Positive and significant correlations were

detected between C3 and C4, C3c and Bb, C3c and Sc5b-9, Bb and Sc5b-9, blood urea nitrogen and Bb, lactate dehydrogenase and Bb, and negative correlation between thrombocyte count and Bb ($p<0.05$).

Conclusion. Our data demonstrates the activation of the alternative pathway of complement in acute Stx-HUS and points to a pathogenic role of the complement system in the generation of the thrombocytopenia, hemolytic anemia and renal dysfunction observed during the acute phase of the syndrome.

Abstract# P-SUN072

The changing face of HUS in Indian children

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Objective: To study the clinical profile, etiology, clinical course and outcome of children with HUS

Methods: Retrospective analysis of children with HUS seen over a period of 18 months is described. Details regarding the patient characteristics, disease presentation and treatment were assessed. Patient survival and renal outcome was evaluated.

Results: 20 children (13 boys, 7 girls) aged day 2 to 12 years (mean 7.5 yrs) were diagnosed as having HUS. Clinical profile was as follows: Oliguric renal insufficiency in 18 cases, post infectious HUS {post diarrheal(1) and post empyema(1)} in 2 cases. Neonatal HUS secondary to deficiency of membrane cofactor protein in one case while the other case was twin of a macerated fetus. Anti factor H antibodies present in 15 cases. Treatment received: Dialysis in 19 (95%), plasma infusions in 2; plasma exchange in 14(70%) (range :10 to 32 sessions). Additional immunosuppression in 14 cases with anti factor H Ab: steroids (14/15), intravenous cyclophosphamide (7/14), intravenous immunoglobulin (4/14), rituximab (4/14) and MMF (1/14). Duration of oliguria ranged from 4 to 36 days. The common complications encountered were: hypertensive encephalopathy in 13 cases (65%); cardiac dysfunction in 7 cases (35%) with 6 needing mechanical ventilation; severe hemolytic anemia in 3 cases, hemoglobinuria in 2 cases and peripheral gangrene in 1 case. 16 cases survived. There was mortality in 3 cases. One patient with a relapse was lost to follow up. Of the survivors; 14 cases had renal recovery and were off dialysis, one had irreversible renal failure and one is currently on treatment and has not recovered after 70 days of oliguria. 4 cases had relapsing disease. On follow-up in the first year, eGFR ranged from 52 to 144ml/min. Persistent hypertension requiring three to six antihypertensive agents for optimal control was seen in eleven cases.

Conclusion: D- HUS was seen more commonly as compared to D+ HUS, associated with mortality in 20% and irreversible renal failure in 10%. Aggressive immunosuppression may be needed in addition to repeated plasma exchanges.

Abstract# P-SUN073

Complement Factor H (CFH) Autoantibody Associated Hemolytic Uremic Syndrome (HUS): Multicentric data, clinical features and outcome

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Objective: While autoantibodies to CFH are present in 10% patients with atypical HUS worldwide, we report their high frequency (56%) in Indian children with HUS, their clinical features & outcome.

Methods: Of 227 patients (22 centers across the country) with HUS, 127 showed anti-CFH IgG antibodies (>150 AU/ml). These patients received intense plasma exchange (PEX) and prednisone, followed by 1/more agents (cyclophosphamide, rituximab, MMF, azathioprine). Adverse outcome was GFR <30 ml/min (3-months from onset) or patient death.

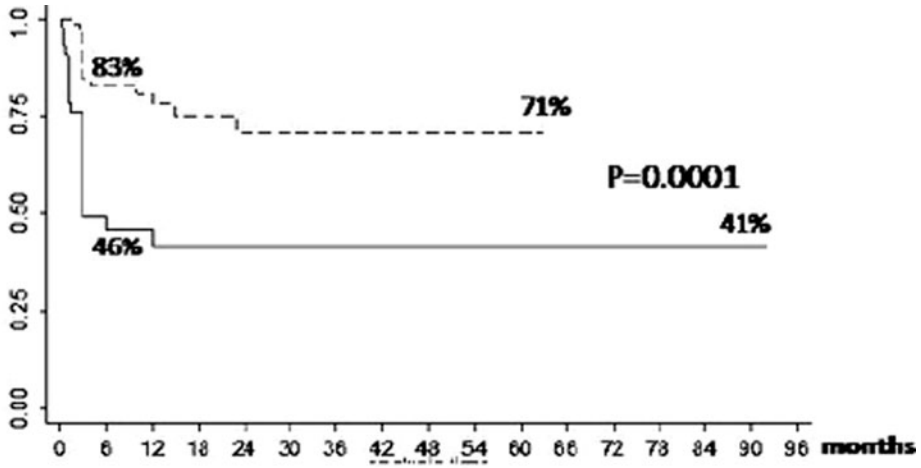
Results: Mean age at diagnosis was 8.3±4.3 yr; illness was preceeded by diarrhea in 11%. Renal failure was severe with anuria, seizures & hypertension (42-66%), low C3 (64%) & high anti-CFH titer (7194±1901 AU/ml); log titers negatively correlated with C3 & not CFH. Kidney biopsy (n=50) showed thrombotic microangiopathy. MLPA & western blot showed homozygous *CFHR1/3* deletionin 65/73 patients (89%) & 13% controls; odds of HUS in homozygotes were 70.4. Intensive PEX resulted in 89% lower antibodies at 3-4 wk. Adverse outcome was seen in 35 (32%) patients at 3-mo and 40 (36%) at 18±12 mo (Table); 11 patients had relapses & 3 successful renal transplantation. Therapy with PEX & steroids resulted in better renal survival (Fig. A). Maintenance immunosuppression reduced risk of relapses (Fig. B); one episode was prevented for 5 patients treated.

Conclusion: Anti-CFH antibodies with homozygous *CFHR1* deletion constitute the majority of children with atypical HUS in India; one-third patients show adverse outcome. Prompt and intensive plasma exchange & immunosuppression enable renal recovery and prevent relapses.

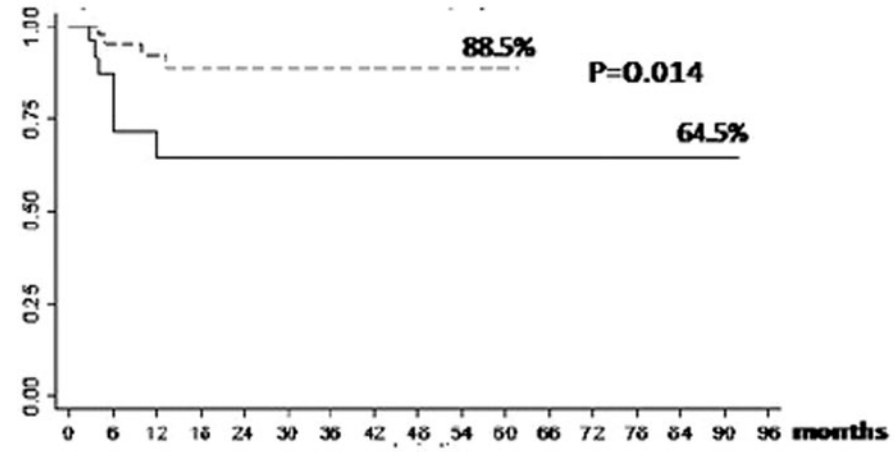
Determinants of adverse outcome

	At 3 months	**Last follow up**
	Odds ratio (95% CI) P	Hazards ratio (95% CI) P
Anuria	2.8 (1.2,7) 0.02	2.3 (1.2,5) 0.02
Creatinine, mg/dl	1.2 (1,1.4) 0.08	1.1 (1,1.2) 0.03
C3 <70 mg/dl	5.5 (1.8,17) 0.002	3 (1.3,7) 0.02
CFH antiody>6000 AU/ml	2.4 (1.1,6) 0.04	2 (1.1,3.7) 0.03
Hematological remission >5 weeks	13.4 (3,56) 0.001	6.4 (2,20) 0.002
Dialysis >4 weeks	3.5 (1.3,9) 0.01	1.4 (0.7,2.8) 0.4
Time to PEX >17 days	7.1 (2.4,21) 0.001	3.9 (1.6,9) 0.002
Intensive PEX & steroids	0.5 (0.3,0.7) 0.001	0.6 (0.4,0.8) 0.001
Relapses		9.5 (3.5,26) 0.001

Funded: **CEFIPRA&Dept. of Biotechnology, Govt of India**



A. Renal survival following therapy with PEX & steroids (broken line) *vs.* no therapy (continuous line)



B. Relapse free survival on maintenance steroids &/or MMF (broken line) *vs.* no therapy (continuous line)

Abstract# P-SUN074

Persistent Decrease of C3 and/or C4 in non-SLE Renal Diseases in Children

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Objective: To investigate the mechanism of persistently low serum levels of C3 and/or C4 in pediatric renal diseases besides SLE, summarize their clinical characteristics and analyze the relevant genes in order to explore proper treatment.

Methods: The study enrolled 5 boys, aged from 5 to 13 years old. Their clinical data (medical history,diagnosis,maintreatment,complementlevelst and follow-up data) and pathologic diagnosis ,genetic analysis were summarized and analysed. They were all ruled out hepatitis B virus associated nephropathy.

Results: Patients in this study were followed up from 1 - 6 years. The C3 and/or C4 in all 5 children were detected in a persistent low level :C3 0.04-0.429g/L(0.6-1.5g/L), C4 0.07-0.11g/L(0.12-0.36g/L). There was 1 boy diagnosed with a-HUS clinically. Renal pathology revealed with MPGN in 1 boy, MsPGN in 1 boy and HSPN in 1 boy, respectively. None of 5 children was diagnosed with SLE or lupus nephropathy. The

majority of the complement genetic analysis revealed the gene mutation and most of them were neither reported before nor recorded in SNP database. Meanwhile, these children had earlier onset age and protracted illness, the conditions of these patients were stable currently and their following conditions and prognosis were still under observations.
Conclusion;Persistent low C3 and/or C4 levels are strongly associated with the reactivity and susceptibility of SLE. But many different glomerular diseases are accompanied with low complement levels, and no evidences of SLE. C3 and C4 deficiencies are also reported to related to some different kinds of glomerulopathies. We conducted gene analysis on those doubtful congenital complement deficient patients. That would be helpful to summarise characteristics of these patients, explore disease mechanisms of complement deficiency, and also can help us find out more reasonable treatment methods.

Abstract# P-SUN075
Factor H antibody associated atypical HUS in children: 2 year follow up data from the international Innsbruck HUS-Net aHUS registry

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Objective:Antibodies against complement factor H (FH Ab) have been reported in aHUS patients. The role of FH Ab in disease onset, progression and treatment is of critical interest for physicians and patients dealing with this unsolved problem. At present, evidence based therapy recommendations are missing.
Methods: We comment on 16 patients with FH Ab associated aHUS from the Innsbruck HUS-Net registry (www.hus-online.at). Patients were followed from the beginning of the acute phase, with recording on patient's therapy and clinical progression over a period of 2 year.
Results: Patients show a median age at disease onset of 7 years. All patients presented with hemolytic anemia (mean hemoglobin: 5,8 g/l), thrombocytopenia (mean platelet count: 33,2 x 10^9/μl) and elevated creatinine levels (mean: 458 μmol/l). Only 37% of the patients showed decreased C3 levels and 15% showed decreased Factor H levels. Within the follow up period of 2 years 37% of the patients developed chronic renal insufficiency, 25% showed ESRD, and 68% showed at least one disease recurrence. Using supportive therapy without plasmatherapy or immunosuppression 2/2 patients showed disease recurrence, 6/7 patients recurred under plasmatherapy without additional immunosuppression and only 2/7 patients with plasmatherapy followed by immunosuppression developed recurrences.
Conclusion: CFH Ab positivity is a distinct pathogeneticaHUS subgroup mainly of pediatric patients. Testing for CFH Ab as soon as possible is mandatory, as in positive cases this has important impact on prognosis and the recommended therapy. Following our results and the literature a recommendation for the use of plasmatherapy as induction therapy followed by a maintenance therapy using immunosuppressive agents can be given. Nevertheless, treatment responses are heterogeneous and the different alternative immunosuppressive agents, the used dosages and the timing of initiation and withdrawal are still a matter of debate.

Abstract# P-SUN076
A case of C3 glomerulonephritis in a 6-month-old infant accompanied by glomerular endothelial injury: the expanding spectrum of complement-mediated kidney diseases

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C3 glomerulonephritis (C3GN) is a recent classification of complement-mediated kidney diseases, presenting with isolated C3 deposits in the mesangium and capillary wall generally caused by dysregulation of the alternative pathway of complement. The glomerular morphology of C3GN by light microscopy (LM) is heterogeneous, but it is uncommon that glomerular endothelial injury similar to thrombotic microangiopathy (TMA) is evident. We report a rare case of C3GN in a 6-month-old infant accompanied by glomerular endothelial injury. A 6-month-old boy was referred to our hospital for massive proteinuria and microhematuria. He had no antecedent infection, and his blood pressure was normal. Initial blood examinations showed the following: Hb, 12.8 g/dl; Plt, 63.3 $\times 10^4/\mu l$; serum BUN, 2.9 mg/dl; serum creatinine, 0.12 mg/dl; serum albumin, 0.5 g/dl; LDH, 275 U/L; C3, 58 mg/dl; C4, 11 mg/dl; and CH50, 29 mg/dl. HBs antigen and HCV antibody were negative. LM showed prominent endocapillaryhypercellularity with a lobular appearance, whereas mesangial proliferation, capillary wall thickening, and double contour appearance of the glomerular basement membrane were marginally observable. Immunofluorescent staining (IF) was dominantly positive for C3 and negative for IgG. Electron microscopy (EM) showed noticeably enlarged endothelial cells of glomeruli, which resembled the finding of atypical hemolytic uremic syndrome. No electron-dense deposits and substances were identified, including in glomerular basement membrane. Both his clinical feature and kidney biopsy findings except those of EM were consistent with C3GN. After two courses of methylprednisolone pulse therapy followed by oral prednisolone and lisinopril, his urinary protein level was decreased and serum complement level was all normalized. This is the first report of C3GN which developed in infancy. C3GN is important as a causative disease of infantile nephrotic syndrome. Besides that, his EM findings suggest the expanding spectrum of complement-mediated diseases, especially on the connection between C3GN and TMA.

Abstract# P-SUN077
Henoch-Schonleinpurpura with hypocomplementemia

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Objective: Abnormalities of the complement system in Henoch-Schonleinpurpura (HSP) have been reported, but how this abnormality in the complement system impacts on the prognosis of HSP remains unknown.
Methods: We retrospectively studied patients hospitalized for HSP in the Children's Hospital Affiliated to Soochow University between October 2010 and May 2011. Patients with HSP and hypocomplementemia were the cases, and those without hypocomplementemia were the HSP controls. Another group of children (n050) with upper respiratory tract infections, but without HSP acted as negative controls.
Results: A total number of 338 HSP patients were included in this study (n=53 cases, n=285 controls). In the cases, C3 and C4 levels decreased in 29 patients, C3 was low in 6, and C4 in 18. Complement levels returned to normal within 3 months in all HSP patients except one. Case group patients had higher levels of serum IgG and arthralgia, as well as positive titers of antistreptolysin-O. Rates of abdominal pain, gastrointestinal bleeding, Henoch-Schonleinpurpura nephritis (HSPN), and serum IgA and IgM levels were similar in the two HSP groups.
Conclusion: Hypocomplementemia associated with HSP is a transient phenomenon. The incidence of significant sequelae such as HSPN

between patients with and without hypocomplementemia does not differ.

Abstract# P-SUN078

EHEC-associated hemolytic uremic syndrome: complement activation and its association to acute clinical presentation

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Objective: The aim of this study was to assess the role of the complement system in the pathogenesis of Hemolytic Uremic Syndrome (HUS).
Methods: The complement status was assessed in 33 acute EHEC-associated HUS pediatric patients. A sandwich ELISA test was used to measure the concentration of terminal complement complexes (TCC) in patients samples.
Results: 33 confirmed EHEC-associated HUS cases were evaluated. TCC concentrations in plasma were significantly higher in children with EHEC-associated HUS than in the control group (median 1.6 AU (IQR 0.9) vs. 1.2 AU (IQR 1.0), p= 0.03). TCC concentrations in serum were higher in children with EHEC-associated HUS than in the control group, although this difference was not significant (median 9.5 AU (IQR 8.1) vs. 7.7 AU (IQR 5.5), p= 0.062). C3 levels in serum in children with EHEC-associated HUS tended to be lower than the reference range, with a median of 90 mg/ml (IQR 36.5). In children with EHEC-associated HUS, C3d levels were significantly higher than in healthy controls (median 43 mU/l (IQR 28) vs. 28 mU/l (IQR 7.25), p<0.001). EHEC-associated HUS patients with low C3 levels showed higher concentrations of TCC in serum and plasma, although this association was not significant. Patients who presented with bloody diarrhea had lower levels of C3 (p=0.010) and higher TCC concentration in plasma (p=0.016). Patients with platelet counts below 20 x 10^9/l had lower levels of C3 (p=0.050) and patients with leukocyte counts above 20 x 10^9 cells/l had higher TCC concentrations in plasma (p=0.026).
Conclusion: We were able to show complement activation via the alternative pathway (C3d) resulting in complement activation of the terminal pathway leading to an increased formation of the terminal complement complex. Furthermore, our results show an association between complement activation and clinical features, with higher frequency of bloody diarrhea in patients with evidence of complement activation (high TCC in plasma and low C3), low platelet counts in patients with low C3 and high leukocyte counts in patients with high TCC in serum.

Abstract# P-SUN079

Application of whole exome sequencing in patients with familial atypical hemolytic uremic syndrome

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Objective: Atypical hemolytic uremic syndrome (aHUS) is a rare, but severe disease that has a heterogeneous genetic background. Mutations in several genes encoding proteins of the alternative complement pathway have been associated with the disorder. Due to the heterogeneity seen in aHUS, making the genetic diagnosis via regular methods is labor intensive and time consuming. Therefore, whole exome sequencing (WES), in which the coding regions of the entire genome can be studied, might be an option for mutation detection in aHUS.
Methods: To investigate the suitability of the use of WES for genetic screening in aHUS patients, exomes of ten patients diagnosed with familial aHUS were captured and enriched using the 50MB Agilent's SureSelect human exome enrichment kit (Agilent, Santa Clara, CA, USA). One of these patients, with an identified *CFI* mutation, was taken along as a positive control.
Results: More than 47000 sequence variations were identified per patient. On average, ~230 of these were false substitutions located in an exon or canonical splice site, all absent in the dbSNP database or present in less than 1% of our in-house database. Overall coverage of associated genes was 86%, but SCR19 and 20 in *CFH* were not covered. The *CFI* mutation in one patient was detected. Potential pathogenicity of other identified variations will be further displayed.
Conclusion: The hotspot for mutations in aHUS patients (SCR19-20 in *CFH*) was not covered with the used enrichment kit.Therefore, at this moment with this specific method, WES might not be the best option for genetic screening in patients with familial aHUS.

Abstract# P–SUN080

Screening of genes encoding complement (regulatory) proteins in patients with C3 glomerulopathy

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Objective: Glomerular pathologies that are characterized by the isolated deposition of C3 are nowadays called C3 glomerulopathies (C3G). These pathologies include MPGN type II, also known as dense deposit disease, and C3 glomerulonephritis, but also immunoglobulin-negative MPGN I and III. It is thought that C3G can be caused by systemic dysregulation of the alternative and terminal complement pathway. Here we report a cohort of 30 C3G patients (all children at time of diagnosis) who have been screened for abnormalities in genes encoding (regulating) proteins of the alternative pathway.
Methods: In 30 biopsy proven C3G patients, mutational screening was performed of the alternative pathway genes *CFH*, *CFI*, *MCP*, *CFHR5*, *C3*, and *CFB* by means of PCR on genomic DNA and sequence analysis. Potential pathogenicity of sequence aberrations was checked in the Exome Variant Server, in which whole exome sequencing data of more than 6500 individuals are shown, in literature, evolutionary conservation, modeling, and *in silico*mutation prediction programs. For 23 of these patients, serum was available for screening for autoantibodies against CFH.
Results: In three patients (3/30; 10%) a potentially pathogenic genetic aberration was identified in *CFH*; one of these patients carried a variation in *C3* as well. All sequence variations in *CFH* are located in domains involved in heparin binding (SCR7 and SCR20); two of thesehave been previously described in aHUS patients. The sequence variation in *C3* is involved in properdin binding and could lead to increased affinity of CFB for C3. In two other patients (2/23; 8.7%), autoantibodies against CFH, associated with dysregulation of the complement system as well, were identified.
Conclusion: In 5/30 (17%) of the patients with C3G, abnormalities in complement genes were found, either consisting of a genetic aberration in one of the screened genes or the presence of autoantibodies against

CFH. These data indicate that dysregulation of the alternative complement pathway is involved in the pathogenesis of C3 glomerulopathy. More research is needed to understand the clinical observed complement activation in C3G.

Abstract# P-SUN081

Renal Involvement in Hypocomplementemic Urticarial Vasculitis Syndrome (HUVS): a report of 3 paediatric cases

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Objective: HUVS has been described only in 8 children, with a rapid progressive glomerulonephritis in 4 and end stage renal disease in 4. We describe the histopathological picture and renal involvement in 3 children with HUVS.
Methods: 3 children (4-9 yrs of age at onset) diagnosed with HUVS (2 major criteria, chronic urticarial skin lesions, hypocomplementemia, and ≥2 minor criteria), who developed persistent microhaematuria 1-3 years after diagnosis (isolated in Case 1, associated with mild proteinuria in case 2, with nephrotic syndrome in Case 3), underwent renal biopsy.
Results: Laboratory: Anti-C1q precipitin were positive and C3-C4 low in all cases; serum autoantibodies were negative in Cases 1 and 2, while Case 3 became positive for anti-dsDNA, with no sufficient criteria to diagnose SLE.
Renal biopsy. **LM**: isolated mesangial GN was found in Case 1, associated with focal necrotizing small-vessel vasculitis in Case 2, while GN with intense mesangial, endo- and extra-capillary proliferation in Case 3. IF: Cases 1 and 2 shared a full-house feature; Case 3 showed intense C1q and C3 positivity, with IgA +/- and negative IgG, IgM and fibrinogen. Treatment: Case1 was initially treated with PDN, after a second biopsy MMF and dapsone were added; Case 2 was treated withoral PDN and CPM for 3 months, then AZT; in Case 3, i.v.MPDN pulses, oral PDN, dapsone and i.v. CPM pulses were administered.
Conclusion: This report shows a significant and severe renal involvement in paediatric HUVS; renal biopsy should be considered also when only isolated microhaematuria is present. Prompt treatment is mandatory in order to avoid progression to end-stage renal disease.

Abstract# P-SUN082

A nationwide clinico-genetic study on anti-complement factor H autoantibody associated atypical hemolytic uremic syndrome in Korea

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Objective: Anti-complement factor H antibody (anti-CFH) association is one of the known etiologies of atypical hemolytic uremic syndrome (aHUS). We describe the clinico-genetic features of the patients with anti-CFH-associated aHUS in a nationwide multicentered cohort.
Methods: A cohort of 44 children with aHUS was analyzed for the presence of anti-CFH in their plasma by ELISA. We also examined for difference in features of the patients with higher antibody titers.
Results: The study included 23 males and 21 females. The mean onset age was 5 years (18 days to 13 years). Thirty-three patients (75%) had preceding gastrointestinal symptoms, including 11 (25%) with diarrhea. The plasma levels of C3, CFH, CFI and CFB were decreased in 17/44 (39%), 14/43 (33%), 2/31 (6%), and 3/31 (10%), respectively. Eighteen (41%) patients were tested positive for anti-CFH, including 13 (30%, Group 1) with extremely high titers (>1000 arbitrary unit, AU) and 5 (11%, Group 2) with medium titers (100 to 1000 AU). The remaining 26 (59%, Group 3) were tested negative. The three groups did not significantly vary in gender, onset age, prodrome incidence or complement levels. Association with defective CFH related protein 1 (CFHR1) with/without CFHR3 was found in 10 (77%) patients in Group 1, 1 (25%) in Group 2 and 2 (8%) in Group 3.Thirty-five patients were followed up for more than 6 months (6 to 175 months). During the follow-up periods, 11 (31%) patients experienced disease relapse(s) [3/11 (27%) in Group 1, 0/3 in Group 2, and 8/21 (38%) in Group 3], and 10 (29%) patients resulted in progressive renal insufficiency or death [2/11 (18%) in Group 1, 1/3 (33%) in Group 2 and 7/21 (33%) in Group 3].
Conclusion: The prevalence of anti-CFH-associated aHUS is higher among Korean patients. Patients with higher antibody titer have stronger association with defective CFHR1/3.

Abstract# P-SUN083

Low serum complement is not unusual in Henoch-Schonleinpurpura

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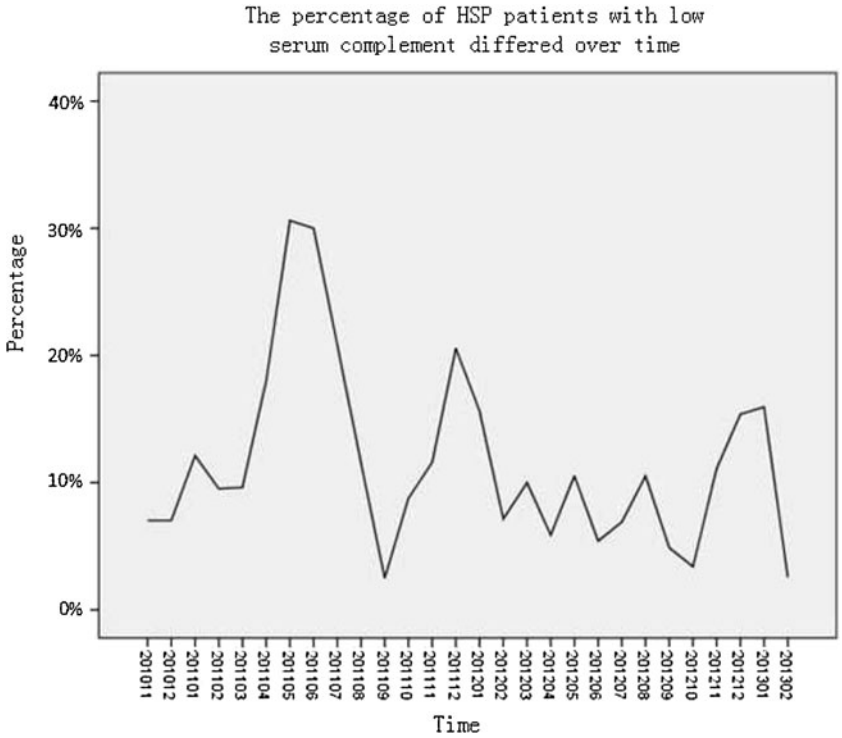
Objective: Low serum complement in Henoch-Schonleinpurpura (HSP) have been reported by a few literatures but the maximum number of patients with low serum complement was only 53, we did this investigation to explore whether HSP with low serum complement is a common phenomenon.
Methods: We retrospectively studied patients hospitalized for HSP in the Children's Hospital Affiliated to Soochow University between October 2010 and February 2013.HSP patients were all included in this study. The proportion of HSP patients with low serum complement in the total number of HSP patients were calculated.
Results: A total number of 1406 HSP patients were included in this study.166 HSP patients got low serum complement. C3 and C4 levels decreased in 157 patients, C3 was low in 20and C4 in 49.Serum complement decreased in 11.8% of HSP patients and the proportion of patients with low serum complement differed over time.Of the 166 patients with low complementtiters of antistreptolysin-O elevated in 112(112/166,67.4%)and autoantibody tests were positive in 7.No one developed into systemic lupus erythematosus in the follow-up.
Conclusion: Low serum complement in HSP is not an unusual phenomenon,it is possibly related to streptococcal infection. These

patients need long-term follow-up as the subsequent development of autoimmune diseases may be a possibility.



Abstract# P-SUN084

Glomerulonephritis with isolated C3 deposits following atypical hemolytic uremic syndrome on native kidneys

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Objective: Atypical hemolytic uremic syndrome (aHUS) and glomerulonephritis with isolated C3 deposits (GNC3) have been recently described as belonging to the same spectrum of disorders involving a dysregulation of the alternative complement pathway. Indeed, both diseases have been associated with mutations in the same complement alternative pathway genes such as *CFH*, *CFI*, *CFB* and *MCP*. We previously reported the unusual observations of 2 children with CFH deficiency and aHUS on native kidneys, who presented GNC3 after renal transplantation.

Methods: We report here the first case of a child with aHUS who developped 6 years later GNC3 on native kidneys.

Results: A six-month old patient was diagnosed with aHUS based upon hemolytic anemia (Hg 7.1 g/dL, 3% schistocytes), thrombopenia (40.000/mL), proteinuria (U P/cr 2 g/mmol) and microscopic hematuria. Renal function was normal. His older brother had been diagnosed with aHUS with a *CFI* variant of unknown significance a few years before and had died of severe sepsis. No dysregulation of the alternative complement pathway was identified in our patient, and an extensive complement genetic testing was negative. He was treated with chronic plasma infusions (10 ml/kg) 3 times a week then slowly tapered. Hematologic parameters rapidly improved and urinary sediment progressively normalized. No relapse of aHUS occurred. Six years later, he presented with nephrotic syndrome (plasma albumin 26 g/L) and microscopic hematuria, but no sign of hemolysis or renal failure. The kidney biopsy showed mesangialhypercellularity and C3 deposits and no downstream interstitial fibrosis. The study of the complement alternative pathway was once again normal. Eculizumab therapy, now widely used in complement-mediated diseases was considered. However, since its superiority to steroids has not been established, we decided to treat the child with steroids. This led to remission of the nephrotic syndrome within 4 months.

Conclusion: aHUS and GNC3 may develop on native kidneys in a single patient. This observation underlies the common pathophysiology of these two diseases and supports the hypothesis of common genetic causes, yet to be identified in the present case.

Abstract# P-SUN085

Causes of Atypical Hemolytic Uremic Syndrome in Egyptian Children

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Objective: There are no previously published studies looking at the causes of atypical HUS in Egyptian children. The aim of this work was to elucidate possible causes of atypical cases of HUS presenting to the Pediatric Nephrology Unit, Cairo University Children Hospital over a period of one year.
Methods: This study was carried out on ten patients (2 males, 8 females) from the Pediatric Nephrology Unit, Cairo University Children Hospital, during the years 2011-2012. Patients had a full history taking and physical examination. In addition to routine investigations done at Cairo University, samples were sent to Innsbruck University, Austria, for special investigations including determination of ADAMTS 13 activity, complement factor H antibodies (CFH antibodies), and terminal complement complex (TCC, C5b-9).
Results: Eight patients had no factor H antibodies. One was factor H antibody positive and another had low factor H antibody titers. Four patients showed signs of slight complement activation. One patient showed significantly reduced complement activity and another showed a massive reduction of complement activatability. Fifty percent of patients showed signs of decreased ADAMTS 13 activity secondary to the thrombotic microangiopathy but the decrease was not as severe as suspected for TTP. There were no cases with ADAMTS 13 inhibitor and thus no evidence for TTP in all ten patients.
Conclusion: The determination of the exact type and cause of HUS is vital for prognosis, management and assessment of the outcome. Until advanced lab studies can be performed in developing countries, it may be feasible to cooperate with an advanced reference center for HUS investigations.

Abstract# P-SUN086
Membranoproliferative glomerulonephritis and C3 glomerulonephritis: clinical features and outcome in children.

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Objective: C3 glomerulonephritis (C3GN) is a recently described disease entity mediated by dysregulation of the alternative complement pathway, and is related to membranoproliferative glomerulonephritis (MPGN). We examined their clinical features and outcome in children.
Methods: Our analysis included children with conventional MPGN type I or III, pathologically diagnosed in our hospital from January 1992 to November 2011 and observed at least one year from onset. According to a recent study, MPGN cases were defined by the presence of C3-positive/IgG-positive immunofluorescence, and C3GN cases were defined by the presence of C3-positive/IgG-negative immunofluorescence. Laboratory findings and clinical courses were compared in both groups.
Results: We identified 15 children (5 boys) with MPGN (n=4), C3GN (n=8), and unclassifiable glomerulonephritis (n=3). We examined the 12 classifiable cases. The median age at the time of renal biopsy and last observation was 10.5 and 14.5 years old, respectively. The median follow-up period was 5.5 years. The mean±SD levels of serum C3 and C4 were 17.8±19.0 mg/dL and 12.0±6.5 mg/dL, respectively. Initially, 4 children with MPGN and 7 children with C3GN received methylprednisolone pulse therapy followed by prednisolone for 2 years. Subsequently, 6 of 7 children with C3GN received combined therapy (prednisolone, azathioprine, and anticoagulants) for 2 years. In 1 child with C3GN, follow up without therapy was adopted because the hypocomplementemia and proteinuria had improved spontaneously. At the time of their last follow-up, 2 children with MPGN and 7 children with C3GN had not achieved remission, and 4 with C3GN still had hypocomplementemia.
Conclusion: More than half of the children with diagnosis of conventional MPGN had cases that were compatible with the criteria of C3GN. C3GN may be more refractory than MPGN to immunosuppressant therapy and may have a distinct disease course in children.

Abstract# P-SUN087
Clinical analysis of Henoch–Schonlein purpura with hypocomplementemia in 20 children

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Objective: The clinical course and prognosis of Henoch–Schonleinpurpura (HSP) associated with hypocomplementemia are not clear.
Methods: The clinical findings of 20 children hospitalized from Jan 2010 to May 2012 with HSP and hypocomplementemia were collected.The control group was 30 HSP children with normal complement. Hypocomplementemia was defined as C3< 75mg/dl(Normal value was 79-152mg/dl),and C4 <14mg/dl(normal value was 16-38mg/dl).
Results: Purpuric rash in all patients, abdominal pain in 5, and arthralgia in 16 were noted. Knee joints were affected in 5 and ankle joints in 12 patients. Incidence of arthralgia was significantly higher than that from controls($P < 0.05$). Hypocomplementemia was preceded by respiratory tract infection in 12 patients . Serum level of C3 was decreased to 59.11mg/dl±20.52mg/dl, and C4 was 5.22 mg/dl±3.70 mg/dl. C3 and C4 both decreased in 17, only C3 decreased in 1 case, and only C4 decreased in 2 cases. Antistreptolysin-O (ASO) titer was tested in 19 cases, and elevated to 2235.6U/L±1336.5U/L in 18 cases. The levels of IgG increased to 1970.2mg/dl±328.1mg/dl in 19 patients. HSP nephritis occurred in 12 patients. Microscopic hematuria occurred in 10 and proteinuria in 7 patients. Abnormal urinary findings returned to normal within 2 weeks in 10 patients , but continued for more than 1 year in 2 patients. One patient presented with hypertension and acute renal failure , and was diagnosed as having acute poststreptococcal glomerulonephritis combined with HSP nephritis according to renal biopsy findings. Hypocomplementemia returned to normal within 6 weeks, 90.2% within 4 weeks. The mean recover time of C4 was longer than C3. The levels of IgG and ASO titer recovered to normal within 8 weeks and half a year respectively.
Conclusions: Hypocomplementemia in children with HSP was transient and was not related to severity of HSP. It indicated a good prognosis. 95% patients were companied with elevated IgG level. The recover time of IgG level was almost same as that of C3. Incidences of elevated ASO titer and nephritis were high. These findings suggest streptococcal infection may be associated with HSP nephritis.

Abstract# P–SUN088
Significance of complement 3 in the diagnosis and prognosis of hemolytic uremic syndrome in children

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Objective: Hemolytic uremic syndrome (HUS) is characterized by a triad of clinical features, including hemolytic anemia, thrombocytopenia, and acute renal failure. Complement regulatory protein deficiency is an important cause of hemolytic uremic syndrome in children, accounting for about 60-70% of atypical hemolytic uremic syndrome. Low levels of serum C3 were found in 73% patients with familial HUS hemolytic uremic syndrome, and even in 24% of their normal family members. The present paper is aimed to analyze serum C3 levels in children with HUS and the relationship of serum C3 level to HUS prognosis.
Methods: The clinical data of 28 HUS cases hospitalized in department of pediatrics, Tongji Hospital of Tongji Medical College, Huazhong

University of Science and Technology were analyzed, and the serum C3 levels were compared between D (-)and D (+) subgroup HUS. The significance of relationship between serum C3 levels and prognosis was analyzed by Wilcoxon rank sum test.
Results: Theserum C3 level were 0.29g/L-1.24g/L, with an average level of 0.59 g/l in our patients. Hypo-complementimia was found in 87% children with HUS. No significant difference was found between D (+) HUS and D (-) HUS. The prognosis of HUS children was divided into 3 groups: death, incomplete recovery and normal, the levels of serum complement 3 were (0.627 ±) g/L, (0.502 ±) g/L, (0.695±) g/L respectively in these 3 subgroups without significant differences. The serum C3 levels were followed-up closely in 7 HUS cases, serum C3 levels decreased significantly in active stage in all cases, recovered to normal level at remission stage in 3 cases, but remained significantly lower in other 4 cases ($P<0.05$).
Conclusion: Lower level of serum complement 3 is an important clinical features of both D (+) and D (-) HUS in children, but is not closely associated with final prognosis.

Abstract# P-SUN089
Mesangial cells play an important role in complement activation via lectin pathway in IgA nephropathy

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Objective: IgA nephropathy (IgAN) is the most comen from 53 patients with IgAN and 23 controls without IgA depositing on kidney were subject to determine the immunohistologic staining of mannose binding lectin (MBL), MBL-associated serine proteases -1(MASP-1), C3, C1q, IgA, membrane attack complex C5b-9, and analysis the clinical features between these two groups. Then we observed the immunohistochemical staining and concentration of MBL protein derived from HMC cultured with IgA patients serum, and detected the expression of MBL mRNA of HMC at the terminal.
Results: In IgAN group, the number of cases with positive deposition of Cmon primary glomerular disease worldwide, leading to progressive renal failure. It has been recognized that deposition of IgA owing to diverse reasons is initial factors resulting in this disease. So we observed the interactions between deposition of IgA and glomerular mesangial cells, and the impacts on the function of mesangialcells.To investigate the role of the lectin pathway of complement activation in IgA nephropathy and the response of mesangial cells owing to the deposition of IgA during the complement activation.
Methods: The renal specim3 , C5b-9 , MBL and MASP-1 were significantly more than those in control group. The deposition degree of IgA has evidently positive correlation with the deposition of MBL ($rs=0.865$, $p=0.058$). The cases presented with proteinuria and gross hematuria in positive MBL-MASP group were significantly more than those in negative MBL-MASP group ($P=0.001$, 0.034), accompanying no difference in serum levels of MBL between these two groups($p>0.05$). After HMC having been cultivated with serum from patients with IgAN 24 hours later, the MBL protein and the expression of MBL mRNA derived from HM could be detected.
Conclusion: Local complement activation play an important role in IgA Nephropathy via lectin pathway, and mesangial cells might aggravate the progress of IgAN via lectin pathway.

Abstract# P-SUN090
Membranoproliferative Glomerulonephritis Associated with Factor-H His402 Risk Variant

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Complement protein factor H (CFH) is one of the regulatory proteins of the alternative complement pathway, and its mutations may lead to a spectrum of different phenotypic manifestations of renal disease. We report a girl who presented with atypical hemolytic uremic syndrome (aHUS) and membranoproliferative pattern of glomerular injury (MPGN) together with factor- H His402 risk variant. A ten year old girl was referred to our hospital with fever,vomiting, diarrhea, and skin eruption. There was consanguinity between parents.Physical examination showed hypertension, signs of fluid overload together with edema, purpura and ecchymosis on the lower extremity. She had partial lipodystrophy in the face. In laboratory analysis, BUN was 58 mg/dl, creatinine1.33mg/dl, albumin 2.5gr/dl, hemoglobin 9gr/dl, white blood cell 7700/mm^3,platelet 23000/mm^3, AST 34 U/L, ALT 12 U/L, and LDH 1097 U/L. Blood smear showed microangiopathic hemolytic anemia. Urinary analysis revealed proteinuria and hematuria with dysmorphic erythrocytes. Urinary ultrasonography was normal except for increased parenchymal echogenicity of the kidney. C_3 was 18 mg/dl (90-180), C_4 14 mg/dl (10-40), ANA and anti-dsDNA were negative. All bacterial and viral serology did not show any abnormalities. According to above findings she was diagnosed as HUS and after plasmapheresis, laboratory abnormalities came back to normal limits. ADAMTS 13 enzyme activity was normal (%51) and anti-CFH antibody was negative. Genetic analysis showed homozygous CFH risk variant (His402Tyr). Diagnostic renal biopsy was interpreted as type II MPGN with granular C_3 (++) staining on the immunofluorescence microscopy. Nephrotic range proteinuria and low C_3 level persisted despite immunosuppressive therapies including pulse methylprednisolone, and cyclosporine. Although she still has nephritic range proteinuria and low C3 levels, clinical findings are stable with weekly plasma infusions. This case suggests that alternative pathway dysregulation, even with risk variants, may cause different renal pathologies,and shows another phenotypic spectrum of the CFH.

Abstract# P-SUN091
A novel familial Autosomal Dominant CFHR deletion syndrome, with a pathological overlap of dense deposit disease and C3 glomerulopathy

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Objective: Disease associated mutations have been identified in complement factor H and complement factor H related proteins (CFHR) in the pathogenesis of MPGN, Dense deposit disease and C3 glomerulopathies. Family HistoryThe elder sibling 8 years, had nephrotic syndrome; and the younger sibling, 3 years, had non-nephrotic proteinuria; both with an active urinary sediment. Father, 34 yrs, was on dialysis since 20 years of life, and received a renal transplant in January 2012 (diagnosed to have MPGN during adolescence). Her grandfather, received a renal transplant in 2001, died in 2008 (age 52 years due to acute coronary event).
Methods: Kidney Biopsy:The elder sibling underwent a kidney biopsy. Complement and Genetic Analysis: Plasma concentrations of the complement C4, C3, Factor B antigens [nephelometry]; Factor H, Factor I antigen concentrations [ELISA]; CD46

membrane expression [flow cytometry] were measured.All patients were screened for mutations and polymorphisms in the Factor H, Factor I, Factor B, C3 and CD46 genes. CFHR1-5 genes were analysed by multiplex ligation-dependent probe amplification (MLPA).
Results: The Kidney biopsy features were an overlap C3 glomerulopathy and dense deposit disease. Immunohistochemistry revealed high levels of C3 but low C5b9 deposition in the mesangium.Complement analysis showed evidence of activation of alternative complement. Anti Factor H antibodies were negative in all. The genetic analysis showed normal genes Factor H, I, B and C3. MLPA revealed heterozygous deletion in CFHR1 and 2 in the 3 affected members of the family associated with a heterozygous deletion of CFHR1 and 3 in all members, including the asymptomatic mother. Both the siblings are currently on plasma infusions, with maximum tolerable doses of Enalapril and Losartan.

Table 1: Complement Assay results of the family

		C3 Ag	C4 Ag	Factor B Ag	Factor H Ag	Factor I Ag
	Normal Values	660-1250 mg/L	93-380 mg/L	90-320 mg/L	65-140 %	70-130 %
Mother		1250	403	184	93	117
Father		505	363	44	134	126
Elder sister, 8 years		489	257	69	115	113
Younger sister, 3 years		579	372	90	126	130

Conclusions: This is the first report of an autosomal dominant CFHR 1 and 2 deletion overlap syndrome; exhibiting anticipation.

Complement disorders: Therapy

Abstract# P- SUN092
A NEWER APPROACH FOR THE MANAGEMENT OF MEMBRANO PROLIFERATIVE GLOMERULONEPHRITIS: AN EXPERIENCE IN A TERTIARY LEVEL HOSPITAL, BANGLADESH.

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Objective: Membrano Proliferative Glomerulonephritis (MPGN) is an uncommon histological variant of Idiopathic Nephrotic Syndrome (INS) in children. Most frequently clinical presentation of MPGN and other rare histological variant of glomerulonephritis is not usually typical like Minimal Change Disease (MCD).
Methods and Results: In the department of Paediatric Nephrology, Bangabandhu Sheikh Mujib Medical University, Dhaka, we managed three children whose typical presentations were like MCD. But later on diagnosed as MPGN after histological evaluation due to non-responsiveness of steroid therapy after four weeks with adequate doses and duration in 2011. We managed these patients successfully by triple immunosuppressive therapy with Inj. methyl prednisolone, cyclophosphamide and oral prednisolone.
Conclusion: It may be concluded from these reports that presentation of MPGN may be like MCD and these patients could be brought in remission by triple therapy with Inj. methyl prednisolone, cyclophosphamide and oral prednisolone.

Abstract# P- SUN093
Successful treatment with eculizumab in plasma exchange - dependent child with homozygous CFHR1 deletion and CFH antibodies

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Objective:Atypical hemolytic-uremic syndrome (aHUS) is a rare and life-threatening disease characterized by systemic thrombotic microangiopathy (TMA) due to chronic uncontrolled dysregulation of the complement alternative pathway. Approximately in 50%-70% of aHUS patients mutations in genes encoding complement regulatory proteins have been identified. In addition, 6-10% of patients have anti-factor H autoantibodies (CFH). Prognosis of aHUS is poor, despite chronic plasma exchange/infusion (PE/PI), about 50% of cases die, require dialysis, or have permanent renal damage. We report the case of a 13-year-old girl with aHUS associated with a CFH antibodies and a CFHR1 deletion, who was highly dependent on PE.
Methods and Results: The patient first presented with clinical features of aHUS (nonimune hemolytic anemia, thrombocytopenia, acute renal failure) at the age of 9-years. PI/PE resulted in clinical improvement within 20 days. A first severe relapse occurred 2 weeks after discontinuation of plasma therapy. The persistent low levels of C3 suggested ongoing complement activation. Diagnostic workup revealed a homozygous deletion of CFHR1 and CFH autoantibodies. Immunosuppressive therapy (IVIG 2g/kg and MMF2x500mg for 6 months) was ineffective and a high degree of plasma dependence developed indicated by the 4 dramatic relapses when PE was ceased. Because of PE dependency and slowly progressive renal failure(eGFR 69ml/min), eculizumab was started in May 2012. 3 weeks after the first administration of eculizumab, PE was completely discontinued and no relapse episode occurred within the next 10 months. Moreover, CFH autoantibodies decreased from 788 to 408 AU/ml (cutoff<100 AU/ml) and no activation of terminal complement pathway was detected (TCC zymosan serum before eculizumab 862.33 ug/ml resp. 31 ug/ml under the therapy). She has maintained normal hematological parameter and eGFR 85 ml/min with ongoing eculizumab treatment.
Conclusion: We have observed that eculizumab is able to prevent relapse of aHUS due to CFH antibodies after PE discontinuation in a patient who was highly dependent on PE. Moreover, our case report shows an effective complement blockade under eculizumab.

Abstract# P- SUN094
Atypical HUS: Successful Eculizumab Treatment of aHUS Recurrence in a Child after Kidney Transplantation

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Objective: Atypical hemolytic-uremic syndrome (aHUS) is characterized by thrombotic microangiopathy (TMA) with thrombopenia, hemolytic anemia and renal failure. Up to 70% of patients have genetic mutation encoding components of complement activation or factor H antibodies. The risk of recurrence after transplantation (KTx) is up to 80% .Eculizumab - monoclonal antibody that binds complement protein C5 and inhibits terminal part of complement prevents from TMA.
Metod and Results: A 9y-old boy with aHUS was treated by PF + MP. Mumps after partial remission induced relaps, renal biopsy proved TMA. EHEC and TTP were excluded. No mutation was proven in

genes for complement factor H (neither anti-CFH antibodies), I, C3, MCP, THBD (98% of known mutations associated with aHUS). 14 months later peritioneal dialysis had to be started. On 30.3.2011 a cadaver KTx was performed. PF was indicated prior to Tx. Immunosuppression Pred, Tac, MMF. Patient was discharged after 1 month with normal kidney graft function, no aHUS activity. 2 months after KTxaHUS recurrence appeared. Hb 54 g/L, Thr 22x10^9/L, schisto 11‰, LD up 4x, Hapto not detectable.SCr 322 umol/L, patient was anuric on dialysis. The 1st dose of Eculizumab (600 mg) on 2-6-2011. Within the first week urine output increased, thrombocytes reached normal value, LD slightly elevated. The Eculizumab treatment continued according to the recommended schema, the first 3 dose weekly. The 2nd dose led to the complete remission, the boy became dialysis independent. Currently 14y-old: Hb 128 g/L, Thr 252x10^9/L, schisto 1‰, sCr 77 umol/L, normal LD and Hapto values.

Conclusion: Eculizumab is effective treatment of aHUS even without proven gene mutation neither anti-CFH antibodies. Treatment according to the recommended schema maintains long lasting remission. No adverse event was observed in association with Eculizumab treatment.

Abstract# P- SUN095

Eculizumab in typical haemolyticuraemic syndrome (HUS) with neurological involvement

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Objective: In typical HUS approximately 25% of patients (pts) show CNS involvement often leading to serious long-term disabilities. As a rescue therapy we treated children with typical HUS complicated by seizures with the C5-complementinhibitor Eculizumab (Ecu).

Methods: In our center 7 children (median age 27 months, range 13-175) with EHEC positive HUS requiring dialysis who had seizures were treated with Ecu during 2011 and 2012. Initially 6 out of 7 pts showed disturbance of consciousness. 2 pts being participants of the STEC-HUS study (NCT01410916) received 6 doses of Ecu, 3 pts each 2 doses, 2 pts each 1 dose.

Results: Cranial MRI was done in 6 pts: 5 pts showed abnormal findings in basal gangalia and/or white matter, 1 pt no abnormalities. A 2-year-old pt with severe cardiac involvement who reached our hospital during status epilepticus needed repeated cardio-pulmonary resuscitation with subsequent extracorporal membrane oxygenation and died 8 days after Ecu in cardiac failure. Another pt with hemorrhagic colitis and severe prolonged seizures requiring medical resuscitation was on ventilator for 6 days with need of catecholamines and showed severe neurological deficits at the time of discharge. The other 5 pts experienced no further seizures after the first dose of Ecu and only one of them required mechanical ventilation longer than 24 h (because of cardiac involvement). These 5 pts showed excellent neurological outcome at the time of discharge: 2 pts with mild neurological impairment and 3 pts without any disabilities. The platelets of the 6 survivors normalized 7.5 days (median, range 0-20) after the first dose of Ecu. The mean duration of dialysis after first dose of Ecu was 14 +/- 7 days.

Conclusion: In children with typical HUS and CNS involvement early use of Ecu appears to improve neurological outcome. In severe HUS cases which are rapidly progressing with multiple organ involvement, late treatment with Ecu seems to show less benefit. We speculate that prophylactic Ecu-therapy prior to development of neurological symptoms could be advantageous in order to avoid neurologic long-term sequelae in rapidly progressing HUS cases. These findings should be confirmed in prospective, randomized trials.

Abstract# P- SUN096

A Case of Atypical Hemolytic Uremic Syndrome Treated With Eculizumab

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Atypical hemolytic uremic syndrome (aHUS) is one of the thrombotic microangiopathies (TMA) with severe clinical manifestations and poor prognosis. Uncontrolled complement activation plays a central role in the development of the disease. Eculizumab has been described as an effective therapeutic approach for the treatment of aHUS that targets complement 5. Here we present a case report of an infant who had severe multi-organ involvements due to aHUS and was successfully treated with eculizumab. A seven-month-old boy was referred to our clinic with a suspicion of aHUS. He had a history of sudden onset anemia, thrombocytopenia, macroscopic hematuria, hypertension and also a history of hospitalization in an intensive care unit due to acute respiratory distress syndrome. On admission, blood pressure was high at 150/100 mmHg. Laboratory studies showed decreased platelet count (35x10^9/L) and reduced hemoglobin (6.6 g/dL) in addition to elevated LDH (2866 U/L), low level of haptoglobulin (<24.7 mg/dL) and negative direct Coomb's test, confirming non-immune intravascular hemolysis. Serum urea level was 74 mg/dl and creatinine was 0.40 mg/dL (previously went up to 0.80 mg/dl). Urine analysis showed hematuria and nephrotic range proteinuria (urinary protein/creatinine: 3.8 mg/mg). The serum complement 3 level was low at 49 mg/dL. Laboratory findings also showed elevated levels of AST (469 U/L), ALT (111 U/L), CK (1583 U/L) and CK-MB (124 U/L), suggesting hepatic and cardiac involvements. Based on these clinical and laboratory findings, the patient was diagnosed as complement-mediated TMA. Activity of ADAMTS-13 was within normal range (89%), thus excluding thrombotic thrombocytopenic purpura. Eculizumab therapy was initiated with a diagnosis of aHUS. After the first infusion, all the clinical and laboratory findings gradually returned to normal. In conclusion, our patient had severe hematological, renal, pulmonary, cardiac and hepatic involvements of TMA, and was successfully treated with Eculizumab. Due to this case, eculizumab may be considered to be an alternative therapy for aHUS with severe clinical manifestations in infants.

Abstract# P- SUN097

Hematologic and renal improvements in atypical hemolytic uremic syndrome patients with long disease duration and chronic kidney disease in response to eculizumab

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Objective: Atypical hemolytic uremic syndrome (aHUS), a life-threatening disease of inherited and/or acquired defects of complement

system regulators, leads to systemic thrombotic microangiopathy (TMA). Adults and children are affected, and onset may occur in early childhood. Within one year (yr) of diagnosis, up to 65% of patients (pts) managed with PE/PI sustain permanent renal damage, progress to end-stage renal disease, or die. Eculizumab (Ecu), a terminal complement inhibitor, is the first approved treatment (tx) for adults and children with aHUS. In previous studies, Ecu was associated with significant improvements from baseline in both hematologic and renal parameters. In the current analysis, we investigate the cumulative percentages of pts meeting criteria for improvement in key hematologic and renal outcomes at each time point in a phase 2 study of Ecu in aHUSpts with long disease duration and chronic kidney disease (CKD).

Methods: Pts aged ≥12 yrs receiving chronic PE/PI were enrolled and treated. The percentage of pts meeting criteria for improvement for each outcome at each time point was measured.

Results: Baseline characteristics are shown below (Table). Twenty pts completed the 26-week (wk) study, and 19 continued in the extension. At wk 12, 18 (90%) pts met criteria for hematologic normalization (platelets ≥150 x 10^9/L and LDH ≤ULN) continuing through 2 yrs. Criteria for CKD improvement (≥1 Stage) were met at wk 4 (5%). Creatinine decrease (≥25%) and eGFR increase (≥15 mL/min/1.73m^2) began at wks 10 and 14, and were confirmed by wks 14 and 18, respectively (Figure). No pt received PE/PI or new dialysis after initiating Ecutx. There were no discontinuations due to tx-related adverse events; 1 pt died of GI-hemorrhage complications unrelated to Ecu.

Conclusion: Ecu use in pts with long disease duration and CKD leads to sustained improvements in renal and hematologic parameters over 2 yrs. In addition, pts experience ongoing improvements in renal function with continued tx.

Abstract# P- SUN098

Efficacy and safety of Eculizumab in the treatment of atypical haemolyticuraemic syndrome: A single tertiary centre experience

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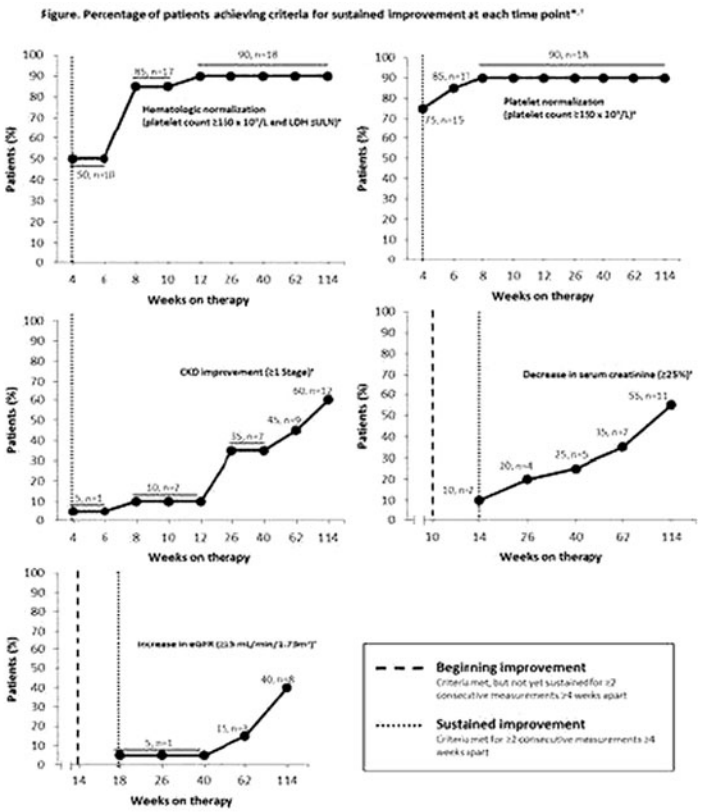
Objective: Atypical haemolyticuraemic syndrome (aHUS) is a rare, chronic, life-threatening disease due to complement dysregulation. The use of early-onset plasma therapy is recommended and Eculizumab, a monoclonal humanized anti-C5 antibody has been licenced in the management of these patients since 2011. We describe our experience with the use of Eculizumab in the treatment of atypical haemolyticuraemic syndrome.

Methods: Retrospective review of outcomes of 3 patients treated with Eculizumab for aHUS in our unit since Aug 2010.

Results: The 1st patient is an 8 year old boy diagnosed with factor H associated aHUS at the age of 2 years old who required at least weekly plasma exchange for 4 years and had progressed to end-stage renal failure prior to commencing treatment with Eculizumab. The 2nd patient is a 5 year old girl diagnosed with CFH/CFHR3 hybrid mutation associated aHUS at the age of 7 months. She also required at least weekly plasma exchange for 31 months prior to commencing Eculizumab due to increasing resistance to plasmatherapy. The 3rd patient is a 4 year old boy diagnosed with complement factor B variant associated aHUS at the age of 9 months who initially required weekly

Table: Baseline Characteristic	ITT population (N=20)
Median age, years (range)	28 (13–63)
Population age category, n (%)	
Adolescent (12 to <18 years)	5 (25)
Adult (≥18 years)	15 (75)
Female, n (%)	12 (60)
Race, n (%)	
Caucasian	17 (85)
Black	2 (10)
Other	1 (5)
Complement regulatory protein gene mutation or antibody identified, n (%)	
Yes	13 (65)
No	7 (35)
Hematologic parameters, n (%)	
Platelets	
<150 x 10^9/ L	3 (15)
≥150 x 10^9/ L	17 (85)
LDH (U/L), ULN=100–290 U/L	
≤ULN	16 (80)
>ULN	4 (20)
Renal function, n (%)	
Serum creatinine, median (range) [µmol/L]	234 (106–893)
Number of patients within each CKD Stage, n (%)	
Stage 1	0 (0)
Stage 2	2 (10)
Stage 3a	2 (10)
Stage 3b	6 (30)
Stage 4	6 (30)
Stage 5	4 (20)
Baseline median eGFR (mL/min/1.73m^2) [range]	28 (6–72)
eGFR (mL/min/1.73m^2)	
<15	4 (20)
15–29	6 (30)
30–44	6 (30)
45–59	2 (10)
60–89	2 (10)
≥90	0 (0)



plasma exchange for 6 months. He suffered his first relapse 18 months post discontinuation of plasmatherapy and was commenced on Eculizumab.
All 3 patients have been maintained on fortnightly Eculizumab for 24, 34 and 15 months respectively. One patient reported frequent headaches post-infusion initially for 3 months. There was also one episode of meningococcus B bacteraemia. No worsening from baseline renal function was seen in all 3 patients. Apart from the child with CFB variant associated aHUS who had 2 clinical relapses (inadequate dosing due to IV cannula dislodgement/live vaccination) while on Eculizumab, the other 2 patients remained in remission throughout.
Conclusion: In our experience, Eculizumab is effective, safe and well tolerated in patients with aHUS. Infection with encapsulated organisms is an ongoing risk and warrants long-term chemoprophylaxis. We suggest close monitoring during periods of immunological stress (infection/vaccination), which may warrant extra doses of Eculizumab.

Abstract# P- SUN099
Use of Eculizumab in atypical haemolyticuraemic syndrome associated with complement factor B variant

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Objective: To describe the clinical course of a 3-and-a-half year old child with atypical haemolyticuraemic syndrome (aHUS) associated with complement factor B variant [heterozygous for the c.724A>C (p.lle242Leu) variant in exon 5 of the CFB gene] who was treated with Eculizumab since Feb 2012.
Methods and Results: He presented at the age of 9 months with thrombotic microangiopathy preceded by an upper respiratory tract infection, and was initially treated with eight daily plasma exchanges. After a week of clinical improvement, he relapsed and was treated with nine daily sessions of plasma exchanges, afterwhich he was maintained in remission with up to three times per week plasma exchange, weaning over the course of 6 months. He remained in remission for 18 months upon discontinuation of plasma therapy (despite infections) and suffered his first relapse at the age of 33 months post-viral illness, for which he was started on treatment with Eculizumab 600mg at induction, followed by 300mg a week later. Clinical improvement occurred within 3 days and he remained on fortnightly maintenance of Eculizumab for 1 year with two separate episodes of relapse (inadequate dosing due to IV cannula dislodgement/live vaccine), 8 months apart. Both relapses (were successfully treated with additional doses of Eculizumab and improved within 3 days. In between the two episodes of relapse while on Eculizumab, he remained in remission with normal renal function, disappearance of proteinuria, improvement in control of hypertension and a significant improvement in quality of life. When the child was in clinical remission, a C5B9 level, taken 14 days post-Eculizumab was high (240 ng/ml) suggesting ongoing complement activation. The child was then maintained on Eculizumab infusion every 10 days. We will present the data on C5B9 and CH50 levels with the change in dosage intervals.
Conclusion: To our knowledge, we present the only reported case with complement factor B variant associated atypical haemolyticuraemic syndrome, successfully managed with Eculizumab. We suggest close monitoring during a period of immunological stress (infection/vaccination), which may warrant extra doses of Ecluzimab.

Abstract# P- SUN100
Eculizumab hepatotoxicity: when to change therapy?

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Objective: We report a potentially significant novel side effect of eculizumab observed in 6 of 10 pediatric patients treated for atypical hemolytic uremic syndrome (aHUS) at the Hospital for Sick Children in Toronto.
Methods: We performed a retrospective review of case notes and investigations for patients treated with eculizumab for aHUS in a single pediatric centre. A standard dosing regimen based on patient weight was used.
Results: Six children aged 6 to 11 years experienced elevated aminotransferases following eculizumab treatment for aHUS. One patient with no pre-existing liver disease developed tender hepatomegaly 3 days following eculizumab. Alanine transaminase (ALT), hepatic alkaline phosphatase (ALK), aspartate aminotransferase (AST) and gamma-glutamyltranspeptidase (GGT) rose to over 20 times the upper limit of normal. Bilirubin, INR and albumin remained within normal limits. Liver biopsy taken after 2 doses when ALT had normalized showed mild hepatocellular injury with no evidence of infectious or autoimmune hepatitis. Recurrent elevation of ALT following re-dosing of eculizumab necessitated its discontinuation and transition to plasma therapy for aHUS. In 5 other children transient elevation of liver enzymes following eculizumab was observed. Infectious and other causes were excluded in each case.
Conclusion: Hepatotoxicity is an important yet previously unreported and so far unexplained adverse effect of eculizumab. We recommend monitoring liver enzymes in all patients receiving eculizumab. Further research is required to characterize the mechanism of hepatotoxicity and to identify which patients are most at risk.

Abstract# P- SUN101
Remission and recurrence free 3 years follow up in a patient with factor H antibody associated atypical HUS after induction therapy with plasma exchange and maintenance therapy with IVIG and MMF

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Objective: Factor H antibodies (FH Ab) can be detected in 6-25% of aHUS patients. At present, evidence based therapy recommendations for this group of patients are missing.
Methods:A 10 year old boy was admitted to the hospital because of weakness, vomiting and oliguria. 4 days before admission he suffered from diarrhoea. Laboratory analysis showed anemia (Hemoglobin 68 g/l), thrombocytopenia ($33x10^9$/l), elevated serum creatinin concentration (6,6 mg/dl), high LDH (2312 U/l), low haptoglobin (5.8 mg/dl) and low C3 (0,58 g/l) levels, no evidence for shigatoxin induced HUS. Hemodialysis (n=2) and plasma exchange (PE) (n=7) were started. After 7 PE sessions normalization of hematologic parameters and renal function was achieved. 2 months later the patient presented a recurrent episode treated with FFP infusions. After remission the patient recieved weekly FFP infusions. At that time FH Ab associated aHUS with homozygous deletion of the complement factor h related proteins 1 and 3 was diagnosed (FH Ab Titer 1500 AU/ml). After diagnosis of FH Ab associated aHUS the patient recieved IVIG 2g/kg body weight

and FFP was tapered. Maintanance therapy with MMF was started. FH Ab titer and terminal complement complex (TCC) concentration were monitored frequently . The patient received additional IVIG infusions when FH Ab Titers increased.
Results: 3 years after the first recurrence the patient is on complete hematological and renal remission. The FH Ab titers are mainly in the low range (Titer cut off <100 AU/ml; low range <500AU/ml). The measurement of C3 and TCC in plasma reveal normal complement activation.
Conclusion: Early start with PE followed by maintance therapy with IVIG and MMF in FH Ab associated aHUS is a reasonable alternative to Eculizumab or periodic plasma infusions.

Abstract# P- SUN102
Eculizumab in MPGN II (Membranoproliferative glomerulonephritis type II) - a promising therapy option.

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Objective: MPGN II is a rare disorder with complement containing deposits in the GBM. It is associated to a dysregulation of the alternative complement pathway. Therapeutic options for restoring complement regulation and avoiding effects of an overactive terminal complement cascade (TCC) enclose plasma therapy and terminal complement blockade through the anti-C5 monoclonal antibody eculizumab.
Methods: We want to report on two different cases with refractory MPGN II who responded instantly to eculizumab treatment.
Results: Patient 1: *2006, C3 nephritic factor, autoantibodies against complement C3 convertase and C3 activation products. Initial TCC 1146 ng/ml.
Biopsy: MPGN II, all glomeruli: mainly sclerosing proliferative crescents.2013: edema, intubation requiring respiratory complaints. ARF, complement activation (C3 0.12 g/l): plasmapheresis (PP) daily, methylprednisolone (MP) pulse therapy. Recurrent pulmonary edema (inspite permanent hemofiltration), need for resuscitation and catecholamines. After a total of 10 PP: worsening of clinical situation, decision to eculizumab therapy. Recovering promptly, resumption of diuresis. Steady improvement in renal function, an exposure of dialysis in the near future is planned. Triple antihypertensive therapy. After 7 doses eculizumab: TCC 349 ng/ml. Patient 2: *2003, C3 nephritic factor. Initial TCC 2904 ng/ml. Biopsy: MPGN II, focal segmental extracapillary proliferation, focal segmental glomerulosclerosis. 2010: nephrotic syndrome, complement activation (C3 0.36 g/l), MP pulse therapy, mycophenolate-mofetil, antiproteinuric medication: 1.5 years. Increasing proteinuria: 1.8 g / sq m BSA, hypalbuminemia: rituximab therapy (2 doses), immunoglobuline administration (3 doses). Continued edema and proteinuria, C3: 0.2 g / l.
After first dose of eculizumab significant increase in S-albumin, decrease in proteinuria and TCC.
Conclusion: Improvement of these two patients in response to eculizumab provides support that complement control with the use of eculizumab may be an effective strategy in patients with refractory MPGN II. Both patients showed an extremely high TCC with a significant decline after administration.

Abstract# P- SUN103
Plasmatherapy in atypical HUS (aHUS) - Long-term follow-up of 4 patients

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Objective: Atypical HUS is a form of thrombotic microangiopathy with uncontrolled activation of the complement pathway and generation of the terminal complement complex. About 5% of HUS cases are attributable to aHUS and show mostly a recurrent course. Current therapeutic options for restoring complement regulation enclose plasma infusion or exchange.
Methods: We report on four patients with aHUS and treated safely and efficiently with plasma infusion (PI) of 10-20 ml/kg body weight every 14 days.
Results: Patient 1: *2003, homozygous mutation CFH gene, TMA with ARF at age 8 months and thus start with PI - complete remission.Patient 2: *2001, CFHR1 deficiency, TMA with ARF in 2007 and start of PI. Single antihypertensive medication.Patient 3: *2010, heterozygous C3-mutation, CFHR1+3-mutation, TMA with nephrotic syndrome 2010 (age 8 months), start with PI at age 21 months. Residual proteinuria.Antiproteinuric medication.Patient 4: *2011, heterozygous mutation CFH gene, TMA with ARF in 2011 (age 5 months), start with PI at age 6 months. Triple antihypertensive medication.The treatment was uneventful and PI was well tolerated in all patients. At times of severe infections and accompanying macrohematuria PI is administered earlier.Patient 1 is receiving PI for 10 years now, having still a good kidney function and no side effects of therapy.
Conclusion: We show a favourable outcome of our patients with plasmainfusion over years. Administration is uneventful and safe. Plasma therapy should be the first- or second choice despite the availability of complement blockers.

LDH (U/l)	Date 1	Date 2	Date 3	Date 4
Patient 1	1256	261	221	219
Patient 2	4420	193	232	185
Patient 3	682	269	289	281
Patient 4	1960	634	361	384
Creatinine (mg/dl)	Date 1	Date 2	Date 3	Date 4
Patient 1	1.3	0.3	0.4	0.46
Patient 2	8.39	0.49	0.55	0.47
Patient 3	0.29	0.27	0.24	0.27
Patient 4	1.16	2.16	0.23	0.27

Abstract# P- SUN104
Eculizumab and aHUS (atypical HUS) - A complicated case with frequent relapses.

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Objective: Atypical HUS is a form of thrombotic microangiopathy with uncontrolled activation of the complement pathway and generation of the terminal complement complex. About 5% of HUS cases are attributable to aHUS and show mostly a recurrent course. Mortality is increased particularly in the first year. Current therapeutic options for

restoring complement regulation enclose plasma therapy and terminal complement blockade through the anti-C5 monoclonal antibody eculizumab. Eculizumab prevents the activation of the terminal portion of the complement cascade and the formation of the potentially lytic terminal complement complex.
Methods: We want to report on a complicated case with aHUS who did not respond satisfactory to eculizumab treatment.
Results: Genetics: heterozygous mutation CFH gene, nucleotide exchange CFH gene and MCP gene. 07/2011: diarrhea, vomiting, TMA with ARF. Complement activation: plasmapheresis and plasmainfusion: stabilization clinical course. 11/2011: recurrent TMA with resuscitation, ARF. Thus hypothermia and hemofiltration.2 doses of eculizumab (stop after absence of effect), repetitive plasma infusion. Repeated seizures with HUS typical signal alterations in MRI. Malignant hypertension.02/2012: permanent eculizumab therapy with twice the amount recommended. After second administration: contact to varicella zoster: Hyper-Ig-administration. Again exacerbation of aHUS (TMA), resuscitation, clinical impairment. Continuous eculizumab therapy, recovering: blood pressure stable, no proteinuria, quite solid GFR. But repeated exacerbations: 12/2012: after measles-mumps-rubella vaccination, with pancreatitis. 01/2013: after flu shot, with pancreatitis. 03/2013: during a slight infection, with pancreatitis, massive hypertension, first time again elevated LDH. Decision to weekly administration. TCC at any time increased. However, after 34 doses of eculizumab, no dialysis required.
Conclusion: Not every aHUS patient shows an optimal effect on eculizumab. Valid outcome measures to determine the efficacy of treatment have yet to be defined. A constantly elevated TCC seems more of a non-response - despite alternative way suppressed maximum.

Abstract# P- SUN105
Remission and recurrence free 2 years follow up in a patient with onset of factor H antibody associated atypical HUS under induction therapy with Plasmapheresis and introduction of maintenance therapy with i.v.IgG and MMF

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Objective: Factor H antibodies (FH Ab) develop in 6-10% of aHUS patients. The role of FH Ab in disease onset, progression and treatment is of critical interest for physicians and patients dealing with this unsolved problem. At present, evidence based therapy recommendations for this group of patients are missing. Many patients develop end stage renal disease (ESRD) and recurrence rates within the first year are up to 70%.
Methods: A 15 year old girl was addmited to the hospital because of weakness, vommitinganddecreasing amount of urine. 6 days ago she had otitis. On examination slight oedema and normal blood pressure. Laboratory analysis showed anemia (Hb - 71 g/l), thrombocytopaenia ($55x10^9$/l), elevated serum creatinin concentration (1219 micromol/l), high LDH (2612 U/l), low haptoglobin (86 mg/l) and low C3 (0,38 g/l) levels. Hemodialysis (n=8) and plasmapheresis (regime as recommended in Guidlines of The European Paediatric Study Group for HUS) were started within 24 hours after addmition to the hospital. After 18 plasmapheresis sessions total remission (normalization of hematologic parameters and renal function) was obtained. 17 day later plasmapheresis sessions had to be started again because of hematologic relapse (Hb - 57 g/l, thrombocytes - $87x10^9$/l, haptoglobin - 29 mg/l, C3 – 0.48 g/l, LDH - 418 U/l, serum creatinin concentration - 95 micromol/l) (total number of plasmapheresis - 36). At that time FH Ab associated aHUS was diagnosed and after remission maintanance therapy (3 months after the onset) with i.v.IgG 2g/kg body weight (days 0, 21, 41) and Mycophenolatemofetil (started on day 2; 600mg/m2 twice a day) was introduced. Repeated IgG infusion at 7 months after onset because of increasing FH Ab titers.
Results: 24 months after onset of the disease the patient is on hematological and renal remission: Hb - 130 g/l, platelets - 281x109/l, LDH - 167 U/l, haptoglobin - 1283 mg/l, serum creatinin - 66 micromol/l, GFR - 126 ml/min/1,73m^2, C3 1.05 g/l.
Conclusion: Early start and aggressive plasmapheresis, followed by maintance therapy with IgG and MMF seems to be a good therapeutic option in aHUS associated FhAbaHUS.

Abstract# P- SUN106
Rapid diagnosis of aetiology of atypical HUS leads to early and optimal treatment

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Objective: Atypical haemolytic uremic syndrome (aHUS) is a rare thrombotic microangiopathy leading often to chronic renal failure if untreated. It is tightly connected to disturbances in alternative complement pathway.
We report a case of four patients with aHUS, where rapid diagnostics helped to optimize treatment strategies that led to remission in all patients.
Methods and Results: Four patients with atypical HUS were admitted to our department in the last year. Diagnostic protocol utilizing rapid methods (ELISA for factor H antibodies and flow cytometry of whole blood for expression of MCP/CD46 on leukocytes performed within 48 hours) was used for the initial diagnostics after diagnosis of aHUS was established. Two patients (both boys, 8 years of age) were having marked decrease of expression of MCP on the leukocytes. In these two patients only supportive therapy was performed and both patients achieved spontaneous remission within 3 weeks of onset with long term remission until present. Two other patients (a girl, 17 years and a boy, 8 years) were positive for factor H autoantibodies. Initial plasma exchanges (PE) were performed and eculizumab was administered because of incomplete remission after PE shortly after. Both patients achieved remission.
Conclusion: Rapid evaluation of aHUSaetiology led to different treatment options (plasma exchange and eculizumab administration vs. “watch and wait” strategy) resulting in all four patients achieving remission. Prompt availability of these diagnostic tests seems essential for therapy decision in the era of complement blocking treatment. The study was supported by grant MZ NT1145 and by the project (Ministry of Health, Czech Republic) for conceptual development of research organization 00064203 (University HospitalMotol, Prague, Czech Republic).

Abstract# P- SUN107
Successful treatment of a DEAP - HUS with mycophenolatemofetil: a five year follow-up

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Objective: DEAP-HUS (Deficient for CFHR1 and CFHR3 proteins and Autoantibody Positive form of Hemolytic Uremic Syndrome)

represents a novel type or subtype of haemolytic uremic syndrome. DEAP-HUS is characterized by acquired Factor H (FH) functional deficiency due to FH-autoantibodies (FH-ab) and deficiency of CFHR proteins 1 and 3 (CFHR1 and CFHR3) resulting in sustained activation of the alternative complement pathway.
Methods and Results: We report on a now 14-year old boy who showed symptoms of atypical HUS (hematocrit 0.14; LDH 3678 IU/L; fragmentocytes +; s-creatinine 150 umol/L; platelets 23 Gpt/L and absence of diarrhoea) at the time of diagnosis when he was 7 years old. The patient revealed low C_3 levels (0.54 mg/L), FH-ab (704 U) and CFHR1/CFHR3 deficiency, whereas FH concentration and mobility (western blot analysis) were normal. The treatment with hemodialysis, plasmapheresis, repeated doses of fresh frozen plasma (FFP) and administration of CD 20 antibodies (Rituximab 375 mg/m^2 at month 4, 9 and 23 respectively) over the first 24 months led to a normalization of C_3 complement, reduction of FH-ab (440 U) and a clinical remission. At month 28 the treatment was changed to Cellcept (mycophenolatemofitil 1200 mg/m^2/d, daily dose of 1250 mg). The FH-ab dropped further down to 281 U (month 68) and C_3 complement remained in the normal range. At month 84 s-creatinine increased to 140 umol/L, C_3 complement decreased to 0.86 mg/L and the FH-ab remained low (222 U) so that a further adaptation of the dose of Cellcept to the original 1200 mg/m^2/d (daily dose of 2000 mg) was necessary. In the further course the abnormal values normalized and the boy did not show any clinical abnormalities.
After 5 years of treatment with Cellcept the renal histology at month 88 showed no disease activity; only mild focal and segmental glomerular scars and a mild benign nephrosclerosis were described.
Conclusion: Patients suffering from aHUS due to FH-ab and deficiency of CFHR1/CFHR3 (DEAP-HUS) appear to benefit from immunosuppressive treatment with mycophenolatemofetil. Whether the previous treatment with Rituximab has contributed to this effect remains to be elucidated.

Abstract# P- SUN108
Preservation of renal function in atypical haemolytic uremic syndrome (aHUS) by eculizumab in two Argentinean children.

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A 7-year-old girl was admitted to hospital on October 6th 2011.She was on dialysis due to acute renal failure (eGFR 13ml/min/1.73m2) and microangiopathichemolytic anemia with thrombocytopenia (MAT). No history of diarrhea or bloody stools (negative stool culture and verotoxine). Two weeks earlier she had experienced a mild cold. Decresedserum C3 and H factor were found. With presumptive diagnosis of complement associated aHUS she received fresh frozen plasma infusions (FFPi). She developed severe hypertension treated with calcium channel blockers, ACE inhibitors and ARB. After 3 weeks of FFPi she had an haematological relapse. She was off dialysis but with ARF, hypertension and heavy proteinuria. An heterozygous complement factor H mutation was found.
A 4-month-old boy was admitted on March 11th 2012 with a two-day history of pallor, purpura and oliguria. There was no history of diarrhea or bloody stools (negative stool culture and verotoxine). Laboratory results revealed MAT and ARF (eGFR 26ml/min/1.73m2) with preserved diuresis. Decresed serum C3. With presumptive diagnosis of complement associatedaHUS, he started FFPi. Hedevelopped severe hypertension treated with propanolol, minoxidil, furosemide and enalapril. ADAMTS 13 activity was normal and low H factor was found. He developed acute pulmonary edema and catheter related sepsis. After 5 weeks of plasma treatment eGFR was 35 ml/min/1.73m2, haptoglobine was low and schistocytes were present.
Both patients showed resistance to daily plasma infusion with persistence of hypocomplementemia and acute renal failure. Eculizumab was used as rescue therapy after meningococcus and pneumococcus vaccination. FFPi was stopped after eculizumab administration. One week later, renal function improved. After administration of eculizumab, the girl has been followed for 12 months and the boy for 10 month without any relapse. Both patients are normotensive with complete renal function recovery; free from severe infections and proteinuria with enalapril as renoprotection. Conclusion: Our experience shows that complement inhibiting therapy allows the preservation of renal function and avoids desease relapses.

Abstract# P- SUN109
Plasma exchange in the management of haemolyticuraemic syndrome: Single centre experience over 10 years

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Objective: To analyse the efficacy and complications of plasma exchange (PLEX) in children with haemolyticuraemic syndrome (HUS) over the past 10 years.
Methods: Retrospective review of patients with HUS who underwent PLEX in a single tertiary paediatric nephrology unit between Jan 2002-Jan 2012. Analysis of basic demographics, duration of PLEX, tolerance, efficacy and outcomes were recorded for each episode.
Results:11 patients with mean age of 3 years (range 0.3-14), accounted for 401 episodes of PLEX. 5 patients were identified with confirmed atypical HUS (aHUS): received a mean of 64 sessions (range 6-198). All relapses were managed successfully with aggressive PLEX. Of these, 3 transitioned to Eculizumab, 1 remained on monthly PLEX and 1 transitioned to haemodialysis due to end-stage renal failure. The other 6 patients (3 patients with HUS who were suspected to have atypical features and 3 patients who had seizures), received a mean of 13 sessions (range 4-22) and PLEX was discontinued following clinical improvement. Mean volume exchanged was 58.8 ml/kg and mean % colloid used was 79.6%.
272 (68%) sessions were uneventful with complications occuring in 129 sessions. Of these 129 sessions, asymptomatic hypocalcaemia was most frequent, occuring in 71 (55%) sessions followed by line thrombus in 12 (9%) sessions leading to 4 lost circuits and 6 (4.6%) sessions with hypotension requiring fluid bolus. All patients were given alfacalcidol prior to each session. When indicated, patients were also maintained on calcium infusion. Chlorphernamine and/or hydrocortisone were administered prior to 146 (36%) sessions. There were no serious complications, death, allergic or transfusion reactions.
Conclusion: We found PLEX to be well tolerated, safe and effective in the management of all types of HUS. All relapses in aHUS were managed successfully with aggressive PLEX. There was complete resolution of neurological signs in patients with typical HUS with CNS involvement. We did not find allergic/transfusion reactions to be a significant problem and suggest giving chlorphenamine/hydrocortisone only when the patient is initially commenced on PLEX. Special care should be given to prevent hypocalcaemia.

Abstract# P- SUN110
Three year disease remission with eculizumab treatment in atypical haemolyticuraemic syndrome: a report of two cases.

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Objective: The treatment of atypical hemolytic uremic syndrome (aHUS) has been revolutionized by the development of the humanized

anti-C5 monoclonal antibody, eculizumab. Eculizumab inhibits the terminal complement pathway. There is evidence for an excellent short to medium term clinical response in aHUS, which is due to dysregulation of the alternative complement pathway in at least 60% of cases. We report two pediatric cases of aHUS successfully treated with eculizumab longer than 36 months.

Methods: Two children, aged 9 and 7 months, were diagnosed with severe aHUS in 2009. From 9 to 13 months of age, the first child had three intensive care admissions for acute pulmonary edema, hypertensive crises and renal failure. The second child remained dialysis dependent from 7 to 16 months with three HUS flares in this period. ADAMTS13 activity was normal in both cases with no infective, metabolic, autoimmune or drug cause of aHUS shown. Alternative complement pathway testing was performed to determine factor levels, activity and presence of gene mutations but no abnormality was found. Plasma exchange had an initial response in both children, but this was not sustained. Eculizumab was obtained on compassionate grounds. Antibiotic prophylaxis and immunization against encapsulated organisms was given. Their clinical course was followed.

Results: There was a dramatic response to eculizumab in both cases. Remission was induced at 13 and 20 months of age, respectively. Both children had required plasma exchange three times per week which was then ceased. In the second case, dialysis was able to be discontinued. They remain clinically quiescent on fortnightly infusions of 600mg eculizumab. They are now dialysis and plasma exchange-free for 36 months. Any reduction in the infusion frequency results in disease recurrence. Both remain highly dependent on eculizumab as maintenance.

Conclusion: We report an excellent clinical response and safety profile using eculizumab for at least 3 years in two children with aHUS. Terminal complement pathway blockade is a novel but highly effective therapeutic strategy in aHUS. Further studies are needed to clarify long term outcomes and safety profiles with this treatment.

Abstract# P- SUN111

An Observational, Non-interventional, Multicenter, Multinational Registry of Patients with Atypical Hemolytic Uremic Syndrome (aHUS): Methodology

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Objective: aHUS is a rare, genetic, progressive, and life-threatening disease often characterized by chronic, uncontrolled complement activation causing thrombotic microangiopathy (TMA) and end-organ damage. Eculizumab (ecu), a terminal complement inhibitor, is indicated for the treatment of patients (pts) with aHUS. The International aHUS Registry is designed to prospectively collect information on the long-term safety and effectiveness of ecu treatment for pts with aHUS, as well as long-term consequences of TMA and other clinical outcomes (e.g., kidney function) in aHUSpts regardless of treatment.

Methods and Results: The International aHUS Registry is open to pts of any age with a diagnosis of aHUS, regardless of treatment status. Data are collected at study enrollment and every 6 months thereafter, and include demographics, medical and disease history, symptomology, targeted lab results including genetic results, TMA complications and associated treatments, concomitant medications, clinical and patient reported outcomes, and safety of ecu and other aHUS treatments. Information from patient medical records is entered via a secure web portal and maintained anonymously. The goal is to follow each patient and to assess long-term outcomes for a minimum of five years. The registry is supported by Alexion Pharmaceuticals, Inc. with governance by an independent Scientific Advisory Board and national coordinators representing each participating country-a structure designed to optimize use of pooled data to advance knowledge in an ultra-rare disease while respecting the rights of individual contributors.

Conclusion: The International aHUS Registry is dedicated to increasing knowledge of aHUS disease history and progression. The information obtained and the results of analyses of the collected data and outcomes provide an opportunity to optimize the care and improve the quality of life for aHUS patients. A single global Registry is preferred to capture disease, safety and efficacy data in an ultra-rare disease population because it maximizes physician and patient participation. New clinical sites are encouraged to participate.

Abstract# P- SUN112

ECULIZUMAB IN REFRACTORY DENSE DEPOSIT DISEASE (DDD). CASE REPORT

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Objective: Increasing evidence of complement(C) involvement inDDD pathogenesis exists. Treatment with eculizumab, a C_5inhibitor,has been associated with clinical remission and biopsy improvement in patientswith refractory DDD, leading to better outcome

Methods and Results:13 y oldgirl, who is 3rd kidney transplant (KT) recipient, is presented. PHx: diseaseonset at 5y with hematuria, renal failure and nephrotic syndrome (NS) (albumin1.7 gr/dl, proteinuria 241 mg/m^2/h),low C_3 28 mg/dl, and positive C_3NeF. Biopsy: severe MPGN,with strongly positive mesangial and diffuse linear isolated C_3&GBM deposits. She rapidly progressed to ESKD, despite methylprednisolone (MP)and Cyclophosphamide pulses. 1st KT treated with Basiliximab+CsA+MMF+MP,which failed 9 months later due to relapse. 2nd KT additionally treatedwith PEX that sustained normal C_3 levels w/o C_3NeF.However, proteinuria and early relapse developed with progressive CKD despite rituximab. *C* analysis: FH, FI, MCP, antiFH Abs, C_3 and FB w/o anomalies. *Current Hx*: 3er KT treatedwith ATG+MP+FK+MMF+PEX. Early relapse which partial response to intensive PEXand rituximab occurred but proteinuria (50 mg/m^2/h)persisted. Several vascular access dysfunction and severe infection episodes,obliged to hold PEX. Patient developed NS with low C_3 27 mg/dL, whichagain responded partially to PEX+MP but impaired renal function (Cr 0.9 mg/dL)and severe graft MPGN were observed. PEX was replaced by eculizumab (900 mg/week x4; 1200 mg/week x 1 & and maintenance1200 mg/BIW). Follow-up: clinical remission and negativeproteinuria was achieved w/o side effects. 6 months later renal function hasimproved (Cr 0.6 mg/dL), and remarkably, glomerular C_3 deposits disappeared.

Conclusion:this case report supports the potential of C blockage and eculizumabintreating refractory C_3 glomerulonephritis, with regression of glomerularC_3 deposition

Abstract# P- SUN113

Post-Transplant Intercurrent Thrombocytopenia Complicating Transient Viral Infections in a Child with Factor H Associated Atypical HUS (aHUS) on Maintenance Eculizumab Therapy

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Complement inhibition by eculizumab (Ecu) prevents aHUS recurrence after kidney transplantation (tx). Long-term effects are unknown. In August 2011, we administered Ecu 600 mg before kidney tx to a 5-y-old 18 Kg boy with aHUS since 6 months of age, associated to heterozygous loss of function mutation (3645C>T) in factor H gene. Ecu was infused on days 1 and 7 post tx, and then 300 mg every other week (eow). Induction included low-dose thymoglobulin and basiliximab, and maintenance steroid, cyclosporine and mycophenolatemofetil. Renal function promptly recovered to normal values. CH50 circulating levels, in normal range (30-50 U/ml) pre-tx, steadily dropped to <5U/ml after eculizumab. Post-tx platelets count (plts),aptoglobin, hemoglobin and hemolysis markers were normal. Three months after tx, during Burkholderiacepacia septicemia due to central venous catheter colonization, plts had a slight drop to 130000/ul and aptoglobin to 37 mg/dl but promptly recovered to normal with sepsis resolution following CVC removal and meropenem. Hemoglobin and LDH were persistently normal. 26 months post-tx, plts progressively decreased to 54.000/ul, without evidence of hemolysis. He was well and plts normalized after up-titration of Ecu to 600 mg eow (weight was 21 kg). One month later plts dropped to 6,000/ul during a mild varicella-zoster virus infection, without evidence of hemolysis, and normalized with 4 sessions of plasma exchange with fresh frozen plasma added-on maintenance Ecu therapy. 2 and 4 months later plts again dropped to 10,000/ul during 2 mild rhinitis episodes, again evidence of hemolysis, and normalized with recovery. Throughout these intercurrent episodes of severe thrombocytopenia he never showed signs of recurrent HUS and hemoglobin, serum LDH and creatinine were persistently in normal range. Transient thrombocytopenia during intercurrent infectious episodes most likely reflected transient complement activation despite continued eculizumab therapy. These episodes did not appear to harm the grafted kidney and the child since never associated with evidence of recurrent HUS.

Abstract# P- SUN114

Severe plasmatherapy dependent atypical HUS of unknown etiology successfully responded to eculizumab

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Objective: Hemolytic-uremic syndrome (HUS) is defined as thrombotic microangiopathy with hemolytic anemia, thrombocytopenia and acute renal impairment. Atypical HUS (aHUS) represents a heterogeneous group of disorders associated with dysregulation of the complement alternative pathway without evidence for infection with shigatoxin producing bacteria.
Methods: 3.5 years old boy was admitted to the hospital because of oedema, anuria, elevated blood pressure (145/100 mmHg) and vomiting. The laboratory analysis showed: anemia (Hb - 52 g/l), thrombocytopenia ($125x10^9$/l), elevated serum creatinin (529 micromol/l), high LDH (987 U/l), low haptoglobin (113 mg/l) and C3 (0.72 g/l) levels. There were no signs of shigatoxin induced HUS, the patient was anuric and required hemodialysis (n=22). Plasmatherapy was started as recommended in Guidelines of The European Paediatric Study Group for HUS within 24 hours after admission. The boy was plasma dependent. C3 stayed low. Because of an severe anaphylactic reaction during plasmapheresis plasma infusions had to be used instead. Despite this therapy regimen severe arterial hypertension persisted (7 antihypertensive drugs) and renal function worsened during 11 months to CKD stage 5 requiring chronic dialysis. Renal biopsy showed chronic active tromboticmicroangiopathy, with diffuse membranoproliferative glomerular changes and various degrees of arteriosclerosis. No Factor H antibodies and no mutations were found in genes C3, FH, FI and MCP. 2.5 months after the start of chronic dialysis eculizumab was administered. During 1 month renal function improved, dialysis was discontinued and hypertension became controlled (from 99th percentile with 7 antihypertensive drugs to 50th percentile with 4 drugs).
Results: Six months after start of eculizumab the patient is in hematologic remission: Hb - 108 g/l, platelets - $295x10^9$/l, LDH - 267 U/l, haptoglobin - 1152 mg/l. Renal function improved significantly to CKD stage 2: serum creatinin - 85 micromol/l, GFR - 63.4 ml/min/1,73m^2. C3 stays low - 0.51 g/l.
Conclusion: Start of eculizumab let the patient with aHUS discontinue dialysis, improved arterial blood pressure and quality of life.

Abstract# P- SUN115

SUCCESS OF ECULIZUMAB IN THE TREATMENT OF ATYPICAL HEMOLYTIC UREMIC SYNDROME

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Objective: Disorders of complement regulation are the most important in the etiology of atypical hemolytic uremic syndrome. Some cases of complement dysfunction appear to respond to plasma therapy or to plasmapheresis. Recent cases reports have shown that eculizumab may be beneficial in the long term treatment of aHUS. We present our case series with aHUS, treated with eculizumab, which are resistant or dependent to plasmapheresis.
Methods: Nine children (F/M: 6/3) with aHUS which are treated with eculizumab were enrolled to the study. Data were recorded retrospectively. Initial treatment dose of eculizumab was 900 mg every week for 2 weeks and at the 3rd week of the initiation of the eculizumab, dosing was changed to 600 mg every 2 weeks.
Results: Median age was 5.5 (min: 1-max: 12) years. All patients had renal failure. Dialysis required in 4 patients. 3 patients had neurologic involvement. Stool specimens were negative for STEC and *Shigelladysenteriae*type 1. aHUS was initiated by pneumonia in one patient. 4 patients had low C3 levels. Number of plasmapheresis courses varied 18 and 49. 4 patients were resistant to plasmapheresis therapy and 5 patients were dependent to plasmapheresis therapy. Eculizumab was initiated and complete remission was obtained in all patients.
Conclusion: Eculizumab can be used for aHUS witch is unresponsiveness to plasma therapy or for aHUS witch is dependent to plasma therapy. In both cases it is life-saving and enhancing the quality of life.

Abstract# P- SUN116

Successful rescue treatment for Atypical HUS recurrence in kidney transplant with plasma therapy and eculizumab

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A 10-years-old girl underwent a cadaveric kidney transplant due to chronic renal failure secondary to atypical HUS. Her illness had began when she was 8 months old. She had had 3 recurrences partially responders to fresh frozen plasma infusion (FFPi) therapy, mostly hematological, until she needed chronic dyalisis. She performed CAPD for 6 years and then hemodialysis. A mutation for complement factor H deficiency was diagnosed. When she was transplanted, she had few vascular accesses. Immunosuppressive drugs were thymoglobulin as induction, tacrolimus, sodic mycophenolate and prednisone as maintenance. She received one FFPi before the surgery and 5 daily plasmapheresis sessions after it. Then she began with FFPi 10 ml/kg/dose twice a day and once a day after 10 days post transplant. She did not show any evidence of recurrence so the infusions intervals lasted very slowly. At 18 months post transplant, she began with pallor, hypertension, high creatinine levels (from 0.7 to 2-2.5 mg/dl) and LDH (up to 600 UI/L), low hemoglobin and haptoglobin (7 g/dl and less than 30mg/dl respectively) and heavy proteinuria (more than 1.5 mg/day). She was under FFPi therapy every thirteen days. Renal biopsy revealed mild to moderate TMA and moderate IFTA. C4d and HLA antibodies were negative. This episode was assumed as a recurrence of her illness so she iniciated again with FFPi through a port-a-cath. Chemistry values improved but they did not return to normality. As FFPi were three times a week, 7 moths ago, she was switched to eculizumabtheraphy, 600mg for two weeks and then 900 at 3rd week and every two weeks. Now, she is 13 years old and her blood values and quality of life improved: she is back to school again

Pre Eculizumab (with FFPi three times a week)	Post Eculizumab (without plasma therapy)
Hemoglobin (g/dl) 8 - 9	10 - 11.5
Haptoglobin (mg/dl) 60 - 85	more than 90
creatinine (mg/dl) 1.3	0.9
proteinuria (g/day) 1.4 - 1.6	less than 0.4

Abstract# P- SUN117

Corticosteroid treatment of hemolytic uremic syndrome (HUS) : a retrospective study

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Objective: Treatment of hemolytic uremic syndrome (HUS) is still a challenge, many protocols like plasmatherapy, life-support, elicuzumab and corticosteroid have been applied in the management of HUS in children, but the effects were not universally recognized, especially regarding treatment with corticosteroid. This study retrospectively evaluated the effect of corticosteroid in the treatment of children with HUS.
Methods: 57 children with HUS were included in this retrospective evaluation. Corticosteroid treatment was applied in 23 patients and other 34 patients were supportively treated without corticosteroid served as control group. The outcomes, classified as death, incomplete recovery and normal, were compared between two groups with Fisher's exact statistical analysis test.
Results: There were 8 cases of typical and 15 atypical diarrhea-associated HUS in corticosteroid treatment group, and 11 typical and 23 atypical diarrhea-associated HUS in control group. The treatment and control groups were not significantly different in terms of age, sex ratio, renal function. The outcomes of corticosteroid treatment group were death in 17.4% in, incomplete recovery in 43.5%, normal in 39.1%, while death in 26.5%, incomplete recovery in 11.8%, normal in 52.9% of control group. It seems that corticosteroid treatment can reduce mortality, but no statistical significance. The prognosis between atypical and typical diarrhea-associated HUS did not showed significant difference.
Conclusion: The retrospective study does not support the efficacy of corticosteroid treatment of HUS in children, perspective clinical trials are needed to clarify the effect of corticosteroid on HUS.

Abstract# P- SUN118

Rare homozygous membrane cofactor protein (MCP) deficiency associated with plasma exchange-resistant, severe (atypical) hemolytic uremic syndrome (aHUS): rescue with a short course of anti-C5 antibody therapy

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Objectives: Heterozygous MCP mutations are found in ~15% incident atypical HUS with spontaneous resolution and generally good outcome. Detailed descriptions of HUS due to complete MCP deficiency are lacking. Here we report the presentation, treatment and evolution of such a patient from Algeria.
Methods: A previously healthy, 17-year-old teenager presented in 01/2011 with headache, arthralgia and metrorrhagia. She was found to have anuric acute kidney injury, severe hypertension and peripheral edema, hemolytic anemia (Hb 49 g/L, ++ schizocytes, elevated LDH) and thrombocytopenia (74/nL). She denied diarrhea or other infection and use of medications/oral contraceptives. Hemodialysis and plasma therapy was started. Infusion of frozen plasma (FP) was ineffective, and therapeutic plasma exchange was initiated with 60 mL/kg FP and albumin 3x weekly, with partial (hematological) response. After 3 months, she remained plasma exchange- and dialysis-dependent.
Results: Plasma C3 and C4 concentrations were normal. Genetic studies revealed non-expression of MCP due to a homozygous deletion in exon 1at the MCP locus, but no abnormalities in CFH and CFI. Both consanguineous parents and a younger sibling are heterozygous MCP mutation carriers and healthy. In 05/2011, she received 5 doses of eculizumab resulting in gradual hematological normalization after 4 months; GFR improved without additional plasma therapy and dialysis was discontinued 3 months post eculizumab. Current GFR is 60 mL/min/1.73m2, 22 months after anti-complement therapy. A first kidney biopsy (Bx) 4 months after HUS onset revealed active TMA with thromboses of arterioles and small arteries, glomerular ischemia and mesangiolysis, but no deposition of C3 or C1q. A second Bx 17 months later showed evidence of ischemia, focal mesangial hyperplasia and GBM duplication, but no active TMA.
Conclusions: While hterozygous MCP mutations are associated with relapsing, self-limiting HUS, this case suggests that complete lack of MCP expression can lead to severe HUS that responds poorly to plasma therapy, but may be rescued by a short course of anti-C5 antibody infusions with clinically important recovery of renal function.

Nephrotic syndrome: Clinicopathology

Abstract# P-SUN119

Clinicopathology of Mesangioproliferative Primary Childhood Nephrotic Syndrome in Red Cross Children Hospital, Cape Town.

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Objective: Several studies on primary nephrotic syndrome have focused on minimal change nephroticsyndrome(MCNS). Also the clinico- pathology of MCNS has been well defined. However the other histological sub- types have not been fully studied especially in the sub -Saharan African. This study was carried- out to document the clinic-pathological pattern of children with mesangioproliferativehistopathological sub-type of primary childhood nephrotic following renal biopsy presenting at Red Cross Children's Hospital between 2003 and 2011. To describe the clinicopathological correlation and clinical course of the mesangioproliferativehistopathological sub-type of primary childhood nephrotic at Red Cross Children's Hospital.
Methods: This is a retrospective descriptive study. The charts and medical records of patients with diagnosis of mesangioproliferativehistopathological sub-type of primary childhood nephrotic following renal biopsy report at Red Cross Children's Hospital were reviewed.
Results: Sixty-one children have mesangioproliferative histological subtype primary nephroticsyndrome on renal biopsy in the period of eight years (2003 -2011). And age range of 1 -12years, mean age of 4.9+ 2.8years with a mode age of 2years. Male: Female ratio of 1:7. Ethnic distribution of Mixed 26(42.6%), Afro-Africans 23(37.7%), Euro-Africans 11(18.0%) and Asian-Africans 1(1.6%). Presentation is that of atypical with haematuria 45(73%), hypertension 28(45%) and anasarca 40(65.5%). Fifty-even (93.4%) had estimated GFR greater than 60ml/min/1,73m2 and 4(6.6%) had GFR less than 60ml/min/1.73m2 at presentation. The final outcome following the third line immunosuppressive drug therapy, (Cyclosporine /Tacrolimus/ Mycophenolatemofetil) with renal function deteriorates in one patient (1.6%) to CKD stage III in the follow- up of this review.
Conclusion: We conclude that mesangioproliferative is the commonest histological sub-type of nephrotic syndrome in our setting and patients run a benign course with atypical presentation.

Abstract# P-SUN120
Spectrum of Clinico-pathological profile and treatment response in Children with Nephrotic Immunoglobulin A Nephropathy (IgAN)

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Objective: Immunoglobulin A nephropathy (IgAN) is the most common type of primary glomerulonephritis in the world, characterized by predominant or co-dominant mesangial deposition of IgA, on immunofluorescence staining of kidney sections. There is spectrum of clinical presentation and treatment options available for children with IgAN. Nephrotic syndrome is an uncommon presentation of IgAN and clinician often face challenges in deciding which treatment is most suitable for each patient. In the present study, we evaluate the clinic-pathological features and, treatment response of nephroticIgAN.
Methods: The prospective study was conducted from August 2009 to December 2012. A total of 18 cases were included in the study; presented with nephrotic syndrome with biopsy proven IgAN. Nephrotic syndrome was defined by presence of edema, nephrotic range proteinuria (urine spot protein creatinine ratio > 2mg/mg), hypoalbuminemia(serum albumin < 2.5 gm/dl) and hypercholesteremia (>200mg/dl). Other secondary causes of IgAN (Henoch-Scholeinpurpura(HSP), systemic lupus erythematous and liver diseases) were excluded by detailed clinical history, physical examination and laboratory findings. The histopathological characterization of IgAN was done with HAAS classification. The demographic profile, clinical presentation, initial laboratory, biopsy finding and treatment response were analysed in the study.
Results: The eighteen patients consist of thirteen boys and five girls and mean age was 6.7 years; the youngest was 2 years old. Indication of renal biopsy was steroid dependent nephrotic syndrome (SDNS) and frequent relapsing nephrotic syndrome (FRNS) in 11 cases, 5 cases were steroid resistance nephrotic syndrome (SRNS), 2 cases first time presented with nephrotic syndrome with hypertension. Microscopic hematuria was seen in 61 %(11/18) and 2 cases had gross hematuria at the time of renal biopsy and all cases had serum C3 levels within normal range. Two cases had AKI with mean serum creatinine of 1.8mg/dl. Based on HAAS classification, majority (8/18) cases had HAAS-III staging, 5 cases HAAS-IV staging, 2 cases had HAAS-II and 3 cases had HAAS-I staging. Thirteen cases had received oral prednisolone and cyclophosphamide at the time of biopsy and switch over to oral Cyclosporine-A. Out of remaining five cases three cases were treated with oral cyclophospamide, one case with Cyclosporine-A and other case with MMF. Complete remission of nephrotic syndrome was achieved in89% (16/18) cases within three months of initiation of therapy. Two cases which had partial remission were stages II and III of HASS- staging.
Conclusion: Majority of children with nephroticIgAN responded to oral Cyclosporine-A and severity of histological lesions doesn't correlate with treatment response. Above study will raise several clinical questions. Is there is a sub-set of nephrotic children with IgA deposits on biopsy or coincidental occurrence of MCD and IgAN? Are these children having low grade IgAN? Is the treatment differing from Nephrotic syndrome? What is long-term outcome of these children? Nevertheless a larger sample size and longer follow-up periods are needed for better understanding of this entity.

Abstract# P-SUN121
Adolescent- onset idiopathic nephrotic syndrome in northern Indian children

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Objective: Adolescent-onset idiopathic nephrotic syndrome has not been studied well in northern Indian children.
Methods: In this retrospective study we analyzed children with idiopathic nephrotic syndrome having onset during adolescence. Adolescent age was defined as 10-19 years according to World Health Organization. Based on the response to steroids, these patients were categorized into infrequent relapsers (IFR), frequent relapsers (FR), steroid-dependent (SD), and steroid resistant nephrotic syndrome (SRNS) using standard definitions. Standard definitions were used for diagnosing AKI. Renal biopsy was done in all children with SRNS and before initiation of calcineurininhibitors. Immunosuppressive therapy included prednisolone, pulse cyclophosphamide, mycophenolatemoefitil and calcineurininhibitors. Complete remission (CR) was defined as defined as (Up/Uc< 0.2 gm/gm; serum albumin > 2.5 g/dl and no edema) and partial remission (PR) as (Up/Uc between 0.2 gm/gm and 2gm/gm, serum albumin >2.5 g/dl, and no edema).
Results: We analyzed 33 children (23 male, 10 female) with adolescent-onset nephrotic syndrome. Age of onset and BMI were 11.96 +/- 1.75 years and 17.39+/- 3.30 kg/m2 respectively. Twenty three patients (70%) had SRNS of which 17 (51.5%) had initial steroid resistance and after a mean duration of 10.5 +/- 8.04 months, another 6 patients (18.5%) developed late steroid resistance. At onset, 36% patients were hypertensive and 39% had hematuria. Thirty percent patients had severe infections and 27% had acute kidney injury at presentation. Of the 23 renal biopsies

performed 6 each had minimal change disease, idiopathic membranous nephropathy, focal and segmental glomerulosclerosis and 5 had membrano-proliferative glomerulonephritis. Calcineurin inhibitors were prescribed in 11 patients, pulse cyclophosphamide in 5, MMF in 4 and levamisole in 1 patient. After mean duration of 18.20 +/- 11.92 months 19 patients were in CR, 6 in PR, 4 did not achieve remission and 4 were lost to follow up.
Conclusion: Significant proportion of patients having adolescent onset nephrotic syndrome has initial steroid resistance. These patients are at risk of severe infections and AKI.

Abstract# P-SUN122
Thyroid Function in Children with Nephrotic Syndrome

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Objective: This study was done to find out the thyroid status of nephrotic syndrome children during nephrosis. Also to compare the thyroid function of these children before and after steroid treatment to see whether it is persistent and need thyroxin therapy.
Methods: This is an observational study with prospective follow up of the study subjects. It is done in the Department of paediatric nephrology, National Institute of Kidney Diseases & Urology (NIKDU), over a period of one year- from July 2006 to June2007. Patients were collected by purposive sampling.
Results: A total of 85 nephrotic children were studied,age ranges from 2 to 12 years, M:F = 1.7:1. All patients were clinically euthyroid. Thyroid function status of 85 nephrotic children during nephrosis showed that mean value of serum T3 (0.65 +/- 0.31 ng/ml) and T4 (5.04 +/- 4.18 ng/ml) were within normal limits, but the mean serum TSH value (7.1 +/- 5.8 MIU/L) was higher than normal. In 21 nephrotic children, thyroid function during nephrosis and 4 weeks after achieving remission was compared. Serum T3 and T4 level during nephrosis and during remission were within normal limits. But TSH level was significantly higher during nephrosis which normalizes during remission (9.11 +/- 6.36 vs. 4.2 +/- 3.6 MIU/L, p=0.005).
Conclusion: High TSH level with normal T3, T4 is common in proteinuricnephrotic children, although they are clinically euthyroid. TSH level normalizes with remission of proteinuria and does not required treatment with thyroxine.

Abstract# P-SUN123
Endothelial dysfunction in children with idiopathic nephrotic syndrome

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Objective: To measure plasma levels of [thrombomodulin (TM), Plasminogen activator inhibitor 1 (PAI-1), Von Willebrand factor (vWF), Tissue plasminogen activator (t-PA)] in children with first episode nephrotic syndrome (FENS) aged 1-18 years compared to controls.
Methods: Study design: Cross sectional study with longitudinal follow-up of one year. Primary outcome measure: Levels of TM, PAI-1, vWF, t-PA in children with FENS and in controls. Secondary outcome measures: Levels of TM, PAI-1, vWF, t-PA in children with FENS at 12 weeks of remission. Levels of TM, PAI-1, vWF, t-PA in children with steroid resistant nephrotic syndrome (SRNS). Inclusion Criteria. Study group: Children with INS. Control group: Age and sex matched controls with normal lipid profile.Sample size: Calculated with mean and SD levels of individual markers in study group and controls using power of 80% and alpha error of 5%. For TM it was 39, the maximum among all the markers, hence study group of 42 was taken, along with 40 controls. Measurements: Quantitative estimation of the markers was done using ELISA technique.
Results: From the total 42 patients, 28 were infrequent relapsers (IFRNS), 4 patients became SDNS and 10 turned out to be initial SRNS at one year follow-up. The levels of markers of endothelial dysfunction (sTM, tPA, PAI-1, vWF) were significantly higher ($p<0.001$) in cases, at disease onset. Markers showed a significant fall at 12 weeks of steroid treatment, but were still significantly raised, as compared to controls. SRNS patients (n=10) show significantly higher levels of sTM, tPA and vWF as compared to Non SRNS patients (n=32) at disease onset. SRNS patients did not show a significant fall in the markers at the end of 4 weeks of steroid therapy. Endothelial dysfunction increased with raised levels of total cholesterol, low density lipoproteins and proteinuria.
Conclusion: Children with INS show marked endothelial dysfunction at disease onset and in remission (12 weeks of therapy). SRNS patients have greater degree of dysfunction which persists at least for short term. Further studies are needed to elucidate the trend of endothelial dysfunction in the long term.

Abstract# P-SUN124
Outcome of steroid resistant nephrotic syndrome (SRNS) in a developing country

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Objective: To look at the short term and long term outcome of patients with SRNS treated at a tertiary care center.
Methods: Study design- Retrospective. Records of all patients with SRNS who presented to the pediatric nephrology outpatient from year 2007-2013 were retrieved. The clinical, biochemical and anthropometric data were recorded. The details of resistance type, kidney biopsy features and response to different treatment were recorded. Standard definitions were used to define complete remission (CR), partial remission (PR) and non response (NR). Results of rebiopsy if done for features of calcineurin nephrotoxicity were noted.
Results: Seventy one patients (58 M; 13 F) presented with SRNS during the mentioned period. Thirty four (47.9%) patients had minimal change disease, 21 (29.6%) focal segmental glomerulosclerosis, 9 (12.7%) had mesangioproliferative glomerulonephritis, MPGN in 3 (4.2%), membranous nephropathy in 3 & IgA nephropathy in 1 patient. The median age at onset and presentation was 36 (11-156) and 81 (12-192) months respectively. Twenty eight (39.4%) subjects had initial resistance and 45 (63.4%) had late resistance.
Of the 71 patients 67 received either cyclosporine (CSA) or tacrolimus (89.6% CSA) with low dose alternate day steroids. Four patients received intravenous cyclophosphamide (IV CP) only as initial therapy and 19 patients had received IV CP in addition to use of calcineurin inhibitors. Forty four (60.3%) patients achieved CR; 17 (23.9%) PR and 10 (14.1%) had NR. The median time to follow up of all patients combined was 24 (6-96) months. At the last follow-up 35 (49.3%) patients were infrequent relapsers, 9 had frequent relapses, 13 had SRNS, 3 patients developed CKD and another 3 died of infections. Twelve patients underwent rebiopsy for identification of calcineurin nephrotoxicity (3/12 had features of nephrotoxicity).
Conclusion: While most patients of SRNS respond to calcineurin inhibitors initially, they still continue to have relapses and almost 50% will continue to be frequent relapsers or have partial or non remission.

Abstract# P-SUN125
Vaccine evaluation and immunity induction against Streptococcus pnemoniae and varicella zoster virus in children with nephrotic syndrome

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Objective: Patients (pts) with idiopathic nephrotic syndrome (NS) are immunosuppressed due to treatment and immunoglobulin loss during relapses. They have an increased risk for severe vaccine-preventable infections, such as *Streptococcus pneumoniae* (Spn) or varicella (VZV). Our aim was to evaluate the immunity of NS pts against Spn and VZV, and measure their ability to acquire and maintain protection following vaccination.
Methods: Spn serotype-specific (6 serotypes) and VZV-specific IgG antibody (AB) titers were assessed at baseline and at month 3 (M3) and 12 (M12) using ELISA. Seroprotection cut-offs were defined at 0.3ug/L (Pn) and 50IU/L (VZV). All pts received 1-2 doses of 13-valent Spn conjugated vaccine (PCV13) unless they had high titers for 6/6 serotypes. Pts with VZV titers <200IU/L and fulfilling specific criteria received 2 doses of VZV vaccine at M1 and M3. SN relapses were monitored (protein/creatinine ratio) at M1, M3, M6, and M12.
Results: 51 pts with NS were included (median age 7.4 years, IQR 5-11.4), with minimal change (82%), focal segmental glomerulosclerosis (16%), other (2%) diagnoses. At baseline, 86 % pts were protected against more or equal to 4/6 Spn serotypes; 42 pts received 1-2 doses of PCV13. Seroprotection was present against a median of 5/6 (M3, range 2-5) and 6/6 (M12, range 4-6) Spn serotypes. Serotype-specific AB titers against Spnsignificatively increased after PCV13 immunization (P<0.001). For VZV, 43 pts (84%) were seroprotected at baseline; 5 non-seroprotectedpts received 2 doses of VZV vaccine. At M3 and M12, seroprotection against VZV was present in 34/39 (87%) and 29/32 (91%), respectively. 2 out of 4 VZV-immunized pts maintained protection against VZV 8-10 M after vaccination. There was no difference in frequencies of relapse during follow-up, regardless immunizations received. No significant adverse event was reported after vaccination. Neither VZV nor invasive Spn diseases were reported during the 1-year follow-up.
Conclusion: We found surprisingly high AB titers against Spn in NS pts at baseline. The proportion of serotypes coverage and titers levels was increased by PCV13.VZV vaccine induced seroprotection in 50% of the pts.

Abstract# P-SUN126
Nephrotic syndrome secondary to CMV infection cases and literature review

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Objective: To improve recognition of Nephrotic syndrome secondary to CMV infection in chiidren.
Methods: For 1 case of secondary nephroticsyndrome,clinical and pathological data were retrospectively analyzed and literature review.
Results: The cases of children with nephritic syndrome,anemia, peripheral blood abnormal lymphocytes as the main performance,CMV-serum IgGpositive,renal histopathology showed atypical membranous nephropathy,immunohistochemical staining method to detect virus antigen,ganciclovirgallowway symptoms after treatment.
Conclusion: Part of nephritic syndrome may be caused by CMV infection,especially when the poor curative effect,coursedeferment, more attention should be paid to the possibility of this disease.Serologic evidence can be taken as the basis for CMV infection,but pathologic examination is an important means of diagnosis of CMVcorrelation kidney disease.

Abstract# P-SUN127
Between Tuberculosis and Primary NephroticSyndrome : a possible Pathogenetic relationship?

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Objective: There have been a few case reports on primary nephroticsyndrome(PNS) secondary to tuberculosis(TB) infection. But their relationship remains unclear.
Methods: 798 patients were enrolled, including 4 groups: PNS group(n=386), secondary nephrotic syndrome group(n=60), pneumonia group(n=196) and TB group(n=156). Due to the difficulty of diagnosing TB in children a novel evidence level evaluating system was developed to assess the evidence of TB infection. In children who had PNS and TB evidence the time sequence of the two was analyzed. Urine change of patients with TB was also studied.
Results: Most children in PNS group had no typical TB symptoms (night sweats, fatigue, weight loss) or laboratory fingdings(PPD and acid-fast staining) while in TB group these were apparent. But through evidence level evaluating system 68 children(68/161,42.24%) had level 1-4 evidence of TB infection, among whom 9.32%(n=15) had a high evidence level (Level 3-4). The evidence level of inpatient PNS group was higher than that of pneumonia group (P=0.004). For 8.07%(n=13) the infection may exist precede the use of glucocorticoid for PNS. The rate of abnormal chest imaging was 61.75%(n=96), 40.44%(n=35), 51.92%(n=27), 87,30%(n=165) and 98.51%(n= 133) in PNS inpatient, PNS outpatient, SNS, pneumonia and TB group, respectively. In TB group abnormal urinalysis accounted for 28.21%(n=44), higher than that in pneumonia group (8.16%, P<0.001).
Conclusion: Tuberculosis infection has a close relationship with primary nephrotic syndrome and may be the pathogenetic cause for around 10% PNS in children.

Abstract# P-SUN128
Long-term Clinical Course in Children with Thin Glomerular Basement Membrane

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Objective: Thin glomerular basement membrane disease (TGBMD) has a clinically benign prognosis with persistent microscopic hematuria. Since 1998, the regular urine tests have been performing in schools, the diagnoses of the disease in children have been increasing. Thus, we conducted this study to characterize the clinical features and long-term clinical courses.
Methods: From 1999 to 2003 at Kyungpook National University Hospital, Department of Pediatrics, 58 patients confirmed by renal biopsy as TGBMD were examined. Mean follow-up period was 6.8 years. Clinical features and courses were reviewed retrospectively.
Results: The ratio of boys to girls who were diagnosed with TGBMD was 27(46.5%) to 31(35.3%) and the average glomerular basement membrane thickness was 187.5mm. The mean age of first visit was 7.8 years (range 1.9 to 14.0 years). They were diagnosed by school regular examination in 31 patients (53.5%), by hospital urine test for other reasons in 17 patients (29.5%), by occurrence of gross hematuria in 10 patients (17%), respectively. The type of hematuria at visit consists of persistent microscopic hematuria (70%), intermittent microscopic

hematuria (15.5%), microscopic hematuria with gross hematuria (13.7%) and gross hematuria alone (1.7%).
3 of them accompanied with proteinuria during follow-up were retried renal biopsy after 9.8 years on the average and were all diagnosed as Alport syndrome. At visit, all three patients were characterized by gross hematuria mixed with microscopic hematuria and no one had proteinuria. Their average age at first visit was 2.1 years (range 1.9 to 2.5 years) which is lower than 8.1 years (range 4 to 14 years) of TGBMD patients ($p = 0.03$).
Conclusion: TGBMD is known as benign disease with persistent microscopic hematuria. However, in patient accompanied with gross hematuria, occurrence of proteinuria during follow-up or young age at diagnosis, additional examination necessarily will be needed.

Abstract# P-SUN129
Homocysteine levels in children with Idiopathic Nephrotic Syndrome

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Objective: To measure the plasma homocysteine levels in children with first episode nephrotic syndrome (FENS) aged 1-16 years at onset and in remission.
Methods: Study Design: Cross-sectional study with longitudinal follow-up of one year.Inclusion Criteria: Children aged 1-16 years with Idiopathic Nephrotic Syndrome (INS). Exclusion Criteria: Renal insufficiency, Consumption of vitamin B_{12}, 7 days prior to sampling.Primary outcome measure:Plasmahomocysteine levels in children with FENS and at 12 weeks of therapy (remission).Secondary outcome measure:Plasma and urine homocysteine and cysteine levels in children with FENS, 12 weeks and one year (remission). Vitamin B_{12} and folic acid levels in plasma and urine in children with FENS, 12 weeks and one year (remission).Sample size: 30 patients with FENS (calculated with power of 0.9, alfa error of 0.05 and standard deviation of 7.7 in study group and 1.6 in control group) and 30 normal healthy children as controls were enrolled.
Measurements:Homocysteine and Cysteine: HPLC based essay.Vitamin B_{12} & Folate: Electro-chemilumiscence immunoassay (ECLIA).
Results: Plasma homocysteine and cysteine levels were comparable in FENS, 12 week remission and at one year remission respectively. Homocysteine and Cysteine levels in urine were found to be significantly higher in FENS, at 12 weeks remission and at one year remission respectively ($p < 0.001$). There was no significant change in urinary homocysteine and cysteine values from initial episode till one year ($p = 0.69$ & 0.28 respectively). Vitamin B_{12} and folate levels were significantly low in plasma in children with FENS compared to controls ($p = 0.04$ and $p = 0.001$ respectively), however it normalized at 12 weeks remission and remained normal till one year remission. Urinary levels of Vitamin B_{12} and folate were significantly higher in FENS, at 12 weeks remission and one year remission as compared to controls ($p<0.001$).
Conclusion: Homocysteine metabolism is significantly altered in children with idiopathic nephrotic syndrome. Our findings need confirmation on a larger sample of patients.

Abstract# P-SUN130
The clinicopathological feature and outcome in 9 cases with idiopathic membranous nephropathy

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Objective: To evaluate pediatric patients with IMN and clarifythe presentation, response to therapy, and long-term outcome.
Methods: The clinicalmanifestations and pathology of 9 children with renal-biopsy-diagnosed IMN wereretrospectively analyzed in Shandong Provincial Hospital between January 2004and December 2012.
Results: The incidence of IMN was 6.20% of pediatric primary nephrotic syndrome whounderwent renal biopsy during the study interval. In the 9 pediatric patients,the ratio of male: female was 4: 5,the median age was 11.22(9~15) years and the medianinterval time between renal biopsy and the onset of IMN was 2.1(1~6)months. The clinicalmanifestation of all patients was primary nephritic syndrome (nephritic type), 8children with hematuria (1 had macroscopic hematuria),2 children withhypertension, none with renal insufficiency. 9 patients with IMN received 10renal biopsy. The results of renal histopathology suggested that 8 cases werein stage II and 2 instage III. Three cases showed slight hyperplasia of glomerular mesangial celland matrix, 2 cases showed Focal segmenta1 glomerulosclerosis and 5 casesshowed the adhesion of glomerulus and capsule. The swelling of tubularepithelial cell was found in 10 results(1case had two renal biopsies) and interstitialfibrosis in 2 patients.All the 9patients were treated with prednisoneinitially and confirmed steroid resistant. All were treated withcombined therapy of angiotensin converting enzyme inhibitor (ACEI) andimmunosuppressive agents such as CTX(1), CTX followed bymycophenolatemofeti(1),cyclosporin (CsA) (3), tacrolimus(2) and tripterygiumwilfordii(GTW)(1).1 case was lost to follow-up and other 8 cases achivedcomplete remission (CR).
Conclusions: IMN in children mainly presents with nephritis-type NS. Allof them were steroid resistant and received CR under the combined therapy withimmunosuppressive agents.

Abstract# P-SUN131
CHARACTERISTICS OF STEROID - RESISTANT IDIOPATHIC NEPHROTIC SYNDROME WITH RENAL BIOPSY AT CHILDREN'S HOSPITAL I- HCM CITY-VIETNAM

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Objective: To describe the characteristics of epidemiology, clinical and laboratory features, and the types of histopathological lesions in children with steroid resistant idiopathic nephrotic syndrome with renal biopsy at Children's Hospital I, Ho Chi Minh City.
Methods: Retrospective study and case series.
Results: There were 43 children with SRNS and having a renal biopsy from 01/01/2011 to 12/31/2011 in our study. The mean age of onset of disease was 6.11+/-3.76 years, the gender ratio (boys/girls) was 1.69, the patients from other provinces was 93.02%, the Kinh people was 93.02% and 6.98% related to family members. Edema was always present; the percentages of hypertension, gross hematuria, oliguria, hypovolemic shock and infection was 44.19%, 2.33%, 32.56%, 9.30% and 32.56% respectively. The GFR<90mL/min/1.73m^2 occurred 30.77% of the children; microscopic hematuria was 41.86%, and anemia was 6.98%. The percentages of early and late resistance to steroid was 27.91% and 72.09%. After renal biopsy, 11.63% of the patients were self-limited gross hematuria; the percentages of minimal change disease were 51.16%, of focal segmental glomerulosclerosis were 44.19% and of mesangial proliferation glomerulonephritis were 4.65%.
Conclusion: Children who suffered from SRNS mostly had 2 types of histopathological lesions: minimal change disease and focal segmental glomerulosclerosis. Renal biopsy was fairly safe, all children with SRNS should be done with renal biopsy to be prescribed a effective remedy.

Abstract# P-SUN132
Analysis of 7 nephrotic children accompanied with cerebral sinovenous thrombosis

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Objective: To investigate the clinical characteristics of children with nephrotic syndrome (NS) accompanied with cerebral sinovenous thrombosis (CSVT).
Methods: The clinical data of 7 confirmed cases with NS accompanied with CSVT was retrospectively analyzed.
Results: The course of NS varied from 2 months to 3.5 years. Three children were steroid sensitive nephritic syndrome with frequent relapse and the other four were steroid resistant (2 cases suggested minimal change disease and one case IgA nephropathy in renal pathological results). The clinical manifestations were headache or ophthalmodynia accompanied with vomiting, dizziness, convulsion and coma. Neck resistance and Babinski's sign were positive in 2 cases. There was one case presenting coma while the muscle tone of extremities was low and patella tendon reflex disappeared in 2 cases. Papilledema was found in only 1 case with winding of vein. Cerebrospinal fluid (CSF) was examined in 2 cases, the pressure of CSF was elevated, while its cytological and biochemical examinations were normal. The D-dimer and fibrinogen were elevated in 4 cases respectively while prothrombin time and activated partial thrombplastin time were shortened in 3 cases respectively. Cranial CT were performed in 5 cases with 2 cases suspected of cerebral thrombosis, one case showed a shadow with low intensity in the corona radiate in the posterior limb of the internal capsule (suspected constructed defect) and no abnormalities in other 2 cases. 7 cases all had magnetic resonance imaging (MRI) of the head, abnormal signs were found in 4 cases. Cerebral vessels were examined by magnetic resonance venography (MRV) in 7 cases and CSVT was suggested in all.
Conclusion: Clinical manifestations of NS with CSVT are not specific but variable. CSVT should be considered in patients with NS when nervous manifestations present. MRV is a sensitive and specific method in diagnosis of CSVT.

Abstract# P-SUN133
A case of drug-induced hypersensitivity syndrome caused by allopurinol

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Objective: Pay attention to allopurinol side effects.
Methods: Retrospective analysis of one cases ofdrug-induced hypersensitivity syndrome(DIHS)by allopurinol was made in detail, including clinical situation, laboratory examination and treatment.
Results: A 13-year-old girl suffered from refractory nephrotic syndrome for twelve years and was treated by steroid and immunosuppressive agents. Recently she had stopped medication and had mild proteinuria. She took allopurinol 100 mg three times a day because of hyperuricemia and developed high fever, systemic erythema, and itching twenty three days after treatment. Laboratory examinations revealed SGPT 228U/L,serum albumin 25.1g/L and blood uric acid 253umol/L. The patient stopped taking allopurinol. Oral ketotifen and reduced glutathione were introduced. But the symptoms didn't improved. She was admitted to our hospital six days after allopurinol withdrawal. Laboratory examinations showed that hemoglobin was92g/L, white blood cells 9.51×10^9/L, manual counting of eosinophilic granulocyte 1050.0×10^6, SGPT 379U/L,SGOT 242U/L,serum albumin24.2g/L and blood uric acid 532.3umol/L. B ultrasonography showed enlargement of liver, kidneys and retroperitoneal and hilus lymph nodes, and a small amount of peritoneal fluid. Intravenous methylprednisolone was introduced at a dosage of 40 mg daily. Fever and erythema subsided the next day, but her white blood count was 2.81×10^9/L, SGPT 504U/L, SGOT 142U/L, serum potassium 5.69mmol/L and blood urea nitrogen 13.21mmol/L. Finally the symptoms gradually improved with a total of ten days of methylprednisolone and other symptomatic treatment. The patient discharged eleven days later, and methylprednisolone dosage was gradually reduced with 3-7 day intervals. We diagnosed this case as DIHS due to allopurinol because of high fever, erythema over the entire body, serious liver damage and eosinophilia.
Conclusion: Allopurinol is commonly used in the treatment of kidney disease. It should be started with a half dose and gradually incresded to maintenance dose in two to three weeks. If clinical adverse reaction is found, allopurinol should be immediately discontinued.

Abstract# P-SUN134
Clinicopathological Analysis of Primary Nephrotic Syndrome in Children based on 28 Years Renal Biopsy Data a Single Center

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Objective: To analyze the epidemiological clinicopathological characteristics and changing tendency of histopathological types in children with primary nephrotic syndrome (PNS).
Methods:A retrospective study was done on pediatric renal biopsy database of our center performed from Jan. 1984 to Dec. 2011. All of these patients were diagnosed as PNS and under 14 years old. The cases were categorized into 3 periods: period I (1984 to 1991), period II (1992 to 2001), and period III (2002 to 2011).
Results: The renal histopathological types of 363 cases comprised: minimal change disease (MCD) (46.3%) , mesangioproliferative glomerulonephritis (MsPGN)(20.9%),focal and segmental glomerulosclerosis (FSGS) (21.2%),membranoproliferative glomerulonephritis (MPGN) (3.9%), membranous glomerulopathy (MN) (3.3%),chronic sclerosing glomerulonephritis (CSGN) (0.8%),crescentric glomerulonephritis (CrGN) (0.6%) and others. 56.5% showed simple NS and 64.9% of them were MCD. 43.5% showed nephritic NS of which the most common histopathological type was MsPGN (36.4%) in the period II and FSGS (38.6%) in the period III. 49.6% cases were frequently relaps NS (FRNS) and 13.5% were steroid dependent NS (SDNS). MCD (62.2%) occupied the largest proportion of FR/SDNS, followed by MsPGN (13.3%) and FSGS (13.3%). 172 (47.4%) cases manifested as steroid resistant (SR) and 54.1% of them were primary steroid resistant. There is no significant difference on histopathological type between primary SRNS and secondary SRNS ($p>0.05$). The most common histopathological type of SRNS was MsPGN (41.5%) in the period II and FSGS (41.5%) in the period III. 29.8% cases with no immune-complex deposition, mainly showed MCD (63.9%). 96 (26.4%) were with simple IgMdeposotion, of which 85.4% were refractory NS.
Conclusion: The main histopathological types are MCD, MsPGN and FSGS in children with PNS. There is a correlation between clinic and pathology. FSGS are increasing while MsPGN are decreasing in recent 20 years. It is necessary to perform the renal biopsy early for nephritic NS, FR\SDNS and SRNS in order to clarify diagnosis and direct therapy.

Abstract# P-SUN135

Primary Nephrotic syndrome complicated with cerebral sinovenous thrombosis: Report of 3 cases

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Objective: To investigate the diagnosis of cerebral sinovenous thrombosis in the primary nephrotic syndrome of children , and the effect of the therapy with low-molecular-weight heparin and warfarin.
Methods: A retrospective analysis of 3 cases(4 times) of primary nephrotic syndrome complicated with cerebral sinovenous thrombosis in children, comparing the clinical manifestations and laboratory test results.
Results: The cerebral sinovenous thrombosis could be found in the children's primary nephrotic syndrome. The clinical manifestations, function of coagulation, D-dimer, fibrinogen and imaging tests were useful for diagnosis. The treatment to the nephrotic syndrome and active anticoagulant therapy could contribute to thrombosis absorption.
Conclusion: The primary nephrotic syndrome complicated with cerebral sinovenous thrombosis was very severe and should be pay more attention to.

Abstract# P-SUN136

Epstein-Barr virus infection is a common cause of bilateral eyelid edema in children

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Objective: Eyelid edema was usually associated with nephrotic syndrome or acute glomerulonephritis.Bilateral eyelid edema caused by Epstein-Barr virus(EBV) have been reported by literatures,but the proportion of children with bilateral eyelid edema caused by EBV infection remains unknown.
Methods: We studied patients hospitalized for bilateral eyelid edema in the Children's Hospital Affiliated to Soochow University between October 2010 and April 2012.The etiology of eyelid edema was analysed.
Results: A total number of 251 patients with bilateral eyelid edema were included in this study.117 patients(46.6%) were diagnosed as nephrotic syndrome;55 patients were diagnosed as EBV infection (21.9%); 26 patients were diagnosed as acute glomerulonephritis(10.4%); other causes of bilateral eyelid edema included infectious mononucleosis-like illnesses,urticaria,cardiac failure,and so on.Patients with EBV infection had normal levels of serum albumin,they got normal results in routine urianlysis except 4.All of the EBV infected patients had fever on presentation,46 patients got enlargement of cervical lymph nodes(83.6%), swelling of tonsils occurred in 47 children (85.5%), whitish plaques on tonsils were observed in 31 patients (56.4%), 22 patients got hepatomegaly (40.0%), 27 patients got splenomegaly (49.1%).
Conclusion: Bilateral eyelid edema is not always caused by nephrotic syndrome or acute glomerulonephritis.EBV infection is a very common cause of bilateral eyelid edema in children.EBV infection should be highly suspected when a child is presented with bilateral eyelid edema accompanied with fever and one of the follow manifestations: enlargement of lymph nodes or tonsils,hepatomegaly and splenomegaly.

Abstract# P-SUN137

Reinfection with Respiratory Syncytial Virus Aggravates The Renal Injury

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Objective: Respiratory infection is one of the reasons for the relapsing and aggravating of nephroticsyndrome.To observe the effect of RSV reinfection on the renal injury.
Methods: Rats were respectively reinfected with 6×106PFU RSV at 4th,8th,14th,28th day. Control groups were reinoculated by virus-free Dulbecco's modified Eagle's medium (DMEM) and normal group.Rats were killed on the 56th day.Serum levels of IL-6, IL-17, the seralbumin and the proteinuria excretion during 24 hours were examined.The percentage of MHC-II+, CD86+ , CD4+, CD8+positive cells and histopathologic changes of kidney were observed.
Results: The proteinuria excretion in the groups of RSV reinfection at 14th day(36.052±4.608mg/24h,P<0.05)were higher than that in the RSV primary infecting groups(27.047±2.479mg/24h,P<0.05), accompanying with hypoproteinemia(15.72±1.619g/L, P<0.05). The glomerular foot process effacement of the groups with RSV reinfection were more extensive than that of the groups of RSV primary infection under the electron microscopy, accompanying with both mesangial cell and mesangial matrix proliferation. The percentage of MHC-IIand CD86 positive cells was higher in the groups of 6×106PFU RSV primary infection(1.60%±4.553%,67.03%±10.058%) and 6×106PFU RSV reinfection(7.16%±4.088%, 71.88%±7.924%) than the control group(54.07%±7.854%,44.50%±5.339%).The percentage CD4+ cell was decreased in the groups of 6×106PFU RSV primary infection(30.85%±6.555%) and reinfection(31.09%±3.533%) than control group(39.10%±5.224%).The percentage CD8+ cell was increased in the groups of 6×106PFU RSV primary infection(27.35%± 3.775%)and reinfection(28.19%±4.223%) than control group (20.81%±1.800%).The serum levels of IL-6(290.11±16.458pg/ml, P<0.05)、IL-17(1752.60±132.813pg/ml,P<0.05) significantly were highest in the groups of reinfection with RSV and had positive relationship with proteinuria excretion((r1=0.843, r2=0.952, P <0.05).
Conclusions: Reinfection with RSV aggravates renal injury. Immune disorder may take part in the exacerbation of the renal injury induced by RSV infection.

Abstract# P-SUN138

Serum endothelin-1 dysfunction in children with nephrotic syndrome and arterial hypertension.

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Objective: Endothelin-1 (Et-1) is one of the specific markers of endothelial dysfunction (ED) in vascular disorders. However there are few studies on endothelial function in patients with renal disease. The aim of the study was to evaluate the relationship of active nephrotic syndrome (NS) with level of Et-1 inchildren with renal hypertension.
Methods: We examined 19 children with NS during 40.2 +/- 34 mon. (12 with steroid resistant NS, 4 with steroid dependent NS, 2 steroid sensitive NS and 1 with NPHS2 mutations). Eight children were in remission of NS during 8.3+/- 7.0 mon., 2 of them expressed significant renal arterial hypertension (AH). Eleven children had active NS, 7 of them have renal AH. The serum level of Et-1 was defined by the method of solid-phase enzyme-linked immunosorbent assay (ELISA).
Results: Renal function was normal in 15 of children. 11 of patients had 1st. AH. Serum Et-1 was elevated inchildren with NS (0.93 +/- 0.4) in comparison with healthy children (0.49 +/- 0.31),AneliaDietmann, 2008.No differences were found between children with active and remission NS with AH. We observed a significant correlation of Et-1 with posterior wall of left ventricle, septum interventriculare (r = 0.69, 0.67, respectively, p<0.05) and diastolic dysfunction only children with active NS, but not in the remission.
The significant inverse correlation between the value of Et-1 and the level of glomerular filtration rate (r = - 0.51, p <0.05), the index of time diastolic blood pressure (r = 0.66, p <0.05) was observed in all the children.

Conclusion: Our data shows the possible involvement of Et-1 inprogression of renal dysfunction. Also Et-1 may play a role in heart remodeling with concomitant AH.

Abstract# P-SUN139

A case of isolated proteinuria with isolated thickening of the glomerular capillary basement membrane

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It is well known that the thickening of the glomerular capillary basement membrane(TGCBM) is associated with diabetes. And isolated TGCBM is related to chronic renal disease, substantiated by persistent proteinuria. The relationship between isolated TGCBM and diabetes are not fully understood, but it appeared before the clinical overt diabetes. We would like to report the case of children with 12 years who presented with proteinuria and kidney biopsy revealed with thickening glomerular capillary basement membrane(TGCBM). An 12-year-old girl with asymptomatic proteinuria was admitted for renal biopsy. The proteinuria was accidentally detected by student check-up. There was no past history of diabetes, any renal disease, or hypertension. On her physical examination, no hepatomegaly and peripheral or facial edema was detected. Her blood pressure was 99/67 mmHg. Her ophthalmologic and neurologic examinations were normal. Laboratory workup showed the following: urinalysis; specific gravity 1.025; 3+ protein; no glucosuria in urinary sediment. The urine protein(UP)/urine creatinine(UCr) ratio 2.1 mg/mg. Serum electrolytes were normal; BUN 11.5 mg/dl, serum creatinine 0.56 mg/dl, calcium 9.0 mg/dl, phosphorus 4.1 mg/dl, total protein 7.1 mg/dl, serum albumin 4.1 g/dl, serum cholesterol 245 mg/dl (normal range 100~220 mg/dl), high density lipoprotein 72.0 mg/dl (normal range 31.5-96.6 mg/dl), serum C3 125 mg/dl, C4 30.4 mg/dl and ANA negative. And her FPS(fasting plasma glucose) was 100 mg/dl. The kidney ultrasonography showed no anatomical abnormalities. A percutaneous renal biopsy was performed. On light and electron microscopic examinations, the thickening of glomerular capillary basement membrane(Average of thickness of GBM: 568.7nm) was seen. Immunofluourescence microscopy showed no immune deposits of basement membranes. We started ACE inhibitor and ARB for proteinuria. Because of the relation between TGCBM with proteinuria and prediabetes, the proper management and regular follow up were needed. It can contribute the prevention and reduction of diabetic complications.

Abstract# P-SUN140

RENAL BIOPSY FINDINGS IN KENYAN CHILDREN WITH NEPHROTIC SYNDROME

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Objective: To retrospectively evaluate the indications of renal biopsy in children with nephrotic syndrome and to correlate the spectrum of histologic findings with the indications.
Methods: a retrospective study was conducted based on medical records on all patients who had undergone a percutaneous renal biopsy from 2010 - 2012. Specifically demographic data, diagnosis, indications for the biopsy, complications and the histologic findings will be obtained
Results: Retrospective study of renal biopsies from october 2010 to september 2012. Total number of renal biopsies done 102. Range 6 months of age to 14 years with a median age of 9 years. Most patients who were biopsied had nephrotic syndrome. Renal biopsy needles used were Trucut and spring loaded. Real time ultrasound guided renal biopsy, trucut technical difficulty. Mean yield was 20 glomeruli (4-58). Higher yields with spring loaded biopsy needles (p=0.02). Histopathology: FSGS in 57% of all biopsies. FSGS and steroid resistance: 84.8% of biopsies with steroid resistance had FSGS v/s 23.6% if indication something else (p= 0.008). Mean age 9.34yrs those without 8.34yrs.
Conclusion: There is need prospective study. In steroid resistance it is more likely to be FSGS and thus benefit of using calcineurin inhibitors. Use spring loaded biopsy needles for biopsy yielded superior results.

Abstract# P-SUN141

Histopathological transition of nephrotic syndrome in children

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Objective: Children with frequent relapsing nephrotic syndrome (FRNS) who develop steroid dependence or resistance may show a transition from minimal change disease (MCD) to focal segmental glomerulosclerosis (FSGS). We review a cohort of children who with who have had two or more renal biopsies during their paediatric nephrology care to assess the progression of histopathological changes
Methods: The renal biopsy database at our institution was reviewed for all children with nephrotic syndrome who had two or more biopsies. Indications for biopsy were 1) frequent relapsing nephrotic syndrome FRSN, 2) steroid dependence SDNS, 3) steroid resistant SRNS
Results: Forty three patients had more than one renal biopsy (33 patients had 2 biopsies; 10 patients had 3 or more biopsies, total of 94 biopsies. 22 patients (FRNS 11, SDNS 3,SRNS 7) had a first biopsy at mean age of 5.4 years (median 2.9) all showed MCD. After a mean interval of 2.5 year (median 2.6, range 0.2 – 8.8) to the second biopsy, 11/22 had transitioned to FSGS. Four of 5 patients with diffuse mesangial proliferation progressed to FSGS over a median of 2 years.
Conclusion: Patients with a history of relapsing or steroid dependent NS have a high risk of progressing to FSGS. At the time of the last biopsy 27/43 patients have developed FSGS.

Abstract# P-SUN142

Long-term clinical outcome of congenital nephrotic syndrome in a single centre

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Objective: Congenital nephrotic syndrome (CNS) presents in the first three months of life with a uniform clinical picture but with varying outcomes in the long-term. We describe the clinical course of 17 patients who were diagnosed with CNS in Malta over 30 years between 1982-2012. The genotype was established, were possible, and an attempt was made to relate this to the severity of the disease.
Methods: All infants born between 1982 and 2012 presenting with nephrotic syndrome by three months of age were identified. Clinical case notes were examined to document key events in the patient history, clinical course and investigations. Genetic studies were undertaken on surviving patients and their first-degree relatives.
Results: 17 patients presented with CNS during this time period. Where data was available, the mean (range) gestation age was 37 weeks (33-40), mean (range) placental weight was 46.6% (25-90) of birth weight, 4 patients were small for gestational age while 9 were appropriate for gestational age. The mean (range) day at presentation was 19 (1-60). 14/17(82%) presented with oedema and 3/17 were noted to have a large placenta and proteinuria. Mean (range) cord

blood TSH was 10.3mU/L (5-17.3) and mean (range) cord blood FT4 was 8.5pmol/L (5.6-11.8). The same homozygous exon 27 R1160X mutation was detected in 13/17 patients. The mutation status was not determined in the other 4 cases but all parents were heterozygous for R1160X mutation. 6/17 (35%) underwent bilateral nephrectomy and transplantation and 4/17 (24%) died of complications related to the nephrotic syndrome in childhood. 7/17 (41%) became clinically asymptomatic by 18 months of age and 5 females survived into late adolescence/adulthood with no overt clinical symptoms but with persistent heavy proteinuria, hypercholesterolaemia, normal stable albumin and thyroid function and stable creatinine.
Conclusion: Important clues for early diagnosis are present at birth: a large, oedematous placenta and abnormal cord blood thyroid screen. The outcome in this cohort varied from death in early childhood to survival into late adolescence/adulthood with heavy proteinuria but no overt clinical evidence of symptoms in a small group of females.

Abstract# P-SUN143
NEPTUNE COHORT STUDY: PEDIATRIC PERSPECTIVES

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The Nephrotic Syndrome Study Network (NEPTUNE) is a multicenter, prospective cohort study of adults and children with proteinuria and a clinical indication for initial renal biopsy. Enrollment began in 2009 and currently 13 of the 19 sites enroll pediatric patients.Phenotypic, histology and biorepository specimens are collected at enrollment and phenotypic data and specimens are collected every 4 months during the first year and then bi-annually.Data entry has been completed for 335 of the 403 currently enrolled participants; of whom 111 (33%) are <18 years old. In 275 patients with available biopsy reports, 146 (53%) had FSGS/MCD, 46 (17%) had membranous nephropathy (MN), and 83 (30%) had other diagnoses. Pediatric participants (age 9.5 ± 5.2 yr) fell predominantly in the FSGS/MCD (n=69, 77%) or other (n=19, 21%) groups with only 2 cases of MN.Baseline characteristics were similar between children and adults. In the overall cohort, 62% are male, 40% White, 24% Black, and 18% Hispanic. Roughly 29% of participants had markers of low socioeconomic status and of those reporting birth history, 9% (25/305) were premature and 19% (30/160) reported a birth weight <2,500 gm.At enrollment 86 (28%) and 122 (39%) of all participants were receiving steroids or RAAS blockade respectively. 71% of the overall cohort is overweight or obese and 66% had pre-hypertension or hypertension. At last follow-up, 38% (127/335) patients had a partial or complete remission of proteinuria and only 4% had developed >50% reduction in eGFR or ESKD. While similar numbers of children were overweight/obese and pre-hypertensive/hypertensive as adults, more children were on steroids (51% vs 13%, P<0.001) and fewer were receiving RAAS blockade (24% vs 47%, P<0.001). After 11±7 months of follow-up, proteinuria in pediatric participants declined by 64% from a baseline value of 4.7 mg/mg and only 1.0% (vs 5.8% adults, P <0.001) developed >50% reduction in eGFR or ESKD.The NEPTUNE study has demonstrated that it is feasible to enroll patients with glomerular disease at the time of a kidney biopsy. Despite similar baseline features, children are treated differently than adults and have a more favorable course during the follow-up period. Additional Authors: C. Sethna, K. Meyers, K. Dell, K. Lemley, A. Neu, G. Zilleruelo, M. Sampson, S. Hingaroni, J. Hernandez and C. Tran for the Neptune Investigators

Abstract# P-SUN144
Reasons for hospitalization in children with nephrotic syndrome.

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Objective: To study the clinico-epidemiological profile and reasons for hospital admissions in children with nephrotic syndrome at a tertiary care hospital.
Methods: Records of 50 hospitalized children (2007-2013) were retrieved and analyzed for reasons for hospitalization, duration of hospital stay, antibiotic usage, investigation and treatment details, need for albumin infusions and outcome. The data retrieved was analyzed on excel sheet.
Results: The mean age at admission was 6.6 years and age at onset of nephrotic syndrome was 4.7 years. Most patients (88%) admitted were males. The reasons for hospitalization in majority (88%) was edema control. A total of 47 episodes of infections were identified in these patients. The commonest infections identified were acute diarrhea in 34%, upper respiratory tract infections in 42.6%, spontaneous bacterial peritonitis in 10.6%, urinary tract infections in 6.4%. The mean duration of symptoms was 4.3 days prior to hospitalization and duration of hospital stay was 9.6 days. Thirty one (61%) patients had leucocytosis. The course of nephrotic syndrome in these 50 patients was steroid sensitive in 70% and steroid resistant in the remaining. Intravenous albumin was used restrictively (in 12% patients) for edema control. The most commonly used antibiotic was ceftriaxone and aminoglycosides were used in only 12% subjects.
Conclusion: The major reasons for hospitalization in children with nephrotic syndrome are infections and relapses. The most common infections identified for relapses were acute diarrrohea and upper respiratory tract infections.

Abstract# P-SUN145
Clinical Analysis of Cerebral Venous Thrombosis in Nephrotic Syndrome Children

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Objective: Arterious thrombosis and venous thrombosis are considered to be serious life-threatening complications of nephrotic syndrome (NS). But there are no clear diagnosis criteria and treatment guidelines especially in cerebral venous thrombosis (CVT), which seriously affect treatment effect and prognosis of NS. We have analyzed 4 cases NS withCVT in children, to achieve a better understanding of early stage in children NS with CVT and to develop an early diagnosis criteria and treatment of NS with CVT in children.
Methods: From Jan. 2012 to Mar. 2013, data of 4 cases of NS with CVT in our center were reviewed.
Results: 4 cases were mostly older children, the oldest was 15 years old, the youngest was 5 years old. Clinical manifestations of all patients was different, such as progressive headache with intermittent vomiting, reaction of indifference, talk rubbish, incontinence of urine, convulsions, inarticulate, numbness of limbs, difficulty swallowing, weakness, sensory disturbance and so on. The patients in the clinical symptoms were required to do cerebral imaging on the same day or second days. The brain CT scan has preliminary judgment of CVT. And head enhanced MRI+SWI+DWI+MRA+MRV could make a definite diagnosis. Among them two cases were on the left sigmoid sinus thrombosis, one case was cerebral embolism, one case of left transverse sinus, sigmoid sinus was smaller than the other side, which conformed to imaging findings of CVT. At same time D- dimer abnormally increased significantly. Immediately by urokinase thrombolysis(course of treatment:7-13 days), low molecular weight heparin calcium and dipyridamole anticoagulant therapy after clear

diagnosis, the symptoms were relieved. Follow-up head enhanced MRI++MRA+MRV showed a good prognosis.
Conclusion: NS with CVT in children can occur at any site, the left sigmoid sinus thrombosis is most common. When suspected abnormal nervous-mental system during NS course, timely head MRI related sequence is helpful for early diagnosis.D-dimer can also be used as screening index to dynamic monitoring . Prompt thrombolysis therapy had a good prognosis.

Abstract# P-SUN146
Case report of 15 posterior reversible encephalopathy syndrome in children with nephrotic syndrome

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Objective: Posterior reversible encephalopathy syndrome(PRES) is a clinico- radiological syndrome characterized clinically by headache, seizures, visual disturbances, vomiting and radiologically by predominant posterior leukoencephalopathy. We assay the clinical characteristics of PRES occuring in nephroticsyndrome(NS) children.
Methods: We reported 15 cases of NS children who presented with PRES during their treatment of NS. All these patients were hospitalized in Children'shospitalofChongqingMedicalUniversity during 2007.11 to 2013.2. We summarized their clinical characteristics including their medical history, symptom, radiological changes, treatment and outcomes. These patients were followed over 3~9 months.
Results and Conclusion: All these 15 cases of patients were steroid resistant NS children, 3.4~9.2 years old, including 9 boys and 6 girls. All of these patients were under their steriod therapy with the doses of 1.2~2.0mg/kg/d when they had PRES. Meanwhile 4 patients were treated with Tacrolimus(FK506) 0.05~0.15mg/kg/d for 5~21 days with 5.4~8.7ng/ml blood concentration of Tacrolimus, 1 patent were treated with cyclophosphamidum by intravenous infusion for the first coures. 4 cases of these patients presented PRES after percutaneous renal biopsy 4~12 days, and the histopathology showed 2 cases of mesangial proliferative glomerulonephritis, 1 case of focal segmental sclerosis nephritis, 1 case of glomerular minor lesion of glomerular nephritis, and 1 case of minimal change glomerulonephritis. 13 cases of these patients presented moderate or severe hypertention (135~180mmHg/85~110mmHg), 2 cases of patients with normal blood pressure on their PRES occuring. Consciousness impairment was the most common clinical sign, occurring in 14 (93.3%) patients, secondly clinical seizures occurred in 12 (80.0%) patients.

Abstract# P-SUN147
Clinical and histopathological characteristics of 132 children with focal segmental glomerulosclerosis: a single center experience

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Objective: Focal segmental glomerulosclerosis (FSGS) has been a clinical challenge due to the poor response to diverse treatments. To enhance our understanding of the pathogenesis and outcome of FSGS, we retrospectively analyzed the clinical and histopathological patterns of FSGS in children admitted to our center. Methods: All FSGS cases who were admitted between 1998 and 2008 were reviewed retrospectively. The mean duration of follow-up is 3 years. The data included clinical types, pathological features and outcome. Moreover, D'Agati defining criteria and Katafuchi semi-quantitative criteria were strictly followed to differentiate pathological types of FSGS and to evaluate tubulointerstitial lesion respectively.
Methods and Results: Totally 132 children with FSGS were included. There were 63 (47.7%) patients with primary nephrotic syndrome (PNS), 21 (15.9%) patients with isolated proteinuria, 2(22.0%) with isolated hematuria, 19 (14.4%) with both hematuria and proteinuria. According to the histopathological data, the incidence of no otherwise specified variant (NOS), perihilar variant, cellular variant and tip lesion variant were 93 (70.5%), 25 (18.9%), 6 (4.5%) and 8 (6.1%) respectively. In addition, the first, the second and the third grade tubulointerstitial injury accounted for 23 (17.4%), 7 (5.3%) and 4 (3.0%) cases respectively. Moreover, the complete remission (CR) of PNS was significantly lower than other clinical types ($P<0.05$), while partial remission (PR) of NOS variant was higher than other pathological variants ($P<0.05$). The CR/PR in patients with heavy proteinuria (≥100mg/kg/24h) or tubulointerstitial injury (≥ second grade) were lower than other groups ($P<0.05$). The glomerular fitration rate (GFR) in patients with PNS, or perihilar variant, or heavy proteinuria decreased in the third year of follow up ($P<0.05$). Similarly, the GFR in patients with tubulointerstitial injury (≥ second grade) began to decrease in the second year of follow up.
Conclusion: Our data suggested that the risk factors of FSGS in children involved perihilar variant, heavy proteinuria and tubulointerstitial injury.

Abstract# P-SUN148
Analysis of pathogenesis and clinical features of nephrotic syndrome in the first year of life

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Objective: To explore the pathogenesis and clinical features of nephrotic syndrome occurred in the first year of life (NSFL).
M**ethods:** 50 NSFL cases were recruited in our center and divided into 4 groups according to onset age: CNS group (8 cases); 4~6 months group (11 cases); 7~9 months group (9 cases); 10~12 months group (22 cases). Clinical, laboratory examinations, including hematological test wereperformed. 4 genes including *NPHS1,NPHS*2, *WT1* and *LAMB2* were analyzed.
Results: In CNS group, 1 presented with congenital syphilitic infection, another 6 of 7 (85.7%) with detected gene mutation including 4 *NPHS1* mutations and 2 *WT1* mutations, respectively . 2 of them accepted steroid treatment and all resistant to steroid. 42 cases were early onset NS, including 2 inherited NS with one *WT1* and *NPHS2* mutation, respectively, 4 secondary NS (2 with herpes simplex virus infection associated nephrosis, 1 with hepatitis B virus associated nephrosis, 1 with congenital syphilitic infection associated nephropathy) and 36 idiopathic NS. 38 of them were treated with steroid. The steroid response ratio of 4~6 months, 7~9 months and 10~12months group were 37.5% (3/8), 33.3% (3/9) and 81.0% (17/21), respectively. Significant difference of distributions were seen among the 3 groups (P=0.003).
Conclusion: The onset age was correlated to steroid response in NSFL children. The main pathogenesis of CNS was gene mutation. Idiopathic NS is the major form of early onset NS children.

Abstract# P-SUN149
ACE immune-histochemical staining in Kidney tissue of nephrotic children

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Objective: Angiotensin 1 converting enzyme (ACE) is a dipeptidylcarboxy peptidase widely distributed in body tissues including kidneys. Our

objective is to study the ACE localization in kidney tissue of nephrotic children trying to elucidate its role in the pathogenesis proteinuria during relapse.
Methods: A total of 19 patients with primary nephrotic syndrome who underwent renal biopsy were included. Indications of renal biopsy included steroid dependency in 11 and steroid resistance in 8 of them. Ten transplant donors were included as controls. Informed consent was obtained from both groups. Kidney tissue was stained for ACE using a monoclonal antibodies. Staining was quantitatively given a score ranging from 0 to 3 in glomeruli (GL), blood vessels (BV) and proximal tubules (PT) in kidney tissue.
Results: A total of 19 children with idiopathic nephrotic syndrome were included. They were 12 male and 7 females. Mean age at diagnosis was 8.5years(range 3.5-12 years). Mean 66mmol/l with a of range 53-78mmol/l. Renal histology included minimal change in 11 patients, focal glomerulosclerosis in 5 patients, membranous in 2patients,diffuse mesangial sclerosis in 1patient. ACE staining was significantly denser in PT of nephrotic patients (mean score1.6) than controls (meanscore0.9) (p=0.004). No significant difference in ACE density in GL and BV in patientsvscontrols (p=0.149 and p=0.06 respectively).
Conclusion: our findings of significant ACE staining in proximal tubules of children with nephrotic syndrome supports the role of RAS System in the pathogenesis of the disease and encourages the adoption of ACE inhibitors or blockers as alternatives to steroids in treatment of relapses.

Nephrotic syndrome: Risk factors and Biomarkers

Abstract# P-SUN150
High serum TNF-alpha level is negatively correlated with steroid responsiveness in primary pediatric nephrotic syndrome

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Objective: The pathophysiology of idiopathic nephrotic syndrome is not clearly understood. There are a few case reports and case series linking Tumor Necrosis Factor Alpha (TNF-alpha) with nephrotic syndrome in children and adults. TNF-alpha is a cytokine produced by macrophages and T cells, and has multiple functions in the immune response. To examine TNF-alpha serum levels at presentation of nephrotic syndrome and during its clinical course.
Methods: A prospective cohort study conducted at our center during the period of 1.3.11 till 7.3.12 included children aged one year to 18 years, diagnosed with first episode of nephrotic syndrome or with a relapse. TNF-alpha was examined by enzyme linked immunoassay at presentation, and as part of a routine follow up during remission. In cases of steroid resistance when no remission was achieved, the additional blood sample was drawn after a minimum of 79 days from presentation (range 79-258 days). Children undergoing elective cardiac catheterization for congenital heart defects (n=3) and children undergoing endocrine evaluation for short stature or obesity (n=9), served as a control group.
Results: The study group included 7 patients with steroid sensitive nephrotic syndrome and 6 patients with steroid resistance. Pretreatment TNF-alpha at presentation were significantly higher in steroid resistant patients than in controls, (6.13 pg/ml vs 4.36 pg/ml, t=2.13, P=0.0483). No significant difference was found in the pretreatment TNF-alpha serum levels between steroid responders and the control group, (4.11 pg/ml vs 4.36 pg/ml, t=0.415 P=0.68). The TNF-alpha serum levels after steroid therapy were found to be significantly higher in the steroid resistant group than in the steroid responders (5.67 pg/ml vs 2.14 pg/ml, t=4.317, P=0.001).
Conclusion: TNF-alpha serum levels might have a role in predicting steroid responsiveness in pediatric idiopathic nephrotic syndrome. TNF-alpha may be involved in the pathogenesis of nephrotic syndrome and therefore further studies are required to define the place of anti TNF-alpha therapy in the in different subtypes of nephrotic syndrome.

Abstract# P-SUN151
The study on differentially expressed CLNS1A gene among steroid-resistant, steroid-sensitive nephrotic syndrome and normal children

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Objective: To compare gene expression profiles among the steroid-resistant, steroid-sensitive nephrotic syndrome (SRNS vs SSNS) and normal children, and to find some clue to pathogenesis of SRNS.
Methods: Total RNA was isolated respectively from peripheral blood mononuclear cell (PBMC) of each children; Purified into mRNA and reverse-transcribed to synthetize cRNA labeled by biotin, then hybridized with the genes on the genechip containing more than 54000 probes. The differentially expressed genes among these groups were identified based on signal-to-noise ratios by using GCOS software; differentially expression of CLNS1A gene was verified by RT-PCR.
Results: 105 genes were found with close relevant to SRNS, 63 genes up regulated and 42 genes down regulated. 104 genes were found with close relevant to SSNS, 79 genes up regulated and 25 genes down regulated. Especially, there is a gene named CLNS1A down regulated in SRNS but up regulated in SSNS.
Conclusion: Several differentially expressed genes were found to be close relevant to pathogenesis of SRNS. CLNS1A gene probably plays an important role in pathogenesis of SRNS.

Abstract# P-SUN152
Predictors of Relapse in Children with Idiopathic Steroid Sensitive Nephrotic Syndrome

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Objective: Majority of idiopathic nephrotic syndrome (INS) in children show a relapsing course after achieving remission with prednisolone therapy. The objective of the present study was to find out the predictors of relapse.
Methods: One hundred and fifty children with a first episode of between February 2004 and January 2010 were enrolled and followed for 12 months after the initial treatment.
Results: 61 (40.7%) children had no relapse and 89 (59.3%) had relapses; 78 (52%) were infrequent, 10 (6.7%) were frequent relapsers and 1 (0.6%) was steroid dependent. A significantly higher proportion of children with disease onset between 1-3 years were relapsers in comparison to children aged 4-6 ($p<0.03$) and 7-13 years ($p<0.001$). The risk of relapse was 2.99 times higher in this age group as compared to patients aged > 6 years ($p<0.001$). Children responding between 1-2 weeks after start of treatment had a 0.423 times lesser risk of relapse than those responded after 4 weeks (p=0.023).Therelapsers had significantly more mean number of infections than non- relapsers ($p<0.001$). During 12 months follow up, the incidence of infection in relapsers at relapse was 74.8% and 15.5% at other time points ($p<0.001$). Canonical discriminant function analysis indicated age at presentation and time to response as significant predictors. The scores assigned for age group: 1 for 1-3 years, 2 for 4-6 years and 3 for 7-13 years and for time to response were: 1 for 1-2 weeks, 2 for 3-4 weeks and 3 for 5-8 weeks. The equation for relapser was -6.559 +2.817 age group score

+3.842 time to response score and for non-relapser was -6.965 + 3.558 age group score +3.256 time to response score. The equation yielding higher value would define the category of the case.
Conclusion: Onset of disease in younger age and delayed response to therapy were found as significant predictors for relapse.

Abstract# P-SUN153
Glucocorticoid Receptor-α (GR-α) and GR-β Gen Expression Through p65 NF-κB and AP-1 Gen Expression in Steroid Resistant Nephrotic Syndrome

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Objective: The research about expression of GR-β through p65 NF-κB and AP-1 expression in steroid resistant nephrotic syndrome (SRNS) has not been reported. This study aimed to determine GR-α and GR-β through p65 NF-κB and AP-1 gen expression in SNRS.
Methods: We examined the GR-α, GR-β, p65 NF-κB and AP-1 gene expression by using RT-PCR, gel-doc and real-time PCR. Statistical analysis using one-way ANOVA, Post Hoc, Pearson test and Path analysis, significance was defined as $p<0.05$.
Results: We found a significant difference in GR-α, GR-β, p65 NF-κB, AP-1 gene expression (p=0.00) between SRNS, SSNS and control. A significant correlation between GR-α and GR-β (r=-0.673, p=0.012). The correlation between GR-α and p65 NF-κB; GR-α and AP-1; GR-β and p65 NF-κB; GR-β and AP-1; p65 NF-κB and AP-1 was not significantly. Significant direct correlation between GR-β and p65 NF-κB (b=0.322, p=0.047); GR-β and GR-α (b=-0.504, p=0.000); AP-1 and GR-α (b=-0.288, p=0.028); GR-α and GR-β (b=-0.465, p=0.000); p65 NF-κB and AP-1 (b=0.284, p=0.021); p65 NF-κB and GR-β (b=-0.229, p=0.047); GR-α and AP-1 (b=-0.310, p=0.028); AP-1 and p65 NF-κB (b=0.344, p=0.021). Non-significant direct correlation between GR-β and AP-1; p65 NF-κB and GR-α; AP-1 and GR-β; GR-α and p65 NF-κB.
Conclusion: We concluded that SRNS obtained an increase in GR-β, p65 NF-κB, AP-1 and decreased of GR-α gene expression. The increase of GR-β gene expression was directly influenced by the decreased of GR-α and the increased of p65 NF-κB, AP-1 gene expression.

Abstract# P-SUN154
CONTRIBUTORY RISK FACTORS FOR DEVELOPMENT OF THROMBOSIS IN CHILDREN WITH NEPHROTIC SYNDROME

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Objective: The aim of this study was to evaluate the prevalence and contributory risk factors for development of thrombosis in children with NS.
Methods: Among 187 children with the diagnosis of NS followed up in Hacettepe University Pediatric Nephrology Unit between July 2006 and January 2013; 17 children (9%) with the mean age of 11.6 +/- 6.7 years, identified as having thromboembolic complications and screened for inherited risk factors for thrombosis.
Results: Among 17 children with thrombosis, 14 (85.7%) FSGS, 2 (14.3%) had congenital NS and 1 has minimal change disease. Among 17 children with thrombosis; 4 had catheter related thrombosis, 2 had cerebral infarct, 2 had portal venous thrombosis, 2 had intracardiac thrombosis, 3 had sagittal sinus thrombosis, 1 had cerebral infarct and intracardiac thrombosis, 1 had left sigmoid and transverse sinuses thrombosis, 1 had superficial femoral vein thrombosis and 1 had cephalic vein thrombosis. High factor VIII levels was detected in 11/17, high factor V levels in 4/17, decreased protein C level in 3/17, decreased protein S level in 2/17, antithrombin III deficiency in 5/17, high homocystein level in 4/17, high lipoprotein a level in 4/17, antiphospholipid antibodies in 1/17, anticardiolipin antibodies in 2/17, factor V Leiden heterozygote mutation in 2/16, MTHFR 677 heterozygote mutation in 6/16, MTHFR 677 homozygote mutation in 1/16, MTHFR 1298 heterozygote mutation in 3/13, MTHFR 1298 homozygote mutation in 1/13, PAI (4G/5G) polymorphism in 2/13 and PAI (4G/4G) polymorphism in 1/13 child. Two children had 1, seven children had 2, three children had 3, and four children had 4 inherited risk factors for thrombosis. Furthermore 4 children had central venous catheters, 2 had infection, and 1 had rejection episode of transplanted kidney as clinical risk factors for thrombosis. Most of the children (76%) treated with only low molecular weight heparin ranging 3 to 12 months.
Conclusion: Unlike other cohorts, in our cohort FSGS is associated with the highest incidence of venous thrombosis. All of our patients except one has genetic predisposition to thrombosis that shows underlying genetic background influences the likelihood of thrombosis in nephrotic syndrome.

Abstract# P-SUN155
DIFFUSE EFFACEMENT OF PODOCYTE FOOT PROCESSES IS EARLY PREDICTOR OF PROGRESSION OF STEROID-RESISTANT NEPHROTIC SYNDROME (SRNS) IN CHILDREN: A 15-YEAR SINGLE-CENTER EXPERIENCE

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Objective: SRNS in children is at high risk of progression to chronic renal failure (CRF). The data on the association between effacement rate of podocyte foot processes and clinical outcome of childhood SRNS are limited. The study was conducted to determine whether effacement rate of podocyte foot processes is useful predictor of SRNS-to-CRF progression in children.
Methods: We conducted a retrospective cohort tertiary single-center study of 75 children (33M/42F) with initial non-familial SRNS diagnosed between 1996 and 2011. Renal biopsy revealed: FSGS in 42.7%, mesangial proliferative GN - in 28%, membranoproliferative GN - in 14.7%, MCD - in 9.3%, membranous nephropathy - in 5.3% patients. We classified patients into 2 groups based upon the effacement rate of podocyte foot processes determined by electron microscopy: 1) focal lesion with <=50% (n=45); 2) diffuse lesion with >50% (n=30). CRF was defined as eGFR<60 mL/min/1.73m^2.
Results: Children with diffuse lesion in comparison with patients with focal effacement of podocyte foot processes had significant differences in frequency of FSGS: 60% vs. 31.1% (p=0.002; OR=4.4, 95%CI: 1.7-11.4) and CRF: 40% vs. 6.7% (p=0.001; OR=9.3, 95%CI: 2.0-44.2). There were no significant differences between these two groups of patients in the duration of disease before renal biopsy, follow-up period and in frequency of remission after immunosuppressive treatment (p>0.05). Renal survival at 5 and 10 years was significantly less in patients with diffuse lesion compared with children with focal effacement of podocyte foot processes: 69.9% vs. 92.1% and 31.1% vs. 70.1%, respectively (p=0.001). Multivariate Cox regression model confirmed that diffuse podocyte foot processes was independent predictor of adverse outcome of SRNS: HR=5.9, 95%CI: 1.7-21.0 (p=0.006) with sensitivity 90% (95%CI: 68.3-99%), specificity 50.9%(95%CI: 37.1-64.7%) and likelihood ratio 1.8.
Conclusion: Diffuse effacement of podocyte foot processes is associated with FSGS and can be considered as an early predictor of SRNS-to-CRF progression in children.

Abstract# P-SUN156

Predictive value of proteinuria seen on routine urinalysis among children with nephrotic syndrome

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Objective: To determine whether the degree of proteinuria based on routine urinalysis can predict nephrotic-range proteinuria and evaluate if biochemical and microscopic factors on urinalysis can affect the level of proteinuria.
Methods: Demographic, hematologic, serologic and urinalysis findings were analyzed. Level of urine protein was analyzed together with WBC, RBC, and bacteria, individually or in combination. Patients were grouped into, group A (+3/ +4) and group B (trace, +1 and +2). Relationship of the urine protein groups and the biochemical and microscopic features were analyzed.
Results: One-hundred seventeen patients were included. Seventy-three (62.4%) patients were male, with a 1.6:1 male to female ratio. Edema was the most common chief complaint. Anemia (53.8%) and leukocytosis (70.9%) were noted. TPAG and serum cholesterol were consistent with nephrotic syndrome. Urinalysis was yellow and slightly cloudy. Specific gravity 1.020 (23.9%), pH 6.0 (47.9%), 49 (41.9%) have pyuria, 31 (26.5%) have hematuria, 65 (55.6%) have bacteruria and 42 (35.9%) have urine protein level +3. All confounders were analyzed individually with urine protein showed no statistically significant difference. Urine protein level has high specificity of 91.67%, when combined with all the confounders. Positive predictive value of urine RBC is 74.19% and slightly increased when combined with bacteria at 75%. Negative predictive values are all low ranging from 30.56 to 32.69%. Diagnostic accuracy for urine protein was within 33.33% to 53.85%. Likelihood ratio of a positive test is within 0.8889 to 1.333 while the likelihood ratio of a negative test is within 0.915 to 1.01.
Conclusion: Urine protein level based on routine dipstick study cannot predict the degree of quantitative proteinuria that is needed to support the diagnosis of nephrotic syndrome.

Abstract# P-SUN157

To analyze risk factors of steroid resistance in children with primary nephritic syndrome and develop a novel risk score to predict steroid resistance

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Objective: To detect the clinical indicators of primary nephrotic syndrome (PNS) in children to looking for risk factors of steroid resistance. A risk index model was planned to set up to aid the identification of patients of not responding at an early stage to corticosteroid therapy.
Methods: The clinical indicators of 106 patients with PNS hospitalized in nephrology ward from Oct 2011 to Oct 2012 were detected, including clinical data (gender, age of onset, edema degree, etc), laboratory detection (kidney function, blood lipids, coagulation function, immune globulin, 24h urinary protein, etc) and imaging examination. Using SPSS 16.0 software to do mono-factor analysis, Logistic regression test and receiver operator characteristic (ROC) curve.
Results: Mono-factor analysis showed the higher level of serum fibrinogen, the shortening of prothrombin time (PT), persistent hematuria, severe edema, the enlargement of kidney and (or) exist diffuse lesions were the risk factors of steroid resistance in children with PNS. PT, the kidney size and lesions were eliminated by Logistic regression test. ROC curve showed the level of serum fibrinogen was higher than4.7 g/ L was the cut-off point of forecasting the PNS patients who would be resistant to steroids. Combined with regression coefficients and cut-off point, it is obtained that the scores of the higher level of fibrinogen, persistent hematuria and severe edema respectively was 1, 3 and 3. ROC analysis of this score yielded area under curve of 0.813, with a sensitivity of 100% and specificity 98.8% using score more than 6 in predicting steroids-resistant.
Conclusion: The higher level of fibrinogen, persistent hematuria and severe edema was the risk factors of steroid resistance. The risk score allows the early identification of children with steroid-resistant nephrotic syndrome who would be suitable for second-line medical therapy at the early stage.

Abstract# P-SUN158

The Detection and Significance of Urinary Neutrophil Gelatinase-Associated Lipocalin in Children ParimaryNephrotic Syndrome patients

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Objective: To analyze the change of urinary NGAL (Neutrophil gelatinase-associated lipocalin) at different phases in children PNS patients, Then discuss the action of NGAL in children PNS patients associated with renal tubular interstitial lesions and AKI.
Methods: A total of 63 children PNS patients were enrolled in this study according to the diagnostic criteria who were examined in our departmentl. The levels of NGAL in urine was detected with ELISA in PNS patient at active phase, remission phase and normal control group, Then compare the difference of urinary NGAL between each group.
Results: 1. The levels of urinary NGAL was (2.43+/- 1.19, 1.32+/- 0.72, 1.44+/- 0.78) ng/ml in each group respectively. The levels of urinary NGAL in active phase was higher than remission phase and normal control group, and there was significant difference in three groups ($p<0.01$). 2. It was positive correlation between urinary NGAL and 24-hour urinary protein quantity, β_2-MG and NAG at active phase ($r=0.316$, $r=0.306$, $r=0.381$, $P<0.05$). It was negative correlation between urinary NGAL and Alb at active phase ($r=-0.367$, $P<0.01$). 3. The urinaryβ_2-MG, urinary NAG between active phase of PNS and normal control group have significant difference($P<0.01$).
Conclusion:1.The levels of urinary NGAL in PNS active phase was obviously higher than remission and normal control group. 2. Urinary NGAL may act as the sensitive index in detecting renal tubular interstitial lesions, and may reflect the severity of renal tubular interstitial lesions. 3. Urinary NGAL played a certain vital role in monitoring disease activity and treatment effect. 4. The levels of urinary NGAL can be used as a predictor actor in PNS patients who might appear the risk of AKI.

Abstract# P-SUN159

Clinical and pathologcal features of idiopathic IgM nephropathy

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Objective: To investigate the clinical and pathological features, treatment and outcome of idiopathic IgM nephropathy (IgMN) in children.
Methods: The clinicopathological features, treatment and outcome of children with renal-biopsy-diagnosed IgMN between Jan 1984 and Aug 2011 in our hospital were retrospectively analyzed.
Results: 127 pedaitric patients diagnosed with IgMN were included accounting for 9.7% (127/1313) of those who underwent renal biopsy and 13.8% (127/921) of those who diagnosed primary glomerular disease. Male: female was 1.5:1. The mean ages at the disease onset and diagnosis were (5.9+/-4.5) years and (8.1+/-4.3) years respectively. Nephrotic syndrome (NS) was the most common clinical manifestation (74%), followed by isolated hematuria (15%) , persisting glomerular

nephritis(7.9%) and isolated proteinuria (1.6%). Among the NS cases, 26 accompanied by hematuria, 5 by renal insufficiency and 3 by hematuria and hypertension. 44 cases were steroid resistant, 36 were steroid dependent or frequent relapse .MCD (45.7%) was the most common histologic types, followed by MsPGN (32.3%) and FSGS (19.7%). 80 cases of refractory nephrotic syndrome were treated with CTX, CsA or FK506. With first use of CTX, the rate of remission was 65.6% (21/32) while CsA or FK506 is 89.6%(43/48) (P<0.05). Among the 11 cases who transferred to CsA or FK506 after showed no response to CTX, 7 cases got remission. 64 patients were followed up more than one year, 6 cases developed into renal insufficiency and no deaths occurred. 2 children received the second renal biopsy, the histological types appeared from MCD developing into FSGS.

Conclusion: IgMN is one of the most common patterns of glomerulonephritis. Refractory nephrotic syndrome was the most common clinical manifestation. MCD, MsPGN and FSGS were the main pathological types. CsA and FK506 were superior to CTX for treatment.

Abstract# P-SUN160

Initial Steroid Sensitivity Is A High Risk Predictor For Focal Segmental Glomerulosclerosis Recurrence Post-Transplant

Wen Yi Ding[1,2], Hugh J McCarthy[2], Agnieszka Bierzynska[2], Murali K Bhagavatula[3], Jan A Dudley[1], Carol D Inward[1], Jane Tizard[1], Christopher Reid[4], Ania Koziell[4], Moin A Saleem[1,2]

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Objective: Recurrence of FSGS post-transplant is high in the paediatric population with rates of up to 50%. A putative circulating factor is thought to be a major player in FSGS recurrence. Accumulating evidence shows that genetic mutations decrease the risk of post-transplant recurrence. Several other risk factors have been studied but with no definitive results as to their role in predicting recurrence. We hypothesised that FSGS patients can be simply stratified into 'genetic' and 'circulating factor disease', and that the latter group gets recurrence, and may be identified by response to steroids at initial presentation. We retrospectively analysed consecutively transplanted paediatric FSGS patients at 2 centres in the United Kingdom.

Methods: We compared age at diagnosis, time to end stage renal failure, age at transplant, presence/absence of native kidneys, initial steroid sensitivity (at presentation), genetic results, family history, and other phenotypic/extra-renal features.

Results: 50 children with FSGS were transplanted at Bristol Royal Hospital for Children and Evelina Children's Hospital, of which 21 children suffered from recurrence. Recurrence risk was significantly higher and occurred in all patients who showed initial steroid sensitivity (n=13/13; p<0.0001; OR = 130, 95% CI=6.68 to 2533.3) (Figure 1). Those with initial steroid sensitivity did not have any genetic or extra-renal abnormalities or family history. Genetic mutations, extra-renal abnormalities or positive family history corresponded to reduced recurrence risk (n=1/15; p=0.0011; OR=0.05385, 95% CI= 0.006297 to 0.4605).

Conclusion: Initial steroid sensitivity has not been previously studied as a predictive factor for recurrence, and may signify the presence of an immunologically derived circulating factor. We conclude that initial steroid sensitivity is a marker for extremely high recurrence risk, with the added implication that this is an early indicator of non-genetic forms of FSGS.

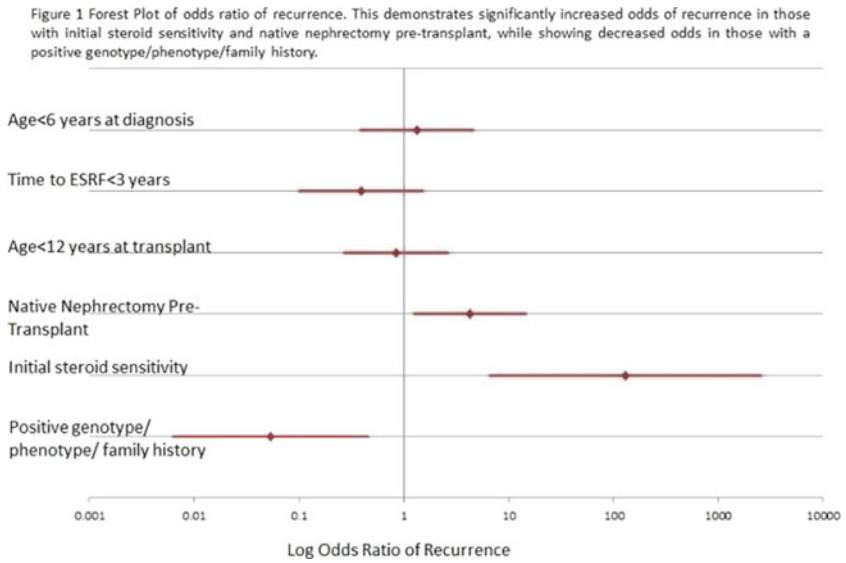

Figure 1 Forest Plot of odds ratio of recurrence. This demonstrates significantly increased odds of recurrence in those with initial steroid sensitivity and native nephrectomy pre-transplant, while showing decreased odds in those with a positive genotype/phenotype/family history.

Abstract# P-SUN161

A study on influencing factors of frequent relapse in primary nephrotic syndrome of children

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Objective: This study was aimed at studying the influencing factors for frequent relapse in children with primary nephritic syndrome.

Methods: A retrospective study of 918 children with PNS who followed for at least 1 year was conducted.

Results: (1) NFR account for 83.8% and FR account for 16.2%. (2) Remission period before the most-recent relapse, level of serum total protein and cholesterol at onset had significant difference in FR and

NFR. (3) The logistic regression analysis reveals that remission period before the most-recent relapse was a powerful independent influencing factor of FR. (4) January to March were main relapse months. Relapse without triggers accounted for 19.9%, while relapse with triggers accounted for 80.1%. January to March were also the main months in relapse with triggers. (5) In triggers of relapse, upper respiratory tract infection accounted for 52.72%, other infections accounted for 18.83%, tapering medicine accounted for 11.98%, irregular treatment accounted for 10.95%. A high level of serum IgE was found in 60 times of relapse, accounted for 51.7% of the 116 relapse times.

Conclusion: (1) Frequent relapse had a proportion of 16.2% in children with primary nephrotic syndrome under regular glucocorticoid treatment. It showed circannual variation with a spring peak. (2) Remission period before the most-recent relapse was a powerful independent influencing factor of FR. The risk of frequent relapse for patients with a remission period less than 6 months before the most-recent relapse will increase. (3) Level of the serum total protein less than 44g/L and cholesterol more than 10mmol/L at onset can be independent predictive factors of frequent relapse. (4) Infections are the main trigger of relapse, while relapse caused by irregular treatment calls for attention.

Abstract# P-SUN162

Serum levels of CXCL16 and CXCR6 were elevated in children with primary nephrotic syndrome

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Objective: To explore the roles of of serum CXCL16 andCXCR6 inchildren with differentstages of primary nephrotic syndrome (PNS).

Methods: 50 children of simple Type PNS with sensitivity to steroid were selectedfor our study and 25 of them whose steroid therapy was finished were investigated inboth two groups—active group and remission group. And 20 healthy children were selectedas the control group. Blood cholesterol, albumin and 24 hour urine proteinduring active phase were determined. Serum CXCL16 and Ox-LDL were determined byELISA. The expression of $CXCR6^{+}$T cells were detected using flowcytometry.

Results: Compared with those in remission group andcontrol group, serum CXCL16 and CXCR6+ T cells in the activegroup were increased obviously$P<0.05$ and $P<0.01$ respectively. There was no statisticalsignificance for the difference of serum CXCL16 and CXCR6+T cells between remissiongroup and control group ($P>0.05$). In active phase ofsimple PNS, serum CXCL16 level wascorrelated positively with blood cholesterol, TG, LDL-C, oxLDL, 24 hour urineprotein and CXCR6+ T cells, while negatively with blood albumin.

Conclusion: Elevated serum levels of CXCL16 and CXCR6+ T cells may be themarkers of activity and contribute to the pathogenesis of simple Type NS.

Abstract# P-SUN163

Expression and Bioinformatic Analysis of MiR-200 Family in Podocytopathy

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Objective: To detect the serum level of miR-141, miR-200a and miR-200b in children with podocytopathy including focal segmental glomerulosclerosis (FSGS) and minimal change disease(MCD) and find out the association between serum level of miRNA and clinical parameters, and predict target genes of miR-141, miR-200a and miR-200b and bioinformatically analyze the target genes, in order to provide basis for exploring intensive regulatory mechanism and biological function.

Methods: thirty children with FSGS, thirty children with MCD and twenty sex- and age- matched healthy controls into three groups were included in this study. The serum level of miR-141, miR-200a and miR-200b were detected using Real-time fluorescent quantitative PCR. TargetScan and PicTar algorithm were used to predict target genes of these miRNAs, and the intersection of the two results combined with the validated target genes as gene set was analyzed by pathway enrichment analysis and miRNA-gene networks.

Results: the serum level of miR-141, miR-200a and miR-200b in children with FSGS were significantly higher than the other two groups, and serum level of miR-141 was positively correlated with proteinuria. The number of target genes was 216. In pathway enrichment analysis the gene set was enriched in Wnt signaling pathway, axon guidance, tight junction, cell cycle, oocyte meiosis, chronic myeloid leukemia and adherens junction ($p > 0.05$), forty two taget genes of which were selected to establish miRNA-gene networks.

Conclusion: The serum level of miR-141, miR-200a and miR-200b in children with focal segmental glomerulosclerosis was significantly high, potential diagnostic biomarkers of FSGS , providing a novel approach to study the pathogenesis of renal fibrosis.

Abstract# P-SUN164

Serum miR-30a in pediatric nephrotic syndrome as a potential biomarker for the diagnosis of frequently relapsing nephrotic syndrome

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Objective: MiRNAs, as highly conserved small RNA, are indispensable for renal development and homeostasis, and emerging evidence has further pinpointed the pathogenic roles played by miRNAs in major renal diseases. We hypothesized that miR-30a, which was relevant to podocyte, in the serum may be related to pediatric nephrotic syndrome and may serve as a diagnostic marker for frequently relapsing nephrotic syndrome (FRNS).

Methods: A cohort of 80 patients, including 30 cases in FRNS, and 30 normal controls were enrolled in this study. MiRNA was extracted directly from plasma and synthetic cel-miR-39, as extrinsic parameter was spiked. Real-time reverse transcription polymerase chain reactions (PCR) were performed to validate the dysregulatedmiRNAs between different group using cel-miR-39 for normalization and synthetic miR-30a standards for standard curve. According to absolute quantitation of miRNAs calculated by standard curve, receiver operator characteristic curve (ROC) analysis was applied to evaluate the diagnostic ability of miR-30a for FRNS.

Results: Serum miRNA-30a level in the NS patients was increased by 1.25 times than in the normal controls. MiRNA-30a level was significantly higher in the FRNS group than in other sub-group of NS. Serum miR-30a inversely correlated with albumin,andcorelated with proteinuria, urine retinol binding protein, and urine N-acetyl-beta-glucosaminidase. The ROC curve showed that serum miR-30a was a specific diagnostic predictor of FRNS with an area under the curve of 0.895 (95% confidence interval, 0.827 to 0.986; $P < 0.001$).

Conclusion: Our findings indicated that serum miR-30a was significantly higher in the NS patients and it could be a potential biomarker for the diagnosis of FRNS.

Abstract# P-SUN165

Is Serum CRP a Reliable Inflammatory Marker in Children with Nephrotic Syndrome? A Prospective Controlled Study Evaluating Nephrotic Range Proteinuria and Urinary CRP Excretion

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Objective: Serum C-reactive protein (CRP) is a widely accepted marker of inflammation. Children with nephrotic syndrome (NS) excrete large amounts of protein in urine, and are prone to serious bacterial infections. Urinary loss of CRP may interfere with interpretation of its serum levels. Urinary excretion of CRP in patients with NS and its influence on serum CRP levels has not been previously studied. The aim of this study was to evaluate the urinary CRP excretion (uCRP) in children with nephrotic range proteinuria and in patients with a febrile infectious disease comparing to levels of excretion in healthy subjects.
Methods: Study group consisted of 23 patients with NS aged 2.5-18 years, and 30 patients with various infectious diseases aged 0.5- 17.5 years. 16 healthy children aged 1.5-14.5 years served as controls. Laboratory tests included urinary protein/creatinine ratio, protein electrophoresis, serum creatinine, albumin, and CRP levels. uCRP levels were measured by ELISA.
Results: Mean uCRP was 8.1 (0-189.7) mcg/g Cr in NS, 34.6 (0-286) in patients with febrile illness and 0.1 (0-1.8) in healthy controls. Only 7/23 nephrotic patients excreted uCRP, 1 child with congenital NS had massive CRP excretion. No significant difference in uCRP was found between NS and controls. Mean sCRP level was 0.4 (0.01-2.4) in NS, 10.8 (4.6-27.7) in patients with febrile illness. A significant increase in uCRP values was observed in the Infectious illness group compared with the nephrotic and control groups. Significant positive correlation was found between sCRP to uCRP levels in NS but not in patients with febrile illness. No significant correlation was found between uCRP values to Protein/Cr levels, Nor to the selectivity of proteinuria. Significant positive correlation was found between uIgG values and uCRP in NS.
Conclusion:uCRP was not found to be lost significantly in NS, thus reassuring that measurement of sCRP in a nephrotic child is still a reliable inflammatory marker. The reason for significant increase of uCRP in patients with transient infectious disease is yet to be determined.

Abstract# P-SUN166

Availability of fractional excretion of total protein for assessment of glomerular protein permeability in nephrotic syndrome

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Objective: The ratio of urine protein and creatinine (uTP/Cr) of the first morning urine is useful to estimate the amount of proteinuria. On the other hand, as glomerular filtration rate (GFR) decreases, the amount of proteinuria decreases, however, that does not necessarily mean improvement of the glomerular protein permeability in nephron. Therefore, it makes sense to evaluate the degree of glomerular protein permeability in nephrotic patients (NS) with acute renal failure (ARF). Meanwhile, fractional excretion of total protein (FETP) is the ratio of protein clearance (CPro) and creatinine clearance (CCr). We studied the availability of FETP as an indicator of protein excretion in nephron through a patient with NS that had experienced recurrence of ARF.
Methods: A 4-year-old boy, who was diagnosed as primary steroid-resistant nephrotic syndrome, was referred and admitted to our hospital.
Results:uTP/Cr 60.7 g/gCr, FETP 0.334 %, size selectivity index 0.17, serum Cr 0.2 mg/dl, and serum albumin 1.4 g/dl. Renal biopsy revealed minimal change disease. We started to the combination therapy of pulse methylprednisolone, cyclosporine and candesartan. Albumin infusion and diuretics were also administered to treat edema. In spite of careful treatment, ARF occurred repeatedly and heavy proteinuria persisted, so we performed the intermittent hemodiafiltration and plasmapheresis. In this clinical course, as serum Cr increased from 0.2 to 2.5mg/dl, uTP/Cr decreased from about 80 to 10 g/gCr, however, FETP tended to increase and maintain a high level between about 0.3 and 1.0 % during the phase of ARF. We investigated the reference FETP (mean ± SD) in 20 past cases of NS in remission and in relapse, and it revealed 0.0003±0.0002 and 0.22±0.13%, respectively. We also checked the values of uTP/Cr (mean ± SD) in the same condition; these were 0.065±0.0471 and 26.86±19.18 g/gCr, respectively. It revealed that the values of FETP and uTP/Cr changed in parallel, but became separated when GFR decreased.
Conclusion: In this case of NS with ARF, FETP increased when CCr decreased. This means that the glomerular protein permeability increased when glomerular filtration decreased, despite of the decrement of uTP/Cr. We need to re-evaluate the physiology of proteinuria in ARF occurred in NS.

Abstract# P-SUN167

The Correlation of Clinic and Pathogenesis of Idiopathic Nephrotic Syndrome with Urine Interleukin-13, Granzyme-B, CD80, CD28 and Matrix metalloproteinase-2 levels

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Objective: T cell dysfunction in the pathogenesis of idiopathic nephrotic syndrome (INS) is known for many years. Literature research is filled with many of cytokine studies for this dysfunction. For this reason, we have studied with old and new urinary markers. In this study, we tried to understand the pathogenesis of INS.
Methods: In this study, we have worked with steroid-sensitive nephrotic syndrome (SSNS) children from INS children. Nephrotic stage urinary IL-13,CD80, CD28, MMP-2 and granzyme B levels of SSNS patients compared with remission phase that same patients and 30 healthy control group children. In the period that urine samples have collected, we have been careful that they are not using any immunosuppressive drugs including steroids. Because we

know that these immunosuppressive drugs can change cytokine release.
Results: Nephrotic stage urinary IL-13, CD80, CD28 and MMP-2 levels were significantly higher than in remission phase and control group. We couldn't find any difference between remission and control groups in terms of these markers. We couldn't find any significant and statistically difference among three groups in terms of urinary granzyme B levels, too.
Conclusion: These results show us that increased urinary CD80 levels indicates increased podocyte CD80 expression, increased urinary IL-13 levels may play a role in the expression of podocyte CD80, increased urinary CD28 levels indicates T cell activation and inability to reverse podocyte CD80 expression, increased urinary MMP-2 levels indicates proteinuria related inflammation or MMP-2 related glomerular basal membrane damage or both mechanism in the nephrotic stage of SSNS. The levels of granzyme B isn't increased in three groups and this finding show us that cytotoxic T lymphocytes and natural killer cells don't play a role in the pathogenesis of SSNS. In the light of these findings, anti CD80, anti IL-13 therapies and MMP inhibitors should be investigated in the future in the treatment of SSNS.

Abstract# P-SUN168
Clinical Significance Of Urine Annexin A5 In Primary Nephrotic syndrome Of Children

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Objective: Explore the clinical significance on the detection of urinary annexin A5 (ANX A5) in children with primary nephrotic syndrome (PNS).
Methods: The subjects were obtained from 56 children with PNS and 38 healthy children for control group. PNS group included 35 children with steroid-sensitive nephrotic syndrome (SSNS) and 21 children with steroid-resistant nephrotic syndrome (SRNS).The urinary ANX A5 and Ucr of children with PNS and control group were detected before and after GC treatment. The 24-hour urine protein (24hUP) and serum C_3 of the 56 children with PNS were detected before GC treatment by turbidimetry. The serum albumin (ALB), blood urea nitrogen (BUN) were detected by colorimetric method and the serum creatinine (Scr) blood lipid of the 56 children with PNS before GC treatment were quantified by enzymic method. SPSS16.0 software was used to analyze the data.
Results: 1. Compared with control group, the urinary ANX A5 levels of SSNS and SRNS groups were significantly rasied before and after GC treatment (P<0.05). The urinary ANX A5 level of SRNS was significantly raised compared with SSNS group before and after GC treatment (P<0.001). The urinary ANX A5 level of SSNS group had no significantly difference before and after GC treatment. The urinary ANX A5 level of SRNS group was decresed after GC treatment conversely (P=0.004). 2. The area under the ROC curve was 0.97 with a high statistical significance (P<0.01). The Optimal Operating Point (OOP) was determined and interpreted at 520.1 (ng/mmol Cr) with higher sensitivity (85.7) and specificity (100,). 3. Before GC treatments, the urinary ANX A5 level was positively correlated with urinary MAlb (r=0.35, P<0.001), urinary Tf (r=0.30, P=0.02) and urinary NAG (r =0.29, P=0.03), and negatively correlated with Fg (r=-0.33, P= 0.02). The correlation with CHO, ALB, Tp, LDL, HDL, PT, APTT and TT was no significant.
Conclusion: Urinary ANX A5 may be one of the indicators to distinguish SSNS and SRNS. Urinary ANX A5 +/- 520.1 (ng/mmol Cr) can be used as a quantitative index to predict SRNS.

Abstract# P-SUN169
Serum urokinase type plasminogen activator receptor (suPAR): Marker for renal dysfunction, not for histology

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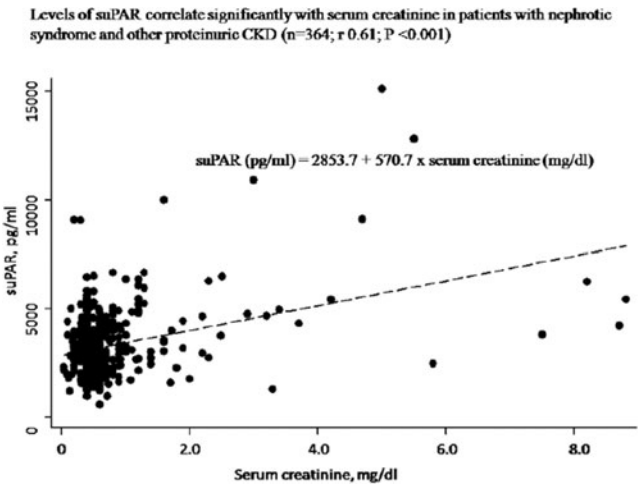
Objective: Recent studies propose suPAR as the pathogenic circulating factor in FSGS. We prospectively estimated these levels in children with steroid resistant & sensitive nephrotic syndrome (NS) &proteinuric chronic kidney disease (CKD).
Methods: We measured suPAR levels in patients with steroid resistant NS with FSGS (n=99) & MCD (83), steroid sensitive NS (119) & proteinuric CKD (55) by ELISA (QuantikineuPAR, R&D). Controls (66) were children with no renal disease. [Funded Dept. Biotechnology, Govt. of India]
Results: suPAR levels were comparable in patients with steroid resistant & steroid sensitive NS (P=0.48; Table). Values were similar in patients with FSGS & MCD & did not change with remission. Levels in patients with NS were similar to controls (all P>0.1). Regardless of cause, suPAR was high in patients with eGFR<30 ml/min compared to proteinuria & normal renal function (P<0.001). suPAR>3525 pg/ml predicted eGFR<30 ml/min with sensitivity of 69% and specificity of 72% (AUC 0.74). Similar proportions of patients with MCD & FSGS, but 67-87% patients with CKD 4-5 showed high (>3000 pg/ml) values (Table; P<0.001). suPAR levels correlated with serum creatinine (Pearson P<0.001; Fig.) but not with albumin, age & height.
Conclusion: Levels of suPAR neither discriminate between steroid resistant & sensitive NS, nor between FSGS & MCD. Highest levels were seen in patients with advanced CKD with FSGS or other causes of proteinuria.
Levels of suPAR in steroid resistant & steroid sensitive NS, proteinuria & controls

(n)	Age, yr	suPARpg/ml, mean±SEM (range)	suPAR>3000 pg/ml, n (%)
Steroid sensitive NS			
Relapse (66)	8.6±3.8	3048±167 (984-8917)	31 (47)
Remission (53)	9.9±4.0	2994±148 (1388-6074)	23 (43)
Steroid resistant NS			
MCD, nephrotic (42)	6.3±3.6	3002±206 (583-9049)	20 (48)
MCD, remission (41)	8.2±3.6	3097±171 (1437-6500)	19 (46)
Congenital NS (8)	0.6±0.2	3738±969 (382-9074)	4 (50)
FSGS, nephrotic (47)	7.3±4.0	3298±178 (1198-6341)	27 (58)
FSGS, remission (37)	8.9±4.3	3235±180 (1372-5632)	21 (57)
Proteinuria, CKD 1-3 (28)	12.3±4.3	3154±192 (1264-5236)	15 (54)
FSGS, CKD 4-5 (15)	9.6±4.8	6189±1003 (1589-15100)^*	13 (87)
Other proteinuric CKD 4-5 (27)	11.1±3.5	4520±475 (1275-11900)#	18 (67)
Controls (66)	8.7±4.6	2958±101 (1375-4939)	28 (42)

P for difference between groups vs. controls ^<0.001 and #0.0006; *versus FSGS nephrotic <0.001



Abstract# P-SUN170

Current status of childhood nephrotic syndrome: a questionnaire survey in patient advocacy group

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Objective: The long-term outcome of steroid-sensitive nephrotic syndrome (SSNS) in children is considered benign. However, patients and their families are concerned about the conditions because about 70% of them will suffer relapses. We have helped activities of the association of SSNS patients and their families in promoting comprehension of NS and resolving worries about treatment and prognosis for years. Aim of the present paper is to know the current status of those children with SSNS and to investigate their understanding and anxieties of relapsing SSNS and of adverse effects of drugs such as short stature or obesity by questionnaires.
Methods: In June 2010, an anonymous survey was sent to members of the patient advocacy group of childhood SSNS in Osaka, Japan.
Results: One hundred and twenty one questionnaires were distributed, of which 67 (49 boys, 18 girls) were returned. The response rate was 55%. Mean age at diagnosis was 5.0 years, and 58% of the patients developed NS at the age of 3 years or younger. Fifteen responders were 18 years old or older. After a mean follow-up period of 7.8 years, 22 patients experienced 2-4 relapses, 12 showed relapse-free and 11 developed more than 15 relapses. In addition, 38 patients (58%) were still being treated with steroids and/or immunosuppressants. Forty-five responders were dissatisfied about their appearance because of drug side effects. Though half of them complained about short stature, the actual height stays above -2 standard deviations. Only 1 patient aged more than 18 years old met the clinical criteria for dwarfism in his adult height. In spite of having the burden of problems in areas such as diet, exercise and education, 97% of the respondents assessed themselves as in average or good physical conditions.
Conclusion: Our results demonstrated the same age distribution of the onset of NS and the incidence of relapses as previous reports by others. The prognosis of adult height was not as short as patients would have worried in spite of frequent relapses. In daily practice we should appropriately provide the objective information about their physical growth as well as results of urine tests to help them lead better life even with NS.

Abstract# P-SUN171

Circulating Soluble Urokinase-type Plasminogen Activator Receptor (suPAR) Does Not Predict Treatment Outcomes in Multi-Ethnic Asian Children with Idiopathic Focal Segmental Glomerulosclerosis (FSGS)

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Objective: Response to therapy is the best clinical indicator of outcome in FSGS. To date, there is no single measurable predictor of treatment outcomes. Recently, suPAR has been reported to be elevated in 60% of FSGS patients. However, its clinical significance has not been well defined. This study aimed to investigate the predictive ability of suPAR levels on treatment outcomes in children with idiopathic FSGS.
Methods: Blood was obtained from 46 consecutive children with biopsy-proven FSGS, and suPAR levels were measured using ELISA (Human uPAR immunoassay, Quantikine®).This was compared to 58 patients with minimal change nephrotic syndrome (MCNS) and 18 healthy controls. Exclusion criteria included genetic and infectious etiologies. Multivariate logistic regression analysis was performed using the following covariates: suPAR levels, age of onset, gender, race, steroid response, urine protein:creatinine ratio, serum albumin and estimated glomerular filtration rate. The primary outcome was treatment failure, defined as persistence of proteinuria despite intensive immunosuppressive therapy or progression to chronic kidney disease stages III-V. Continuous and categorical variables were analyzed using one-way ANOVA and chi-square tests respectively.
Results: Mean age at diagnosis was 4.1±3.3 years with male:female ratio of 2:1. Of the 46 patients, 44.7% were Chinese, 29.8% Indians, 19.1% Malays and 4.3 % other ethnicities. suPAR levels were significantly higher in children with FSGS (2955.1±947.1 pg/ml) compared to age-gender-ethnicity matched MCNS children (2118.9±610.1 pg/ml) and controls (1786.7±472.6 pg/ml) ($p<0.001$). There was no significant difference in suPAR levels between treatment failures (3133.1±944.8 pg/ml, n=15) and responders (2868.9±951.5 pg/ml, n=31) (p=0.38). Additionally, suPAR level was not shown to be predictive of treatment failure using multivariate logistic regression (p=0.37).
Conclusions: Circulating suPAR levels are not useful in predicting treatment outcomes in our cohort of Asian children with FSGS. Prospective studies with larger sample sizes are needed to define and establish the clinical role of elevated circulating suPAR in FSGS.

Abstract# P-SUN172

Expression of ANGPTL3 in Different Types of Renal Disease

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Objective: To investigate ANGPTL3 changes in patients with different types of nephrotic syndrome (NS) and analyzed the function of ANGPTL3 for the pathogenesis of NS.

Methods: (1) we collected 41 fresh kidney biopsy specimens from normal renal tissue and different pathological types NS, including 5 normal controls, 8 cases with MCD, 12 with IgA nephropathy (IgAN), 9 with membranous nephropathy (MN), 3 with lupus nephropathy (LN), and 4 with focal segmental glomerulosclerosis (FSGS). Using laser microdissection system to dissect glomeruli and extract RNA. Real-time RT-PCR was used to determine the level of ANGPTL3 and synaptopodin mRNA in glomeruli; (2) Using immunohistochemical staining (IHC) to study the expression and distribution of ANGPTL3 and synaptopodin in 44 human renal tissue wax specimens (7 normal controls, 13 MCD, 6 IgAN, 8 MN, 5 LN, and 5 FSGS).
Results: ANGPTL3 mRNA level in glomerular of various pathological types were: FSGS>MCD>MN>IgAN>LN>normal control, in which FSGS and MCD were significantly higher than normal control (P=0.002 and 0.013, respectively). IHC showed that ANGPTL3 inFSGS (non-sclerotic glomeruli), MCD and MN was higher than normal control.
Conclusion: The level of ANGPTL3 inglomerular increased in different types of renal disease, especially in FSGS, MCD and LN groups. ANGPTL3 may devote for the development and progression of NS.

Abstract# P-SUN173
Evaluation of serum IgE levels as an indicator of risk factor in the patients with relapsing nephrotic syndrome

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Objective: Recently, the relationship between idiopathic nephrotic syndrome (NS) and the serum IgE levels (sIgE) has been reported, however the relation to sequela is still unknown. We investigated the relationship between the levels of sIgE and the frequency of relapses in the patients with relapsing NS this time.
Methods: We retrospectively analyzed 14 cases of steroid-sensitive NS (10 males and 4 females) in which the levels of sIgE were measured at the time of diagnosis. The normal IgE ranges were decided according to the patient's age, such as 1~3 years: <20 IU/ml, 3~5 years: <40 IU/ml, 5~10 years: <100 IU/ml, and >10 years: <170 IU/ml. The number of relapses was shown as the number of times seen in a yaer before the immunosuppressive drugs were started.
Results: The number of patients who was divided into the normal group (N group) was 2 and was divided into the higher group than normal range (H group) was 12. The H group had significantly higher the number of the relapses per year (3.43 vs 0.83; P<0.05) than the N group and higher ratio of treatment with immunosuppressive drugs (0 vs 7; P<0.01).
Conclusion: These results suggested that levels of sIgE at the time of diagnosis might be an indicator of the risk of relapsing NS.

Abstract# P-SUN174
Soluble urokinase plasminogen activator receptor (suPAR) in children with nephrotic syndrome

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Objective: Elevated plasma levels of suPAR correlate very tightly with occurrence of focal segmental glomerulosclerosis (FSGS). Patients with high titres of suPAR are in risk of developing recurrence of FSGS after kidney transplantation. Plasma exchange (PE) is efficient to reduce proteinuria in recurrent FSGS. Aim of our study was to measure suPAR levels in patients with nephrotic syndrome of different aetiologies to identify those who might benefit from plasma exchange.

Methods: We tested plasma levels of suPAR with standard sandwich ELISA in patients with steroid resistant nephrotic syndrome (SRNS), (patients after kidney transplantation with recurrence of FSGS in graft undergoing plasma exchanges, n=2. Patients with idiopathic FSGS n=3. Patients with minimal change disease MCD, n=4. Patient with genetically determined FSGS due to podocine mutation, n=1)
Results:suPAR was above the cut-off (3000 pg/ml) in both patients with recurrent FSGS. Plasma exchanges lowered the suPAR levels to 20%. Patients in idiopathic FSGS group had higher levels in two out of three cases. In MCD patients three out of four had levels under the cut-off and one had slightly elevated level. High levels were found in the patient with podocine mutation.
Conclusion:suPAR levels were sensitive for patients with recurrence of FSGS in graft and showed notable decrease after plasma exchange. Surprisingly high titre of suPAR found in the patient with podocine mutation suggests interplay of other factors in FSGS pathogenesis in these patients beyond mechanistic slit diaphragm disruption.
Supported by the project (Ministry of Health, Czech Republic) for conceptual development of research organization 00064203 (University Hospital Motol, Prague, Czech Republic)"

Diagnosis	Kidney biopsy histology	suPAR(pg/ml)
idiopathic SRNS, relapsing	FSGS	3523
idiopathic SRNS	FSGS	3906
idiopathic SRNS	FSGS	2835
frequently relapsing NS	MCD	1905
frequently relapsing NS	MCD	1938
steroiddependant NS	MCD	3187
idiopathic SRNS	MCD	2804
SRNS with podocinemutation	FSGS	4367
reccurence of FSGS in graft - prior PE	FSGS	3828
-after PE		894
reccurence of FSGS in graft - prior PE	FSGS	3281
- after PE		489

Abstract# P-SUN175
Prevalence of herpesviruses at onset of Idiopathic Nephrotic Syndrome

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Objective: Idiopathic nephrotic syndrome (INS) is likely a primary immune disorder. Viral infections have been suggested as a trigger of the onset and relapses of the disease. The aim of this study was to analyze the relationship betweenherpesviruses infection and the first manifestation of idiopathic nephrotic syndrome in children.

Methods: A prospective, multicentric and population-based, case-control study: NEPHROVIR included 164 patients aged 6 months to 15 years old, newly diagnosed with INS, and 233 controls matched on gender, age and period of sample. The analysis was done on 124 patients and 196 controls. EBV, CMV, HHV-6 and HHV-7 DNA prevalence at diagnosis were assessed out of whole peripheral blood samples, as well as EBV and CMV viral load and seroprevalence.
Results: EBV DNA was significantly more prevalent in cases than in controls (50,8 vs 29,1%; OR=2.6; p=0.0002), with no difference in viral load. A significant difference was also found for CMV (11.3 vs 3.6%; p=0.02) and HHV-7 (83 vs 72%; p=0.02) DNA prevalence between cases and controls. There were significantly more recent EBV and CMV infections based on VCA-IgM and CMV IgM in cases than controls, while there were no differences in IgGseroprevalence. A trend was also found between a positive CMV DNA and early steroid dependency outcome (OR 2.6; p=0.08).
Conclusion: The onset of idiopathic nephrotic syndrome is closely associated with the prevalence of EBV DNA.

Abstract# P-SUN176
Risk factors for frequent relapses and steroid dependency in Indian Children with Nephrotic Syndrome – Are they different?

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Objective: While an estimated 60% - 80% of the patient with Idiopathic Nephrotic syndrome experience at least one relapse after they have achieved complete remission, and almost one half show steroid dependency. Several attempts have been made to identify risk factors associated with frequent relapses and steroid dependency. To identify risk factors at onset for the occurrence of frequent relapses and steroid dependency in children diagnosed with Idiopathic Nephrotic Syndrome (INS).
Methods: Case control study conducted in Department of Pediatric medicine, S.M.S. Medical College, Jaipur, India. 165 Patients with diagnosis of INS in the age group 1-15 years, fulfilling the criteria of FR/SDNS served as study group and those with IFRNS as controls. Patients with SRNS and those with secondary causes were excluded. Detailed history, previous course, examination and investigations were recorded.
Results: Out of total 165 patients, 37 were FR, 48 were steroid dependent and 80 were IFRNS controls. 117(70%) were males and 48 (30%) were females. Mean age of onset was 3.8 years. Regime lesser than 6wks daily plus 6 wks alternate day (OR= 4.43, 95%CI =1.20-16.25), poor compliance (OR= 3.33,95% CI= 1.19-9.33) and initial remission time of >9 days(OR= 3.11, 95%CI=1.34-7.22) were significant risk factors for FR (p<.05) whereas remission time of more than 9 days (OR= 5.52,95%CI=2.38-12.76) and more than 3 relapses in first 6 months (OR= 33.60,95%CI=4.19-269.24)were significant risk factors for dependency(p<.05) when compared with IFRNS controls. Young age at onset(<2 years), low serum albumin(<2mg/dl) , concurrent URTI during relapses, and high cholesterol levels were other independent risk factors for relapses and dependency. Hematuria, hypertension and pulmonary tuberculosis had no relation with relapses and dependency
Conclusion: Various risk factors at onset may predict future course of disease.Risk factors in developing countries may differ.

Abstract# P-SUN177
The monocyte chemotactic protein-1 in children with the nephrotic syndrome during the cyclosporine A therapy.

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Objective: To establish the value of excrection of the monocyte chemotactic protein-1 (MCP-1) with urine for the diagnostics of degree of tubulointerstitial changes (TIC) in children with the nephrotic syndrome (NS) on cyclosporine A (CSA) therapy.
Methods: We examined 20 patients with steroidresistant NS and 12 – with steroiddependent NS who received the CSA therapy. Results of kidney biopsy showed mild TIC in 13 patients (damage to 1/3 of tubulars and interstition), moderate TIC – in 14 (damage to 2/3) and severe TIC – in 5 (more 2/3 damage). We carried out repeated kidney biopsy in 12 cases after 25±15,3 months from beginning of the CSA therapy. Urinary levels of MCP-1 as one of key markers of TIC were determinated by enzyme-linked immunosorbent analysis. The control group included 8 healthy children.
Results: The urinary MCP-1 level in children with NS (889±252.6 pg/ml) was significantly higher than in the control group (325±19.09 pg/ml, p<0.05). We found positive correlation between urinary level of MCP-1 and expression of TIC (R=0.71, p<0.05), but – negative correlation between urinary level of MCP-1 andSingular index PluralindexesGFR (R= –0.68, p<0.05) in children with NS. Results of repeated kidney biopsy showed progressing of TIC in 1/3 patients. Both correlations were observed also in children who demonstrated progression of TIC according to repeated kidney biopsy. The urinary MCP-1 level in these children was increased comparing with the previous results (1447.4±101.7 pg/ml and 879.03±38.4 pg/ml accordingly, p<0.05).
Conclusions: Relationship between urinary level of MCP-1 and expression of TIC is established in children with NS during CSA therapy. This fact allows to evaluate urinary MCP-1 level dynamics as a diagnostic test for an assessment of expression of TIC as the CSA therapy complication in these patients.

Abstract# P-SUN178
Quantitation of Serum and Urine Angiopoietin-like 3in Children with Nephrotic Syndrome

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Objective: In previous study, we found increased expression of angiopoietin-like 3 (ANGPTL3) in podocytes in children with nephrotic syndrome (NS). The aim of this study is to quantify the serum and urine ANGPTL3 levels in these children, and investigate their significance in disease progression.
Methods: Serum and urine ANGPTL3 concentration were detected by ELISA. Urine protein (Up), urine creatinine (Ucr), serum creatinine (Scr), blood urea nitrogen (BUN), triglyceride (TG) and total cholesterol (TC) levels were analyzed by automatic biochemical analyzer. Data statistics was analyzed by SPSS20.0
Results: From September 2012 to February 2013, serum and urine samples of 120 children (84 boys, 36 girls; age 6+/-4 yr) with nephrotic syndrome were analyzed. The average serum concentration of ANGPTL3 was 713.94+/-432.65ng/ml, higher than that of normal adult population (218 +/- 144ng/ml). The serum ANGPTL3 level was positively correlated with 24 h urine protein excretion (p=0.004), Up/ Ucr (p=0.006), TG (p=0.021), and TC (p=0.001), but not correlated with Scr (p=0.477) or BUN (p=0.717). Urine ANGPTL3 concentration was 1.94 + /- 1.97ng/ml, which had no difference with healthy children (n=8, 2.50 +/- 1.14ng/ml). The serum ANGPTL3 level varied in different pathological types: minor lesions and minimal change was 438+/- 200ng/ml (n=21), focal segmental glomerulosclerosis was 678+/- 361ng/ml (n=3), membranous nephropathy was 343+/- 169ng/ml (n=6), mesangial proliferative glomerulonephritis was 1112+/- 446ng/ml (n=4); membranoproliferative

glomerulonephritis (n=5) was 489+/- 247ng/ml. In terms of treatment response, no difference of serum and urine ANGPTL3 levels were found among steroid sensitive, steroid-resistant, or steroid-dependent NS group, as well as between the frequency relapse and non-frequency relapse group.
Conclusion: Our data showed that serum ANGPTL3 level was positively related to proteinuria and serum lipid level in NS, which indicated that it might be an important indicator of impaired podocyte function and lipid metabolism disorder. However, urine ANGPTL3 level had no relation to serum ANGPTL3 level, proteinuria, and serum lipid level in NS, clinical significance of it might be little.

Abstract# P-SUN179
Risk factors for frequent relapse in children with idiopathic nephrotic syndrome

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Objective: The purpose of this study was to determine the predictive risk factors of patients with steroid-sensitive nephritic syndrome (SSNS) that point to a high risk of frequent relapsed (FR) SSNS.
Methods: A retrospective study of 350 children with SSNS, followed up for at least 12 months in the past 10 years, was conducted. The cases were divided into FR group and non-FR group. Univariate analysis for continuous variables were carried out with *t* test in the two groups,while categorical variables were tested with chi-squared. The risk factors of continuous variables significantly deemed to frequent relapsing by univariate analysis were further analyzed with the Receiver Operating Characteristic (ROC) curve to determine the cut-off value. The continuous variables were converted into categorical variables at the cut-off value. Risk factors that were deemed to contribute significantly to FR after univariate analysis were further analyzed using the multivariate logistic regression model.
Results: In the 350 patients, there were 282 (80.6%) boys and 68 (19.4%) girls, with a median age at onset of 3.47 years (range 0.6-13 years). Ninety seven (22.3%) children had no relapses, 175(50.0%) had infrequent relapses, 97(27.7%) had frequent relapses. In univariate analysis, clinical classification, total protein(TP), low density lipoprotein-cholesterol(LDL-C) and erythrocyte sedimentation rate(ESR) at onset had statistical significance in FR children and NFR children. The logistic regression analyses revealed that TP<33g/L(OR:3.911, 95%CI:1.630~9.382;P=0.002) and LDL-C≥6.7mmol/L (OR:3.153, 95%CI:1.640~6.061; P=0.001) were independent risk factors of FR.
Conclusion: About 27.7% cases of pediatric SSNS would frequently relapse even in regular glucocorticoid treatment. Low values of TP and high values of LDL-C are the independent risk factors of FR and should be well documented.

Nephrotic syndrome: Therapeutic protocols

Abstract# P-SUN180
Curative effects of ACEI combining with steroids for infant nephrotic syndrome

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Objective: To investigate the protective effects of angiotensin-converting enzyme inhibitor (ACEI)combining with Steroids for infant nephrotic syndrome.
Methods The 42 children (26 boys and 16 girls) with primary nephrotic syndrome (PNS) were randomly assigned to treatment group (25 children) and control group (17 children). All patients received prednisone (1.5~2.0mg/kgd) for 4~12weeks. The treatment group received ACEI at the same time. The level of each index was measured at the 4th and 12th week. The indexes include: quantitation of 24-hour urine protein, serum levels of blood urea nitrogen (BUN), total albumin (Alb), beta2-microglobulin (beta2-MG) and creatinine clearance rate (Ccr). Total cholesterol (TC), triglyeride (TG), very-low-density lipoprotein (VLDL), low-density lymphocyte (LDL), high density lipoprotein (HDL), lipoprotein-a (LP-a). Prothrombin time (PT), activated partial thromboplastin time (APTT), plasma fibrinogen (Fib) and D-dimer.
Results Treatment group showed an obvious improvement in all biochemical indicators except Ccr, PT and APTT compared with the control group ($p<0.05$ or $p<0.01$).
Conclusion: Combination ACEI and steroids for infant nephrotic syndrome is improving the state of proteinuria, lipids and hypercoagulabale. This therapy is protective for the renal functions of PNS children.

Abstract# P-SUN181
Retrospective study of treatment outcomes with steroid sparing agents in children with Nephrotic Syndrome (FRNS/SDNS/SRNS)

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Objective: To assess the efficacy of steroid sparing agents in maintaining remission in patients with primary and secondary NS - FRNS/SDNS/SRNS.
Methods: Retrospective study of outpatients and inpatients attending The Pediatric Nephrology Clinics at Pimpri and Pune and D.Y.Patil Medical College was done. 1. All patients with initial SDNS were started on cyclophosphamide at a dose of 2 - 2.5 mg/kg/day with a total cumulative dose not exceeding 167mg/kg for 8-12 weeks with two weekly monitoring of complete blood count. 2. All patients with initial FRNS were started on Levamisole 2.5mg/kg single dose alternate day for a minimum of 12 months to 2 years with monthly monitoring of complete blood count . 3. Patients who showed poor response to Cyclophosphamide were started on Levimasole and vice versa. 4 Patients who showed poor response to both Cyclophosphamide and Levamisole were then started on Mycophenolate mofetil (MMF) for 6 months to 2 years in a dose of 750mg-1g/m^2/day or 30mg/kg/day. 5. Patients with initial steroid resistance were commenced on CNI's-Cyclosporine or Tacrolimus for 6 mths to 2 years.
Results: 1. Excellent response: defined as sustained remission for at least 6 months after stopping the drug. 2. Moderate/ good responses: defined as a) a partial response (urinary protein creatinine ratio 0.2- 2) and/or b) sustained remission for at least 1- 6 months after stopping the drug. 3. Poor response: defined as either a) no response (urinary protein creatinine ratio more than 2), and/or b) lack of sustained remission for at least 1 month after stopping the drug, and/or c) relapse while on the drug.
Conclusion: 88% patients (135/154) with SDNS/FRNS showed a good to excellent response to Cyclophosphamide 74% patients (54/68) with SDNS/FRNS showed a good to excellent response to Levamisole 85% pts (24/28) with SDNS/FRNS showed a good to excellent response to MMF (these are the ones who showed a poor response to both Cyclophosphamide and Levamisole). 70% pts (18/26) with SRNS showed a good to excellent response to CNI's, 90% (16/18) being MCD and 10% (2/18) being FSGS 30% pts (8/26) with SRNS who showed a poor response to CNI's were all non-MCD.

Abstract# P-SUN182
Incidence of Infection related relapses among children with nephrotic syndrome on probiotics at National Kidney and Transplant Institute

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Objective: To estimate the incidence of infection related relapses among patients with nephrotic syndrome given with probiotics.
Methods: This is a prospective descriptive study. Children diagnosed with nephrotic syndrome at National Kidney and Transplant Institute were given Ohirra Mountain Extract (OMX) probiotics twice a day for 6 months. The frequency of relapses was determined at three and six months of supplementation.
Results: Among the 20 children included in the study, only 1 (5%) relapsed at 3 months and none on the 6th month. Their age ranged from 2 years to16 years with a mean of 8.35 years.
Conclusion: Findings in this trial suggest that OMX supplementation results in a trend towards remission and reduced infection related relapses among nephrotic syndrome patients.

Abstract# P-SUN183
Efficacy of Oral Galactose in Children with Steroid Resistant Idiopathic Nephrotic Syndrome

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Objective: Children of idiopathic steroid resistant nephrotic syndrome having focal and segmental sclerosis (FSGS) histopathology is sometimes associated with a permeability factor, FSGS permeability factor (FSPF). Galactose administration binds with it forming complexes and prevents its interaction with glomerular glycocalyx, and hence can help in reduction of proteinuria.
Methods: Three cases (2 females) of steroid resistant idiopathic nephrotic syndrome having FSGS histopathology, aged 8 yr, 12 yr and 13 yr, and normal glomerular filtration rate (85- 92 ml/min/1.73m^2) unresponsive to minimum of 3 months course of Cyclosporine and Prednisolone were given oral Galactose (0.2 g/Kg twice daily for 90 days) as an add on therapy. NPHS2 gene mutation was also tested before treatment. Patients were monitored for urinary protein/creatnine ratio (mg/mg), serum albumin (g/dL) and cholesterol (mg/dL) levels and oedema in pre and post- galactose period.
Results: NPHS2 gene mutation was absent in 2 cases and one had R229 Q polymorphism. Urinary protein/ creatinine showed marked reduction at 90 days of galactose therapy in comparison to their pre-galactose levels (7.9 vs 4.9, 13.8 vs 3.1 and 7.7 vs 3.8). Similarly serum albumin increased (2.5 vs 3.9, 3.0 vs 3.7 and 2.5 vs 4.3) and cholesterol values decreased (306 vs 156, 206 vs 188 and 244 vs 142) at 90 days of post -galactose treatment. There was decrease in oedema also. However, parameters showed deterioration (increase of urinary protein/creatinine and cholesterol and decrease in serum albumin levels); repeated after 3 months of stoppage of galactose despite continuation of immunosuppressive therapy.
Conclusion: It appears that oral galactose is a promising adjunct treatment in reduction of proteinuria in these patients. However, larger trials along with evaluation of FSPF can further confirm its usefulness.

Abstract# P-SUN184
Methotrexate in Steroid Dependant Nephrotic Syndrome:a case series

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Objective: To analyse the effect of Methotrexate on patients with steroid dependant nephrotic syndrome (SDNS). Patients with nephrotic syndrome who develop steroid toxicities, yet remain steroid dependant despite treatment with Levamisole and Cyclophosphamide, are usually offered options of Mycophenolate mofetil, Calcineurin inhibitors and Rituximab. However such therapies are not financially possible for many patients in developing countries. Methotrexate (MTX) has been used effectively and safely as an immunomodulant in pediatric Rheumatoid Arthritis and Psoriasis, and has a relatively low cost of therapy. T-cell mediated immune dysregulation occurs in both these conditions as well as in Nephrotic Syndrome.
Methods: MTX was used in 15 steroid toxic SDNS patients pre-treated with Levamisole and Cyclophosphamide, who had refused other options for financial reasons. Parental informed consent and institutional ethics committee approval was obtained. MTX was given in a dose of 10 to 15 mg/m^2/week, for a mean of 13 months. Regular clinical and laboratory monitoring was performed.
Results: During MTX therapy, the mean steroid threshold dose reduced from 13.83 mg/alternate day to 4.33 mg/alternate day (p=0.0003). Eleven patients showed good response:- 6 lost steroid dependant status with 2 having no relapses, and 4 having infrequent relapses, while five patients remained steroid dependant but the mean threshold steroid dose was reduced by 79%. In 4 patients there was no change in steroid requirement. Nine out of 11 responders completed 1 year of follow up after stopping MTX, 4 resumed a steroid dependant course while 5 had infrequent relapses.
No hematological, hepatic or gastro-intestinal side-effects occurred.
Conclusion: Although a small series, this data suggests that MTX may have an important utility in SDNS, where Levamisole and Cyclophosphamide have been ineffective, providing a breakthrough for patients in whom other options of steroid sparing therapy cannot be pursued. Larger studies are justified to confirm our findings.

Abstract# P-SUN185
The Efficacy of Atorvastatin an Adjunct Therapy in Decreasing Proteinuria in Children with Difficult To Treat Nephrotic Syndrome: A Randomized Controlled Trial

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Objective: To determine the effect of Atorvastatin in proteinuria, renal function and lipids in difficult to treat nephrotic syndrome
Methods: The efficacy of Atorvastatin as an adjunct medication was prospectively analyzed. A total of 41 children between 10-16 years old considered to have difficult to treat nephrotic syndrome were included in the study. Consent and assent forms were obtained. Baseline urinalysis, spot urine protein creatinine ratio, serum creatinine, albumin, lipid profile, ALT, AST and CPK were requested prior to start of therapy and monthly for the next 2 months. Secondary causes of nephrotic syndrome were ruled out. In cases of relapse secondary to infection, antibiotic was initiated in addition to treatment regimen. Outcome measures are changes in urine protein excretion and GFR, its effect on lipid levels as well as safety and tolerability of the drug. Repeated comparisons for renal and liver function tests were performed using repeated measures of ANOVA. All p values < 0.05 statistically significant.
Results: A total of 41 patients with difficult to treat nephrotic syndrome met the inclusion criteria and were included in the final analysis. Twenty three patients (56%) received atorvastatin, immunosuppressant and enalapril while eighteen subjects received immunosuppressant and enalapril only (44%) . The two groups were comparable in all baseline clinical and laboratory variables. (All p-values >.05). Proteinuria was significantly lower in the treatment arm after three months (mean values for month 1,2,3=2.3, 2.89,2.1,1.3, respectively, p=. 049).

Estimated creatinine clearance significantly improved (mean=157.1, 167.8, 172.1, p=. 012). All parameters for toxicity were within normal range.
Conclusion: Atorvastatin as adjunct therapy is effective in reducing proteinuria and improving renal function in difficult to treat nephrotic syndrome.

Abstract# P-SUN186
Actual outcome and problems associated with cyclosporine treatment in children with steroid-sensitive nephrotic syndrome

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Objective: A problem of cyclosporine (CyA) treatment in children with frequent-relapsing or steroid-dependent nephrotic syndrome (FRNS/SDNS) is that most patients relapse when CyA is withdrawn, thus necessitating prolonged treatment and increasing the risk of adverse events, including nephrotoxicity. However, few reports have shown therapeutic efficacy and failure of CyA administration.
Methods: We retrospectively investigated clinical data from FRNS/SDNS patients who first started to receive CyA between 2000 and 2008. CyA was given for at least 2 years, and kidney biopsy was performed before and after CyA therapy.
Results: Thirty-three patients were enrolled. The age at the start of CyA, the length of CyA treatment, and follow-up duration were 8.1+/-0.9, 4.9+/-0.4, and 10.8+/- 0.7 years, respectively. Fifteen patients restarted CyA because of difficultly in controlling relapses after discontinuation. Ten patients were frequent relapsers during CyA administration and seven first relapsed 1 year after initiation of CyA. Four patients showed arteriolar hyalinosis from a kidney biopsy and all of them had confirmation of amelioration during the course. The estimated glomerular filtration rate at the last visit was 128+/-7 ml/min/1.73m^2.
Conclusion: Our study showed that many patients receive prolonged administration of CyA to prevent relapses. This finding partially advocates the KDIGO recommendation that CyA be given for at least 12 months. Administration of CyA for a relatively long period may be safe. Our study also showed that tachyphylaxis, the acquisition of tolerance for CyA, is likely to be a critical problem. Further studies are required to clarify risk factors of tachyphylaxis, and to develop a more promising treatment strategy for FRNS/SDNS.

Abstract#P-SUN187
MANNITOL - A NOVEL THERAPY FOR REDUCING SEVERE EDEMA IN CHILDREN WITH NEPHROTIC SYNDROME

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Objective: The potent diuretic effect of Mannitol in management of severe edema in children with nephrotic syndrome has not been adequately studied though literature reports it to be safe, effective and a possible inexpensive alternative to 20% Albumin. To study the efficacy and safety of mannitol in reducing severe edema in childhood onset nephrotic syndrome.
Methods: A Prospective Observational pilot study was conducted in the Pediatric Nephrology Division of Christian Medical College, Vellore from March 2011 to November 2011. Children between 1-15 years old with proven nephrotic syndrome and persistent edema despite 3 days of frusemide, with none of the exclusion criteria (secondary nephrotic syndrome, low GFR, abnormal blood pressure, cardiac failure, coexisting severe infection) were recruited. Mannitol (20%) 1 gm/kg infusion with frusemide 2 mg/kg/dose midway was given twice daily for 3 days. Children were uniformly assessed for edema based on a devised grading scale, weight changes, abdominal girth, urine output and adverse events. Results were compared with similar data while on frusemide. Statistical analysis using SPSS and Epidata was done and Student t test was applied.
Results: 20 children were recruited. Reduction in edema by 2.1 grades after mannitol and 0.2 grades after frusemide was statistically significant (p=0.00). At 72 hours, mean percentage weight loss was higher after mannitol compared to frusemide (9.3% vs. 4.83% (p = 0.07). Mean abdominal girth reduction by 3.8 cms after mannitol was statistically significant when compared to 0.9 cms after frusemide (p=0.05). Side effects of mannitol noted were hyponatremia, hypokalemia and hyperkalemia in 3/20, reduced creatinine clearance (2/20) and hypernatremia and hypotension in 1/20 each.Similar effects were also seen after frusemide with hyponatremia in 1/20, hypokalemia in 2/20 and reduced Creatinine clearance in 1/20..
Conclusion: Mannitol shows promise as a safe and efficacious diuretic in reducing edema in Nephrotic syndrome. A Randomized control trial comparing its efficacy against the more expensive albumin may be helpful in promoting its use in resource poor countries.

Abstract#P-SUN188
Two-Year Outcome of the ISKDC Regimen and Frequent-Relapsing Risk in Children with Idiopathic Nephrotic Syndrome

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Objective: The purpose of this study is to clarify two-year outcome of the ISKDC regimen and frequent-relapsing risk in children with idiopathic nephrotic syndrome.
Methods: The relapse status and clinical data of patients previously registered (January of 1993 to December of 2001) in a multicenter prospective study of the International Study of Kidney Disease in Children regimen were analyzed for risk of frequent relapsers over a 2-year follow-up period.
Results: Of 166 children with nephrotic syndrome (113 boys and 53 girls; median age=5.1 years), 145 (87.3%, median age=5.5 years) children were steroid-sensitive, and 21 (12.7%, median age=2.9 years) children were steroid-resistant. Of 145 children with steroid-sensitive nephrotic syndrome, 32 (22.1%, median age=4.2 years) children experienced frequent relapses over 2 years. The time to initial response was significantly longer (10 versus 7 days, P<0.001, log-rank test) in the 32 frequent relapsers than in the 106 nonfrequent relapsers. The time from start of initial treatment to first relapse was significantly shorter (2.6 versus 6.1 months: P<0.001, log-rank test) in the 32 frequent relapsers than in the 57 infrequent relapsers. In a Cox regression model, the time to initial response >=9 days and the duration from start of initial treatment to first relapse <6 months were significant predictors of frequent relapses (unadjusted and adjusted).
Conclusion: Initial remission time >=9 days and first relapse within 6 months were associated with frequent relapses. These findings may also be useful also in selecting potential frequent relapsers for clinical trials.

Abstract# P-SUN189

Genetic and in vivo determinants of glucocorticoid sensitivity in relation to clinical outcome of childhood nephrotic syndrome

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Objective: Following initial glucocorticoid treatment, children with nephrotic syndrome display a variable clinical course with multiple relapses in the majority of patients. We hypothesized that intrinsic sensitivity to glucocorticoids may be a determinant of this variability. Functional polymorphisms of the *NR3C1* gene, which encodes for the glucocorticoid receptor, have been associated with either relatively impaired glucocorticoid sensitivity (GR-9β) or increased glucocorticoid sensitivity (*Bcl*I). In addition, low dose dexamethasone challenge tests may reflect in vivo glucocorticoid sensitivity.

Methods: In a prospective, well-defined cohort of children with nephrotic syndrome, we determined carriage of GR-9β+TthIII-1 and *Bcl*I haplotypes (n=113), and performed a 200 μg/m^2 dexamethasone suppression test (n=90). These parameters were subsequently evaluated in relation to clinical course.

Results: Median follow up was 4.4 years (IQR 3.3-5.0). Carriers of the GR-9β+TthIII-1 haplotype demonstrated a higher incidence of frequent relapses compared to non-carriers: 19/25 (76%) vs 37/75 (49%), adjusted (gender and descent) Hazard Ratio (aHR) 1.93; 95% Confidence Interval (CI) 1.03-3.62, p=0.041. Both the occurrence of a first relapse and steroid dependence were seen more often in GR-9β+ TthIII-1 carriers than in non-carriers: aHR 1.73 (95% CI 1.01-2.95), p=0.045 and 2.79 (95% CI 1.27-6.13), p=0.010 respectively. There were no significant differences in therapeutic outcomes between carriers of the *Bcl*I haplotype and non-carriers. Side effects were not related to either of the genetic variations. Results of the low dose dexamethasone test revealed no associations with clinical outcome.

Conclusion: Sensitivity to glucocorticoids, in particular carriage of the GR-9β+TthIII-1 haplotype of the glucocorticoid gene, offers new insights into the clinical course of children with nephrotic syndrome.

Abstract# P-SUN190

Population pharmacokinetics of prednisolone in relation to clinical outcome in children with nephrotic syndrome

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Objective: The relapse frequency in children with nephrotic syndrome is highly variable, despite standardized prednisolone treatment regimes. The current study was undertaken to evaluate this clinical variability in relation to between-subject variability in prednisolone exposure.

Methods: We analysed pharmacokinetics of prednisolone in a well-defined, prospective cohort consisting of 104 children with steroid sensitive nephrotic syndrome while in remission. Non-invasive salivary prednisolone measurements were performed using a sparse sampling strategy. A population pharmacokinetic approach (with NONMEM) was used to derive individual estimates of apparent clearance (Cl/F) and apparent volume of distribution (V/F) from the salivary concentration-time curve, followed by calculation of the area under the curve (AUC) of non-protein bound (free) serum prednisolone. Genetic polymorphisms of *CYP3A4*, *CYP3A5*, *ABCB1*, *NR1L2* and *POR* were explored in relation to between-subject variability of Cl/F and V/F.

Results: The individual free serum prednisolone exposure from prednisolone in saliva was derived from the salivary concentration-time curves. Low to moderate inter-individual variability was found for Cl/F and V/F (CV 23.8% and 11.1%, respectively), which was not related to genotype. Exposure to free prednisolone (AUC) was not associated with (frequent) relapses or side effects.

Conclusion: This study resulted in new steps towards the possibility of prednisolone drug monitoring through salivary measurements. These observations may be of particular interest to pediatric populations. However, we conclude that it is unlikely that variability in prednisolone exposure in the therapeutic dose range studied is a major determinant of clinical outcome in children with NS.

Abstract# P-SUN191

Cyclosporine C2 monitoring for the treatment of frequently relapsing nephrotic syndrome in children: A multicenter randomized trial

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Objective: Japanese Study Group of Kidney Disease in Children (JSKDC) conducted an open-label multicenter randomized controlled trial (JSKDC03) to identify the better of two protocols for treating children with frequently relapsing nephrotic syndrome (FRNS) using microemulsified cyclosporine (mCyA).

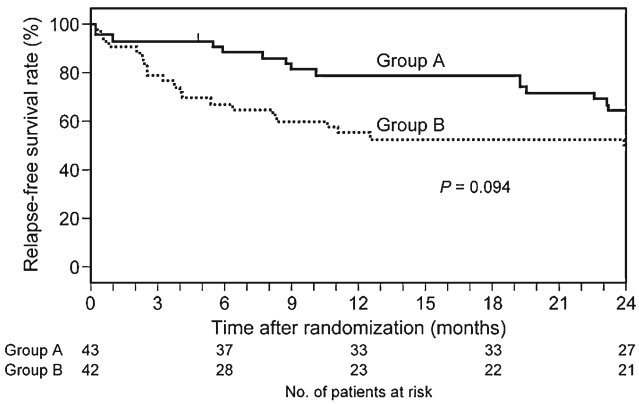
Methods: We enrolled Ninety-three children with FRNS from 15 centers in Japan and randomly assigned them to Group A (n=46) or Group B (n=47). In both groups, the 2-h post-dose cyclosporine level (C2) was monitored. For Group A, the C2 target was set to 600-700 ng/ml for the first 6 months and 450-550 ng/ml for the next 18 months;

for Group B, it was set to 450-550 ng/ml for the first 6 months and 300-400 ng/ml for the following 18 months. The primary endpoint was the sustained remission rate (SRR) at 24 months. When there was no difference in safety profile between the two groups and the SRR in Group A was superior with a decision threshold of 8% to Group B, the regimen for Group A was to be selected as the better treatment. Otherwise the regimen for Group B was to be selected.

Results: At 24 months, the SRR was higher in Group A than in Group B (64.4% vs. 50.0%, P =0.094) (Figure 1), as was the progression- (to FRNS) free survival rate (88.1% vs. 68.4%, P = 0.028). The relapse rate in Group A was lower compared to that in Group B (0.410 vs. 0.945 times/person-years, P = 0.016). The rate and severity of adverse events including chronic cyclosporine nephrotoxicity were similar in both treatment groups.

Conclusion: We identified that the C2 monitoring regimen for Group A was better than that for Group B.This study was supported by a grant from the Ministry of Health, Labour and Welfare, Japan (H15-shouni-002) and has been registered in a public trials registry, the University Hospital Medical Information Network (UMIN-CTR: C000000008).

Figure 1. Relapse-free survival probability (Kaplan-Meier curves)



Abstract# P-SUN192

Mycophenolate Mofetil Therapy in Children with Idiopathic Membranous Nephropathy

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Objective: Idiopathic membranous nephropathy (IMN) is a rare form of childhood nephropathy. To date there are no standardised protocols of management for this condition in children. The aim of this study is to report on 4 children with IMN who were treated with mycophenolate mofetil (MMF).

Methods: MMF was given in combination with low dose steroids and angiotensin converting enzyme antagonists in a dose of 1200mg/m^2 body surface area in 2 divided doses for a minimum of 6 months.

Results: All children had histopathological findings in keeping with stage III membranous nephropathy. At the last hospital visit, 3 children had achieved a >50% reduction of proteinuria with preservation of renal function. One patient who failed to respond progressed to stage III chronic kidney disease. None of the children who were treated with MMF experienced any major side effects of the drug.

Conclusions: MMF, administered over a limited period, served as a safe and effective immunosuppressive agent in the treatment of this condition, in conjunction with low dose steroids and angiotensin converting enzyme inhibitors. Large multicentre randomised studies of children with IMN are necessary to assess the efficacy and long-term safety of MMF.

Abstract# P-SUN193

The comparison between three types of immunosuppressant

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Objective: To compare the efficacy and safety of Tacrolimus, Cyclophosphamide and Tripterygium glycosides treatment of children with frequently relapsing nephrotic syndrome (FRNS) .

Methods: A retrospective study of 67 cases of children clinically diagnosed with FRNS from October 2001 to January 2012 in Tianjin Children's Hospital. Observed the remission rate, remission maintaining time, the frequency of recurrence, and hormone dosage reduction after tacrolimus Division (TAC), cyclophosphamide (CTX), and Tripterygium glycosides (TG) treatment. The Observation and follow-up time after the medication lasts 24 months.

Results: 1.TG group efficacy: There are 35 cases in this group, including 23 male patients and 12 females. The age of onset is 1.2-15.6 years old with an average of 6.1 +/- 3.6 years old. This group includes 23 simplex cases and 12 cases of nephritis. Pathological type: two cases of minimal change nephropathy (MCD). The course of medication is from 9 to 72 months. The hormone dosage is 35.7 +/- 13.3 mg / d before the treatment. The recurrence rate of the year before medication is 5.2 +/- 2.9. Cumulatively 19 cases achieved complete remission after 12 weeks treatment, and the response rate was 54.3%; Cumulatively 20 cases achieved complete remission after 24 weeks treatment, and the response rate was 57.1%. Time required to achieve a complete remission is 120.7 +/- 48.3 days; The average amount of hormones usage in the same period of time after treatment was 30.5 +/- 11.6 mg / d, and the dosage difference compared with before was not statistically significant (P> 0.05). The remission maintaining time after treatment is 1 to 10 months with a median of 5.8 months. The recurrence rate after medication is 4.9 +/- 2.8 times, and the difference compared with before was of no statistical significance (P> 0.05). 2.CTX group efficacy: There are 20 cases in this group, including 13 male patients and 7 females. The age of onset is 1.5-15.8years old with an average of 6.5 +/- 3.8years old. This group includes 15 simplex cases and 5 cases of nephritis. Pathological type: three cases of minimal change nephropathy (MCD) ,one case with focal segmental glomerulosclerosis (FSGS). The course of medication is from 9 to 80 months. The hormone dosage is 36.5 +/- 12.9 mg / d before the treatment. The recurrence rate of the year before medication is 5.3 +/- 2.8. Cumulatively 14 cases achieved complete remission after 12 weeks treatment, and the response rate was 70.0%; Cumulatively 16 cases achieved complete remission after 24 weeks treatment, and the response rate was 80.0%. Time required to achieve a complete remission is 60.8 +/- 30.2days; The average amount of hormones usage in the same period of time after treatment was 20.5 +/- 8.6mg / d, and the dosage difference compared with before was statistically significant (P< 0.05).The remission maintaining time after treatment is 4 to 15 months with a median of 12.3months. The recurrence rate after medication is 2.1 +/- 0.8 times, and the difference compared with before was statistical significance (P < 0.05).The remission maintaining time after treatment is 10 to 24 months with a median of 17.8months. The recurrence rate after medication is 1.5 +/- 0.5times, and the difference compared with before was statistical significance (P 0.05); The differences between complete remission rate achieved after 12 weeks treatment, complete remission rate achieved after 24 weeks treatment, the time required to achieve complete remission, the average amount of hormones usage in the same period of time after treatment, remission maintaining time after medication, and the annual recurrence rate after medication among the three groups were statistically significant. The result is as

follows, TAC group is better than the CTX group, and the CTX group is better than the TG group ($P < 0.05$). The TG group has eight cases with aminotransferase abnormality, and five cases with hair loss; CTX group has 5 cases with alopecia, six cases with neutropenia, and three cases with menstrual disorders. The TAC group has lower incidence rate of adverse reactions than the TG group and CTX group ($P < 0.05$)
Conclusion:TAC and CTX treatment can both effectively control the FRNS disease and reduce the relapse rate; However TAC is more effective than CTX and has fewer side effects. TG has no obvious advantage in the efficacy of FRNS treatment.

Abstract# P-SUN194
ACTH Gel for Treating Steroid Resistance (SR) and Oral Steroid Intolerance (OSI) in Pediatric Minimal Change Nephrotic Syndrome (MCNS)

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Objective: Adrenocorticotropic hormone (ACTH) was used in the 1950s, prior to the introduction of oral synthetic steroids, to remit nephrotic syndrome in children. Recently, it has been reintroduced for standard treatment-resistant nephrotic adults. The goal of this case series was to assess the potential of subcutaneously (SQ) injected ACTH for treating MCNS in patients with SR and OSI.
Methods: Patients were diagnosed with OSI if they experienced spitting, vomiting, and refusal to take oral steroids. Three MCNS patients, 2 with OSI and 1 resistant to standard therapies, were treated with 40 units of ACTH. Complete remission was defined as negative or trace proteinuria, and partial remission as a decrease in proteinuria to 1+ or 2+ from 3+ along with an increase in serum albumin and a decrease in peripheral edema.
Results: Case 1 (4 y.o. M)demonstrated OSI with infrequent relapsing, followed by frequent relapsing (FR) and then steroid-dependent patterns. ACTH promptly induced remission. Case 2 (2 y.o. F) had OSI with a FR pattern, and ACTH promptly induced sustained remission. Case 3 (5 y.o. F) had SR MCNS and was tacrolimus-dependent. ACTH failed to induce remission. It was determined that ACTH 40 units SQ daily was an effective dose in steroid-responsive young children, and it was well tolerated in all 3 cases.
Conclusion: Daily ACTH induced prompt remission for 2 steroid-sensitive pediatric patients who had OSI. Case 3 was resistant to multiple previous interventions, as well as ACTH. Treatment with ACTH was well tolerated by all 3 patients and provided a relief for families who had struggled with administering oral steroids. ACTH dosing was empiric and therefore needs further refinement, and use in SR patients needs additional research. In conclusion, studies on patients with OSI and SR are needed to examine the potential use of SQ ACTH when standard steroid therapy fails.

Abstract# P-SUN195
The changes of T regulatory cell and cytokines in children with nephrotic syndrome at pre-and post-treatment assist with huaiqihuang particles

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Objective: The purpose of the present study was to observe the dynamic changes of T regulatory (Treg) cells and cytokine in children with primary nephrotic syndrome (PNS) and the effect of huaiqihuang particles on the infection and relapse of the patients.
Methods: The study cohort was composed of 59 children with PNS which were randomly divided into group A (32cases) and group B (27cases). Group A was treated with prednisone and Huaiqihuang particles, while group B treated with prednisone only. Additional 13 healthy children were served as control group (group C). Flow cytometric analysis was performed to dertemine Treg in the peripheral blood mononuclear cells (PBMCs) in all children per-and post-treatment treatment, cytokines were measured by enzyme linked immunosorbent assay in all the children.
Results: (1) The absolute number of Tregs in PBMCs and the concentration of IL-10 in serum in patients with PNS were found to be declined compared with healthy children, those variables were increased in group A after 3 months treatment. Before treatment the concentration of IL-6, IL-17, TGF-β1 in both A and B groups were increased compared with the control group. (2) During 3 months treatment the infection times of group A (0.16 time each patient) were fewer than group B (0.41 times each patient).
Conclusion: The decrease of Treg cells and disequilibrium of cytokine may play an important role in the pathogenesis of PNS. Huaiqihuang particles can reduce the times of infection in the patient with PNS, maybe by elevating the number of Treg in PBMCs.

Abstract# P-SUN196
Mycophenolate mofetil (MMF) for severe steroid-dependent nephrotic syndrome (SDNS)

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Objective: While chronic steroid therapy has important side effects in SDNS, the indication and interest of the different steroids sparing strategies are not yet completely defined.
Methods: Retrospective single-centre study of pediatric SDNS treated with MMF from January 2003 to August 2012. Patients previously treated with ciclosporine were excluded. Statistical analysis was carried out using non-parametric Wilcoxon test; results are expressed as median [range].
Results: 84 children aged of 8.1 [1.8-16.6] years at MMF initiation, with an exposure to steroids of 1.9 [0.1-13.5] years, were treated with MMF during 2.8 [0.1-8.4] years. 18 children received cyclophosphamide (N=14) and/or levamisole (N=10) prior MMF. Steroid dependency threshold at MMF initiation was 10.1 [0-61.5] mg/m^2/day. The relapse rate decreased from 2.3 [0-13.9] to 0.2 [0-5.6] per year with MMF ($p<0.001$). Among the 46 patients receiving MMF because of a decreased growth velocity, the delta Height-SDS between diagnosis and MMF initiation was -1.2 [-3.6 to -0.3] whereas the delta Height-SDS between MMF initiation and the end of follow-up was +0.3 [-1.3 to +2.2] ($p=0.006$). An average of 1.9 pharmacokinetic profile per patient was performed, followed by doses modification in 45% of cases (22% increase, 23% decrease). Steroids were discontinued in 73/84 children, 4.4 [0.9-76.8] months after MMF initiation but had to be re-initiated in 35 cases, with 56/84 steroid-free patients at the end of follow-up. Another immunosuppressive agent was started in 7 patients, 8 [5-43] months after MMF initiation; these patients were therefore excluded for further analysis. Tapering MMF was applied in 39/84 children after 21 [9-60] months, followed by a relapse in 9 children still on MMF (dose: 500 [149-1500] mg/m^2/day). MMF was withdrawn in 17/84 after 29 [13-57] months of therapy. This withdrawal was followed by a relapse in 10/17 cases after 5.6 [0.3-30.7] months; the follow-up without relapse in the remaining 7 patients was 13 [2.3-29.9] months.
Conclusion: MMF is efficient and safe in severe pediatric SDNS, aiming at steroid sparing to allow enough catch-up growth but with frequent relapses when MMF is tapered or stopped.

Abstract# P-SUN197
FOCAL SEGMENTAL GLOMERULOSCLEROSIS (FSGS) IN PEDIATRICS: COMPARISON OF PATIENTS ENROLLED IN AN OBSERVATIONAL VERSUS INTERVENTIONAL TRIAL

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Objective: FSGS is a rare disease that presents with proteinuria or nephrotic syndrome (NS) and which can progress to ESKD. Extensive research is being performed into the pathogenesis and treatment of FSGS. To determine if the clinical features of patients with FSGS who are enrolled in an observational study are comparable to those of participants in interventional randomized controlled trials (RCT).
Methods: Two pediatric (age <18 yr) cohorts were assessed: (1) NEPTUNE, an ongoing incipient NS observational cohort and (2) FSGS Clinical Trial (CT), an RCT that evaluated cyclosporine vs the combination of mycophenolate mofetil and dexamethasone. Only children with FSGS from the NEPTUNE cohort were included in this analysis. Common data include: age at entry, gender, race/ethnicity, disease duration, prematurity history, smoking exposure, family history of kidney disease, hypertension (HTN), use of BP meds at entry, presence of edema, serum creatinine, albumin, cholesterol, Hct, eGFR, and proteinuria. Data were analyzed with t-test or Chi-square.
Results: FSGS CT (n=93) and NEPTUNE (n=54) pediatric subcohorts were included. Differences between the cohorts are shown in the Table. Gender, disease duration, prematurity or family history, smoking exposure, serum creatinine and albumin, and proteinuria were similar in the FSGS CT and NEPTUNE groups.
Conclusion: Our data suggest that for patients with a specific renal disease such as FSGS, those who enroll in observational cohorts may differ in meaningful ways from those who participate in RCTs. The reasons for these differences require further study and need to be accounted for before generalizing the findings from one type of study to all patients with the clinical illness.

	FSGS CT (n=93)	NEPTUNE (n=52)	P
Age at entry (yr) (mean+/-SD)	11.0 +/- 4.6	9.0 +/- 5.0	<0.01
Race/ethnicity	W 58%, B 35%, H 20%	W 44%, B 42%, H 14%	<0.01
HTN at entry	53%	29%	<0.01
Presence of edema	67%	42%	<0.01
Hematocrit	41 +/- 5	39 +/- 5	<0.02

Abstract# P-SUN198

The follow-up after cyclophosphamide therapy in steroid-resistant,-dependent and frequently relapse nephrotic syndrome

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Objective: To investigate the efficacy and safety of cyclophosphamide (CTX) in the treatment of steroid-resistant (SRNS), frequently relapse (FR) and steroid-dependent nephrotic syndrome (SDNS) in children.
Methods: A retrospective study was made on thirty-two children diagnosed as idiopathic nephrotic syndrome(INS) with SRNS, FR or SDNS who were admitted to the Children's Hospital Affiliated to Capital Institute of Pediatrics from January 1986 to October 2011. Group 1 consisted of 20 children (17 boys, 3 girls) age range 1.3-13.2(mean 6.3+/- 4.1) years. Renal biopsy was performed in ten cases, consists of 8 FSGS, 2 MsPGN. At the start of their disease, 14 were steroid resistant, 6 were steroid sensitive, but following several relapses, they became steroid resistant. 17 cases received MP before CTX. The cumulative dosage range 72-180(mean 116.7+/- 40.6) mg/kg. Group 2 consisted of 12 children (10 boys, 2 girls) age range 1.5-10.0(mean 4.3+/- 2.9) years, all were steroid sensitive, 9 cases relapse frequently and 3 cases became steroid dependent. Renal biopsy was performed in 4 cases, consists of 2 FSGS,1 MsPGN ,1 MCNS. 4 cases received MP before CTX. The cumulative dosage range 72-147(mean 113.2+/- 27.4) mg/kg.
Results: Group 1: for 8 cases of FSGS treated with CTX up to 8 weeks, 1 case reach complete remission,1 case reach partial remission, 6 cases unremission. of all cases,11 cases reach complete remission after CTX were introduced, it took 46 (median) days. At the end of the 1-year follow-up, 2 cases had 4 relapses in all, 9 cases maintain remission. Group 2: after CTX was introduced, the relapse rate decreased in all cases, it decreased from 4.6+/- 3.6/year to 0.8+/- 0.7/year (t=3.791,P=0.001). The relapse-free period range 1-72(median 8) months,. the prednisolone dosage decreased from 36.0+/- 15.2mg/d to 18.3+/- 13.8mg/d (t=6.203, P<0.001). There were no patients who needed hospitalization due to severe infections during the administration of CTX.
Conclusion: CTX is an effective second-line therapy in idioathic nephrotic syndrome patients, but is less effective in patients with FSGS.

Abstract# P-SUN199

Randomized Trial Comparing Efficacy & Safety of Mycophenolate Mofetil and Levamisole in Frequently Relapsing & Steroid Dependent Nephrotic Syndrome

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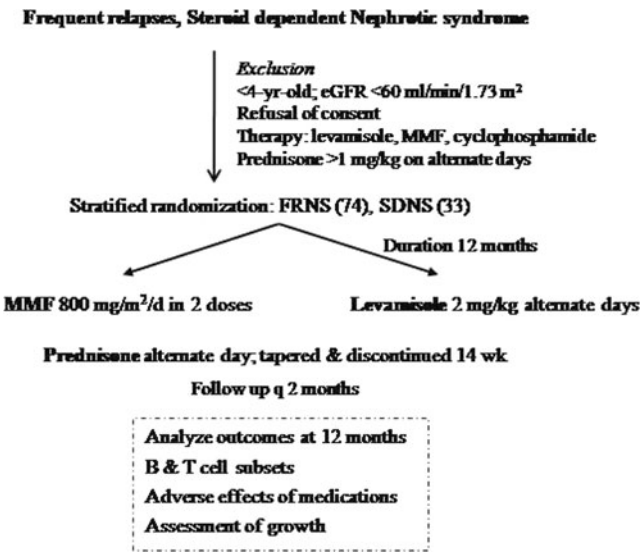
Objective: While case series show that therapy with levamisole or mycophenolate mofetil (MMF) is effective in frequent relapsing (FRNS) or steroid dependent nephrotic syndrome (SDNS), their efficacy has not been compared prospectively. We report study design & baseline features of patients enrolled in an open label, parallel group, randomized trial on efficacy & safety of 12-months (mo) therapy with levamisole & MMF. CTRI/2012/02/002394
Methods: Following ethics & parental consent, consecutive patients (4-18 yr-old) are randomized (computer generated; stratified for FRNS & SDNS) to receive levamisole (2 mg/kg alternate day) or MMF (800 mg/sq.m/d) for 12-mo(Fig). Prednisone is discontinued at 4-mo; subsequent relapses are treated with prednisone 2 mg/kg/d until remission, then alternate day for 4-wk. Proportion of lymphocyte (Th1, Th2, Th17, Treg, B) subsets will be estimated. Outcomes at 12-mo, based on intention-to-treat, include relapse rates, proportions in sustained remission & frequent relapses, cumulative steroid dose, infections, adverse effects & growth velocity. Assuming that MMF will reduce relapse rates by 40% more than levamisole, 66 patients are required per group at 80% power, two-tailed alpha 0.05 & 10% attrition.
Results: Table shows features of 107 enrolled patients (74 FRNS, 33 SDNS); randomization is likely to be over by September 2013.
Conclusion: Results from this study shall provide evidence for guiding the initial choice of steroid sparing therapy in relapsing nephrotic syndrome.

Baseline characteristics (N=107); mean±SD

	Levamisole (N=55)	Mycophenolate mofetil (N=52)
Boys	85.5%	82.7%
Age at onset, months	48.8±27.7	49.9±27.8
Age at enrollment, months	89.4±33.7	90.6±33.7
Prior long-term steroids; cyclophosphamide	50%; 23%	46%; 15%
Steroid dependence	33%	29%

Weight, kg	23.7±8.8	23.4±7.1
Height, cm	116.4±16.5	117±14.7
Relapses preceding year	3.4±1.1	3.3±1.0
Blood creatinine, mg/dl	0.5±0.2	0.5±0.2
Albumin, g/dl	4.0±0.9	4.0±0.9

Funding: Indian Council of Medical Research



Abstract# P-SUN200

Randomized Controlled Trial Comparing Efficacy of Mycophenolate Mofetil (MMF) & Alternate Day Prednisone Versus Tacrolimus & Prednisone in Maintaining Remission in Steroid Resistant Nephrotic Syndrome (SRNS)

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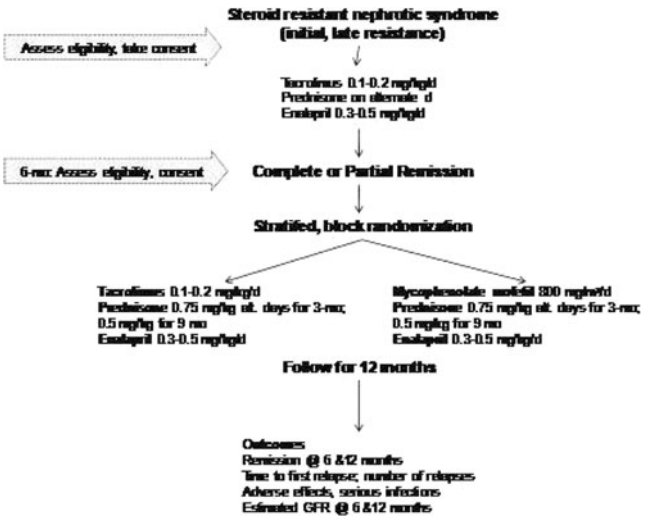
Objective: Treatment of SRNS with calcineurin inhibitors induces remission in 70% cases, but prolonged therapy is associated with nephrotoxicity. Following tacrolimus induced remission, this randomized study proposes to compare the efficacy of 'MMF switch' *vs.* continued therapy with tacrolimus in maintaining remission. If therapy with MMF is noninferior to tacrolimus, early switch of therapy from tacrolimus to MMF shall protect patients from nephrotoxicity. CTRI/2012/03/002479

Methods: Following ethical & parental consent, new patients 1-18-yr-old, with idiopathic initial or late SRNS (lack of remission despite prednisone 2 mg/kg/d for 4 wk) & biopsy showing minimal change disease or focal segmental glomerulosclerosis shall receive therapy with tacrolimus (0.2 mg/kg/d; trough 3-7 ng/ml), enalapril (0.2-0.5 mg/kg/d) & prednisone (1 mg/kg/alternate d) for 6 months (mo). Using computer generated block randomization, stratified for histology and complete (Up/Uc <0.2) or partial (Up/Uc 0.2-2) remission, patients shall be randomized to either continue daily tacrolimus or receive MMF for 12-mo. Both groups shall receive tapering prednisone (Fig); relapses shall be treated with prednisone (2 mg/kg/d till remission followed by taper on alternate days). During follow up, patient diaries shall be checked for proteinuria and compliance assessed by pill count. The proportion of patients with sustained remission, number of relapses, adverse events and eGFR shall be compared at 12-mo. Failure of therapy is the recurrence of resistance, occurrence of 2 or more relapses or severe infections or drug toxicity.

Results: Assuming that remission with tacrolimus and MMF are 70% and 50% respectively, with 15% non-inferiority margin, 48 patients are required/group at one-tailed alpha error of 0.05 and 90% power. Interim analysis shall be done once one-third patients have completed 12-mo follow up.

Conclusion: The study examines a novel strategy that is less toxic than the standard of care. If successful, early switch from tacrolimus to MMF will be an important innovation in management of patients with steroid resistant nephrotic syndrome.

Medication provided by Panacea Biotec Ltd.



Abstract# P-SUN201

Assessment of Cyclosporine A Efficacy and Safety in Childhood Steroid-Resistant and Steroid-Dependent Nephrotic Syndrome

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Objective: To assess efficacy and safety of Cyclosporine A (CsA) treatment in children with nephrotic syndrome (NS).

Methods: 77 children with steroid-resistant (SRNS) (18 - minimal changes disease (MCD), 38-focal and segmental glomerulosclerosis (FSGS), 17-mesangeal proliferative glomerulonephritis (MesPGN), 3-membranous nephropathy (MN) and 1 non-biopsied) and 78 with steroid-dependent (SDNS) (58 with MCD, 7 with FSGS, 2 with MesPGN and 11 non-biopsied) were included into the study. The monitoring of CsA treatment with evaluation of C0 (trough level) and C2 (2 hours after drug intake) blood concentrations was performed.

Results: Clinical efficacy of CsA in SRNS was 76.6% (complete remission (CR) in 48 (62.3%) partial in 11 (14.3%), CR was achieved in 4 mon. on average (max. in 33 mon.). The median C0 was 99.3 ng/ml, C2 841.0 ng/ml. In patients with SDNS prednisolone was withdrawn with remission maintaining >6 mon. in 61 patients (78.2%), median C0 was 109.0 ng/ml, median C2 896.9 ng/ml. The most common side effects of CsA were: hypomagnesemia-55%, hyperkalemia-12%, hypertension-16% and glomerular filtration rate (GFR) decrease - 25%. In 20 patients in order to restore renal function the drug had to be withdrawn. There were no significant differences in prevalence of side effects between children with various histological and clinical variants of NS., however the withdrawal of the drug

in order to restore renal function was demanded more often in SRNS than in SDNS (18.2 % and 7.7%, respectively). Repeat biopsy was performed to 27 patients in 24-36 mon. of treatment, in 11 of them (41%) the histological signs of CsA nephrotoxicity (focal interstitial fibrosis and/or arteriolopathy) were revealed. There were no correlations between CsA blood levels and frequency of side-effects.
Conclusion: CsA treatment is efficient in 76.6% of SRNS and 78.2% of SDNS. The risk of side effects development does not depend only on the level of CsA blood concentration, which suggests the necessity of control for serum creatinine, potassium, magnesium and blood pressure. According to histological data the prevalence of nephrotoxicity may be higher than according to clinical signs.

Abstract# P-SUN202
Effect assessment of Tacrolimus treating children with steroid dependence and drug-resistant nephrotic syndrome

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Objective: To investigate tacrolimus (FK506) therapy in children with steroid-dependent and steroid-resistant nephrotic syndrome (NS) clinical efficacy and safety.
Methods: To select children with primary nephrotic syndrome in 42 cases, in which the steroid-dependent NS (SDNS) in 32 cases of steroid-resistant NS (the SRNS) 10 cases; 24 males and 18 females; aged 3-14 years old. Simple nephrotic syndrome in 11 cases, 31 cases of nephritis nephropathy. Some patients used cyclophosphamide (CTX) and cyclosporine A (CsA) ineffective. Changed to tacrolimus and prednisone combination therapy, oral tacrolimus dose 0.1mg 0.2mg/kg.d, empty stomach, to maintain FK506 blood drug concentration in of 5ug ~ 10ug / L, treatment of 3 to 6 months gradually reducing the total course of 6 to 24 months. Respectively, before treatment and 12 weeks after treatment, observation of the indicators change, including the 24h urinary protein excretion, blood urea nitrogen (BUN), serum creatinine (Scr), creatinine clearance (Ccr), plasma albumin (Alb), blood and urine beta-microglobulin (beta-MG); lipid testing indicators: total cholesterol (TC), triglyceride (TG); 3 hypercoagulable state indicators: the prothrombin time (PT), activated partial thromboplastin time (APTT), the plasma concentration of fibrinogen (Fib) and blood D-dimer (D– dimer). Renal biopsy in 16 cases.The observation of FK506 efficacy and adverse reactions.
Results and Conclusions: Tacrolimus combined hormone therapy before and after treatment have significant effects. The clinical and biochemical indicators improved significantly after treatment, there were significant differences ($p < 0.05$ or $p < 0.01$); lipids and hypercoagulability-related indicators also improved significantly; significantly reduced proteinuria. Complete remission in 29 cases, partial remission in 10 cases.

Abstract# P-SUN203
Two dosing regimens of steroids in nephrotic syndrome

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Objective: Prednisolone doses of 60 mg/m2/day (body surface area (BSA)-based) and 2 mg/kg/day (body weight (BW)-based) are internationally accepted as standard doses in children with idiopathic nephritic syndrome (INS). However, a recent report suggested that BW-based dosing results in altered treatment outcomes, especially in children who weigh < 30 kg. Therefore, to investigate whether the 2 dosing regimens differ in patient outcomes, we retrospectively reviewed the medical records of children diagnosed with INS at our institution.
Methods: We retrospectively reviewed the medical records of 46 children (36 boys, 10 girls) with newly diagnosed INS observed for > 24 months in Saitama Children's Medical Center between January 2000 and January 2010. Patients with steroid-resistant NS at onset or BW > 30 kg were excluded.
Results: Of the 46 patients, 16 (35%) received BSA-based steroid therapy, while the remaining 30 (65%) received BW-based steroid therapy. The choice of dosing regimen depended on the treating physician. The children's ages at onset ranged from 1-11.4 years (median, 4 years).
There were no significant differences between the 2 groups in gender ratio, age, serum albumin at onset, response time to initial therapy, or the proportion of adverse events. The onset time of relapse after initial therapy was significantly shorter for children in the BW-based group than those in the BSA-based group (2 months vs. 6 months; $p < 0.05$). Further, the proportion of steroid-dependent NS was significantly higher among children in the BW-based group than in the BSA-based group (53.3% vs. 12.5%; $p < 0.05$).
Conclusion: Although our study was retrospective in nature, it showed that BW-based and BSA-based steroid dosing are not equivalent in children with INS having BW < 30 kg. Based on our findings, we suggest the use of consistent dosing regimens in future trials involving children with idiopathic NS to enable accurate comparisons between trials.

Abstract# P-SUN204
Tacrolimus in treatment of membranous nephropathy

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Objective: To assess the effect and safety of tacrolimus in treatment of membranous nephropathy by Meta analysis in this study.
Methods: The data of Cochrane Library, PubMed, CNKI and VIP until September 25, 2010 were retrieved to search the studies about the randomized controlled clinical trials (RCT) in the treatment of membranous nephropathy by tacrolimus. standard studies by quality evaluation and Meta analysis. The qualities of included articles were assessed and then a meta-analysis was conducted.
Results: Five randomized controlled trials studies in which included 188 patients at home and abroad were collected. Meta analysis showed that compared with the control group, tacrolimus was more effective in complete remissions [RR=2.16,95%CI(1.32-3.55)]and total remission[RR=1.59, 95%CI(1.27-2.01)].Adverse effect could be recovered by symptomatic treatment.
Conclusion: The current limited evidence suggests that tacrolimus was more effective than traditional protocols in treatment of membranous nephropathy.

Abstract# P-SUN205
Treatment with tacrolimus and prednisone is preferable to intravenous cyclophosphamide for children with difficult-to-treat nephrotic syndrome

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Objective: There are limited data on the relative efficacy and safety of calcineurin inhibitors and alkylating agents for difficult-to-treat nephrotic syndrome (NS). To clarify this, we conducted a prospective randomized trial evaluating tacrolimus and intravenous cyclophosphamide therapy to achieve complete or partial remission in patients with steroid resistance or steroid dependent.
Methods: Twenty-one Patients were randomized to receive tacrolimus for 12 months, whereas twenty patients receive 6-monthly infusions of

intravenous cyclophosphamide, while both arms received equal amounts of alternate-day prednisone for 12 months. The main outcome measures are remission rate, 24-hour urine protein, creatinine level, relapse rate.

Results: The probability of complete remission in the tacrolimus group was 42.9, 81 and 76.2% after 2, 6, and 12 months, but only 10, 25, and 30%, respectively in the cyclophosphamide group. The probability of complete remission was higher in the tacrolimus group than that in the cyclophosphamide group respectively at the same time (P=0.0176, 0.0003 and 0.003). The decrease of 24-hour urine protein was significantly greater in thetacrolimus group than that in the cyclophosphamide group.The risk of renal function worsening was significantly higher with cyclophosphamide than tacrolimus. NS relapsed in almost half of the patients after tacrolimus withdrawal or during the taper period. When reintroduced tacrolimus in most of those patients with a relapse, they could remission again.Treatment withdrawal was higher with cyclophosphamide, chiefly due to systemic infections. Compared to cyclophosphamide, 9 patients required treatment with tacrolimus to achieve 8 additional remissions.

Conclusion: tacrolimus and prednisone are effective, safe, and preferable to cyclophosphamide for patients with difficult-to-treat nephrotic syndrome.

Abstract# P-SUN206

Clinical application of 11 infant with steroid-resistant nephrotic syndrome treated with tacrolimus

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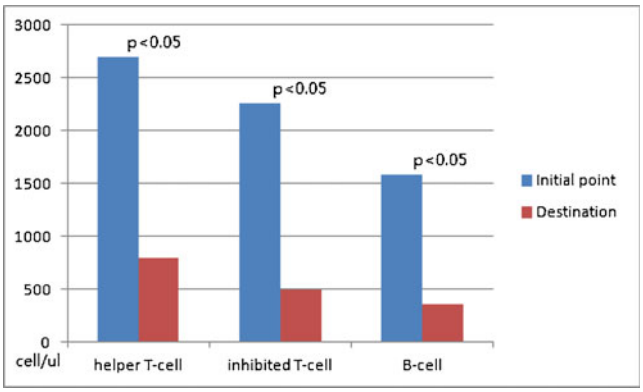
Objective: To assess efficacy, infection rate and recurrence rate of tacrolimus prescribed in infants steroid-resistant nephrotic syndrome (SRNS).

Methods: From Sep. 2010 to Mar. 2012, 11 cases of infants under 2 years old SRNS children (treatment group) received oral tacrolinms treatment were enrolled in this retrospective longitudinal study and were compared with 12 cases infant SRNS (control group) treated with high-dose methylprednisolone pulse therapy. Followed up for half a year the case of non-remission could be excluded. We analysed the data of proteinuria, lymphocyte count, proteinuria relapse and infection of the two groupsat every point time.

Results: All SRNS children underwent kidney biopsy. 5 minimal change disease (MCD), 4 mesangial proliferative glomerulonephritis (MPGN), 1 focal segmental glomerulosclerosis (FSGS) and IgM nephropathy were contained in the treatment group. MCD constituent ratio of treatment group had no significant difference with control group. Follow-up to 6 months, in the treatment group 3 MCD cases were complete remission and 2 partial remission; 4 MPGN were complete remission and 1 partial remission; The FSGS case was complete remissed; And the IgM nephropathy was of no remission at all.The data aforementioned have been displayed in the following graph and image.

	Treatment group	Control group	P
complete remission	7	3	
partial remission	3	4	
non-remission	1	5	
remission rate	90.9%	58.33%	0.061
Upr/Ucr(0 month)	8.71	7.13	0.86
Upr/Ucr(3th month)	2.94	4.61	0.054
Upr/Ucr(6th month)	0.29	0.78	0.038
person-time of infection	9/10	15/7	0.023
person-time of recurrence	10/10	11/7	0.43

Image: lymphocyte count



Conclusion: Pathologyof infants steroid-resistant nephrotic syndrome remains minimal change which differ reports with older children and adults. The pathological type may not be the main factors of the steroid-resistant nephrotic symdrome, what's more, steroid resistance may be due to its own mutant gene. Tacrolimus show its own advantages of reliable effect and less side-effect on the infant with steroid-resistant nephrotic symdrome associated with genes, but it could not lessen the relapse of the disease, and it's long-term prognosis is still not very clear.

Abstract# P-SUN207

Treatment of Steroid Resistant Nephrotic Syndrome (SRNS) in Children

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Objective: Achieving remission in children with Steroid Resistant Nephrotic Syndrome in Children (SRNS) could be difficult. Many immunosuppressive drugs are used with variable success rate.

Methods: We have analyzed the response of children with SRNS who presented to the department of Pediatric Nephrology, BSMMU between February 2010 to march 2013 to various modalities of therapy. We included the patient with no response to prednisolone (60 mg/M2/day) after four weeks of therapy; all patients had renal biopsy and follow up duration for at least one year. We excluded the patients with congenital nephrotic syndrome, lupus or sickle cell disease.

Results: Total thirty five patients were steroid resistant (15 girls & 20 boys with F:M = 1.5:2; the mean age at presentation 8.1+/-7) who fulfilled the inclusion criteria.The mean duration of follow up was 2.1+/-1.2 years. Out of thirty five resistant patients, Mesangio-Proliferative glomerulo nephritis was 48.57% (17), Minimal change disease 22.85% (8), Focal segmental glomerulosclerosis 8.57% (3), Membrano proliferative nephritis 20.3% (7). Twenty two patients (57.15%) achieved partial remission, five patients (14.28%) achieved complete remission and occasional proteinuria present in eight patient (22.85%), two patient (5.7%). Thirteen children (37.14%) treated with I/V methyl prednisolone, eight patients (22.8%) treated with I/V cyclophosphamide. Seven patients (20%) received oral cyclophosphamide, five patients (14.28%) received cyclosporine A and thirteen patients received Mycophenolate mofetil when on alternate day prednisolone. Total nine patients were received Mendoza regimen.Very few side effects were observed during follow up period. Three pts had developed renal impairement(CNI regimen) and switched to MMF. One

child progressed to CKD (MesPGN) and expired due to septicemia & one developed ESRD and now on hemodialysiis.
Conclusion: SRNS in children is difficult to treat. Treatment should be individualized according to the underlying histopathology and clinical & social condition of the children.

Abstract# P-SUN208
Single-centre experience with Rituximab in children with steroid-resistant nephrotic syndrome, resistant lupus nephritis and recurrence of focal segmental glomerulosclerosis after kidney transplantation

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Objective: To describe the 6-year single-centre experience of Rituximab use in patients with nephrotic syndrome, lupus nephritis and focal segmental glomerulosclerosis (FSGS) recurrence after kidney transplantation.
Methods: We retrospectively reviewed the data of children with steroid-resistant nephrotic syndrome (SRNS), resistant lupus nephritis and FSGS recurrence post-kidney transplantation who received Rituximab from 2007 to 2012.
Results: A total of 27 patients who received Rituximab were reviewed with the following indications: SRNS (n=14), resistant lupus nephritis (n=8) and FSGS recurrence post kidney transplant (n=5). The mean age at start of treatment is 141 months. Rituximab dose used was 375mg/m^2. Majority (89%) of patients had been given a total of 4 doses. Six children received previous Rituximab treatment. Six (43%) patients in the SRNS group had a histological diagnosis of minimal change disease. These children had previously received multiple immunosuppressive agents with periods of partial and complete remission. Baseline ratio of urinary protein to creatinine and serum albumin level showed significant proteinuria and hypoalbuminemia, respectively. Seven patients had achieved complete remission after receiving Rituximab. In the lupus nephritis group, six had class IV diffuse proliferative glomerulonephritis. All received cyclophosphamide and were maintained on steroids and mycophenolate mofetil. Six patients had partial or complete renal remission. In the FSGS recurrence post - transplant group, 3 patients had decreased proteinuria after treatment with Rituximab.
Conclusion: Rituximab is an effective treatment option in patients with SRNS, resistant lupus nephritis and FSGS recurrence post kidney transplant.

Abstract#P-SUN209
Rituximab in pediatric steroid resistant nephrotic syndrome

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Objective: Recently the role of B cells in the pathogenesis of nephrotic syndrome is explained by some researchers. The majority of case reports and series have demonstrated the success of RTX in nephrotic syndrome especially in SDNS/FRNS pediatric patients.
Methods: We administrated rituximab to 5 patients, 3 patients with secondary steroid resistance and 2 patients with primary steroid resistance. Three patients with late steroid resistance responded to rituximab and steroid sensitivity returned in these patients. One of these three patients had recurrence one year after rituximab administration, but he responded to steroid after 3 weeks. Steroid dose and complications reduced significantly in these three patients after rituximab starting.
Results & Conclusion: Two patients with primary steroid resistance did not respond to cyclosporine and frequently were admitted because of severe edema. After rituximab one of them responded completely and another responded partially. Edema disappeared in both f them and they did not admit for one year after rituximab.

Abstract# P-SUN210
Clinical application of tacrolimus in children with nephrotic syndrome

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Objective: To analyze and evaluate the efficacy of tacrolimus(TAC) and the relation with the pathological type,T lymphocyte subpopulation in the treatment of nephrotic syndrome in children.
Methods: 78 children with nephrotic syndrome enrolled, 15 steroid-resistant, 17 steroid-dependent, 36 frequency relapse, 7 with tuberculous infection, 3 with hepatitis B. Before joint use of tacrolimus and prednisone, 35 children took cyclophosphamide (CTX) treatment, 27 took mycophenolate mofetil and did not remission or had serious side effects. They received oral TAC treatment, 0.1 to 0.15 mg/kg per day and once every 12 hours. During the treatment, the plasma concentration of TAC, urine volume, urine, serum creatinine , liver function, pathological type,T lymphocyte subpopulation were monitored.
Results: 36 cases of FRNS and 17 cases of SDNS, 13 cases in 15 cases of SRNS showed remission. 13 cases experienced recurrence. Various pathological types had different remission rates or ratio, which were follows: minimal change nephropathy(94.4%), mesangial prolifrative glomerulonephritis (91.0%),membranous nephropathy (57.1%), membranous prolifrative glomerulonephritis (70.58%), focal segmental glomerulosclerosis (58.6%). Increased CD4 indicated higher remission rate.During the treatment,l7 cases appeared gastrointestinal symptoms, 12 headache, 5 abdominal pain, 2 insomnia, 3 transient increased Scr, 1 ilica-femoral venous thrombosis.
Conclusion: TAC is effective in primary NS children, even with abnomal liver function or tuberculosis infection, glaucoma.

Abstract#P-SUN211
RESPONSE TO MYCOPHENOLATE IN PEDIATRIC PATIENTS WITH STEROID-RESISTANT NEPHROTIC SYNDROME AT PABLO TOBÓN URIBE HOSPITAL (MEDELLÍN-COLOMBIA)

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Objective: Nephrotic syndrome is one of the most frequent glomerular diseases among children, steroid therapy remains at the core of its treatment. In spite of this, 10 to 15% of the patients are steroid-resistant, and the best therapy for such cases has never been defined. Mycophenolate is one of the treatments used in such situations.
To describe the clinical behavior of children diagnosed with steroid-resistant nephrotic syndrome (SRNS) and to assess the therapeutic response to Mycophenolate.
Methods: A retrospective, descriptive study.
Results: 26 clinical records of patients with SRNS; 70% male and 30% female. All patients underwent kidney biopsies, which showed a predominance of focal segmental glomerulosclerosis (FSGS). The second-line therapy was: Mycophenolate 100%, Cyclosporine 69,2%, Cyclophosphamide 23,1%, and Rituximab 23%. One month after treatment initiation with mycophenolate 61,5% achieved remission. The median of relapses per year for the patients was 3 (p25: 2.75-p75: 4). This median became 1 (p25: 1 – p75: 3.25) after using this

medication (p=0.08). Furthermore, prior to the start of the Mycophenolate treatment, the median of the steroid dose was 1 (p25: 0.5– p75: 1,62) mg/k/day. After using Mycophenolate, this median became 0.07 (p25: 0- p75: 0,55) mg/k/day (p<0.001), in the eight patients prednisolone was stopped.
Conclusion: In our experience, treatment with Mycophenolate showed positive results such as a decrease in the frequency of relapses, less proteinuria, and a reduction in the dose of steroids administered without deterioration of glomerular filtration rates. However, more studies are needed to assess efficacy, safety, and optimal dosage.

Abstract# P-SUN212
Prevention of FSGS Recurrence by a Combination of Pre-transplant Bilateral Nephrectomy, Rituximab and Plasma Exchange:Two Case Reports

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Objective: Recurrence rate of focal segmental glomerulosclerosis (FSGS) after first kidney transplantation (KT) is 30 to 50 % with a higher incidence of graft loss after second transplant. We report two cases of primary FSGS treated with combination therapy of rituximab (Rtx), plasma exchange(PE) and bilateral nephrectomy to prevent recurrence after the first transplant.
Methods: We retrospectively reviewed the medical records of two patients with biopsy-proven FSGS who presented in January 2012 to March 2013. The two patients were given Rtx 100mg/m2/week for 2 weeks and 4 sessions of PE. A bilateral nephrectomy was done prior to KT. Pre-transplant immunosuppression consisted of the following: mycophenolate mofetil (MMF) for 14 days, tacrolimus (Tac) orally and methyl prednisolone (MP) orally 7 days and basiliximab 5% 0.5 mg intravenous(IV) just 4 hours before KT. Post transplant immunosuppression consisted of MMF, MP IV until 5 days then orally, basiliximab IV on day 4, Tac IV 3 days then orally until now, adjusted with serum drug level.
Results: The first case was a 15y-old girl diagnosed steroid resistant nephrotic syndrome (SRNS) with FSGS not otherwise specified(NOS) at 2y-old. She developed end stage kidney disease (ESKD) and commenced on peritoneal dialysis (PD) at the age of 3 years. A living-related KT was done at 15y-old. This was a 3-mismatch(A02/B46/DR09). During 3 months, monitoring of urine protein creatinine ratio (Upr/cr) was decreased from 1.4 to 0.2 g/g·Cre and CD19 was 0.0 % to 7.6%. Protocol renal biopsy after 3 months showed mild interstitial nephritis and tubular atrophy. The second case was an 11y- old girl diagnosed with SRNS (FSGS NOS) at the age of 3 years. She developed ESKD and commenced on PD at 4y- old. She had a living-related KT at 11y- old. This was a 2 antigen mismatch (A26/DR09). Monthly monitoring of CD19 showed 0.0%, 0.0%,0.3% and Upr/cr ratio was declined from 1.6 to 0.2 g/g·Cre. Renal biopsy presented normal in the 3th months.
Conclusion: Two FSGS patients after KT were reported and after three months monitoring recurrence were not found. Combination therapy with rituximab, PE and bilateral nephrectomy may be effective in preventing post-transplant recurrence of FSGS.

Abstract# P-SUN213
EFFICACY AND SAFETY OF RITUXIMAB IN DIFFICULT TO TREAT STEROID RESISTANT & DEPENDENT NEPHROTIC SYNDROME

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Objective: Rituximab (RTX) is promising therapy for patients with difficult-to-treat steroid resistant (SRNS) & steroid dependent nephrotic syndrome (SDNS). We report its efficacy in 151 patients treated during 2005-12.
Methods: Patients with SRNS with failure or toxicity to calcineurin inhibitors (CNI), and difficult SDNS with or without prior resistance, received 2-4 doses of RTX (375 mg/sq.m/wk); the number of doses were based on CD19 counts. Response in SRNS was described as complete (CR) or partial remission (PR). For SDNS, relapse free duration and relapses/6-months (mo) were calculated.
Results: STEROID RESISTANT NS: 52 patients (22 girls; 29 initial resistance; MCD 21, FSGS 31) received RTX at 9±4 yr. At 1.9±1.3 mo, 17 (29%) showed CR/PR. At 16±13 mo, 7 patients had sustained remission, 6 had steroid sensitive relapses; 4 had late non-response. Favorable response was associated with MCD (P<0.03), late resistance (P<0.05) and prior response to CNI (P=0.001). PRIOR STEROID RESISTANCE: 39 patients (12 girls), currently showing steroid dependence & CNI toxicity or failure received RTX at 12±5 yr. Therapy resulted in median (IQR) relapse-free duration of 11 (4-27) mo; 71%, 37% and 6% had remission at 6, 12 and 24-mo respectively. On follow-up, 18% had sustained remission, 32% infrequent relapses & 40% frequent relapses. STEROID DEPENDENT NS: 60 patients (20 girls), 13±3 yr-old, failing multiple therapies, were administered RTX. Relapse-free duration was 17 (7-38) mo; 69%, 43% and 32% had remission at 12, 18 and 24-mo respectively. Therapy resulted in reduced relapses (mean difference 1.8 episodes/6-mo; P<0.001); 41% had sustained remission. Thirty-one patients were redosed, with remission for 11 (9-14) mo. Adverse effects (rash 7, throat pain 1, chills 3, synovitis 2) were seen in 14.
Conclusion: Rituximab induced remission in one-third patients with refractory SRNS; minimal change, late resistance & prior response to CNI predicted favorable outcome. Though steroid-free remission was 69% at 1 yr in SDNS, results were less satisfactory if steroid resistance had preceded steroid dependence. While utility of RTX in SRNS is limited, it is valuable in patients with SDNS.

Abstract# P-SUN214
Outcome of children with steroid resistant nephrotic syndrome, with response to 2nd line agents

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Objective: Steroid resistant nephrotic syndrome (SRNS) is a therapeutic challenge. Patients who achieve remission of proteinuria are expected to have a better outcome.To assess: (1) outcome of SRNS patients who respond to 2nd line immunosuppressives (IS) like cyclosporine A (CSA), tacrolimus (TAC), mycophenolate mofetil (MMF) or IV pulse cyclophosphamide (IVCP) and (2) correlation of renal histopathology with outcome.
Methods: Children with documented SRNS were biopsied and started on one of - CSA, TAC, MMF or IVCP, with subsequent steroid tapering. Those who achieved proteinuria remission, completed at least 2 years follow up were analysed. If patients developed drug toxicities, or relapsed on > 1mg/kg/alternate day prednisolone, the 2nd line IS was replaced by another from the ones listed. Rituximab was used as rescue for persistent relapses with drug toxicities. This is an ongoing study with continuing follow-up.
Results: Twenty patients (13 male) with SRNS and remission of proteinuria on 2nd line IS were followed up for mean 3.25 years. Mean age at diagnosis was 3.5 years, 14 had primary and 6 had

secondary steroid resistance. Biopsies showed minimal change disease (MCNS) in 11, IgM nephropathy in 3, mesangioproliferative glomerulonephritis (MesPGN) in 2 and focal segmental glomerulosclerosis (FSGS) in 4. Nine children received CsA, 2:TAC, 8:MMF and 1:IVCP as the initial IS agent. Mean time to remission was 2 months.At last follow up, 8 patients (MCNS:4) are off regular IS, with continued remission or infrequent relapses responding to steroids.
Seven patients (MCNS:3) maintain remission on 2nd line IS + low dose (<0.5mg/kg) alternate day steroids.In 5 patients (MCNS: 4), steroid requirement continues to be high (1-1.5 mg/kg/alternate day) despite consequent trial of 2 of the 2nd line IS, of these 2 patients (both MCNS) with severe steroid toxicities received Rituximab.Serum creatinine increased >50% in one patient with FSGS, and remained stable in rest.
Conclusion: Our data shows that 75% SRNS patients who responded to 2nd line IS had a stable course, and regular IS could be stopped in 40%. Biopsy was not predictive of outcome. Continued follow-up will clarify prognosis in the long term.

Abstract# P-SUN215
The Efficacy of Cyclosporine in HIV patient with FSGS- a case report

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Objective: Describe the use of cyclosporin in the treatment of steroid resistant Focal Segmental GlomeruloSclerosis (FSGS) in HIV infected patient.
Methods: Case review of 10years 9months old HIV positive patient, on HAART since 2003. He presented at 8years 6 months with nephritic nephrotic picture, protein creatinine ratio of 0.99g/mmol, albumin of 15g/l, cholesterol of 7.9 ,C3 and C4 levels were slightly raised and serum creatinine level of 29 micromol/L. Histological findings showed segmental sclerosis in two out of 30 glomeruli with overlying mesangial hyperplasia but no evidence of collapsing glomeruli or interstitial changes characteristic of HIVAN.He had a six-week course of prednisone without response. Subsequently, he was commenced on cyclosporine initially at 3mg/kg/dose twice daily. However dose was adjusted to 20 per cent of normal dose once weekly following persistent high levels of cyclosporine. He was continued on low dose prednisone, and enalapril and HAART.Blood pressure maintained within normal limits for age, sex and height. Urine protein creatinine ratio, albumin, creatinine, cholesterol as well as cyclosporine levels were monitored.
Results: The Patient went into remission within 3 months of commencing cyclosporine. He has remained in remission on low dose weekly cyclosporine with 3 occasions of 1+ to 2+ proteins on dipstick. Protein creatinine ratio has improved to 0.04g/mmol, serum albumin has increased to 28g/l, and serum creatinine remained within normal limit. Cholesterol levels are now within normal limits. Estimated GFR using Schwartz formula is 130ml/min/1.73m^3 and the viral load remains undetectable to date.
Conclusion: Low dose weekly cyclosporine has shown to be efficacious in the treatment of FSGS in HIV positive patient and may be beneficial in preventing progression to end stage renal disease.

Abstract#P-SUN216
Tacrolimus for Children with Refractory Nephrotic Syndrome: A 1 year Prospective, Multicenter, Open-Label Study

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Objective: Cyclosporine A and tacrolimus (TAC) are often used as second line treatment choices for children with refractory nephrotic syndrome. The aims of this study were to investigate the efficacy and safety of Tacrobell (Chong Kun Dang Pharmaceutical Corp., Seoul, Korea), locally produced generic form of TAC. Here we report the preliminary result of this study.
Methods: This study was a prospective, open-label, single-arm, multicenter 1-year study. We enrolled children with steroid-dependent nephrotic syndrome (SDNS) or steroid-resistant nephrotic syndrome (SRNS). The primary endpoint was a remission rate after 1 year in SDNS and remission rate after 3, 6 and 12 months in SRNS. The secondary endpoint was the duration of remission and adverse effects of TAC.
Results: After 1 year of treatment, 27 of 36 children with SDNS (75%) were in complete remission and 4 (11.1%) were in partial remission. Sixteen patients (43%) did not relapse during treatment. The mean duration of remission in children who experienced relapse was 5.4± 3.0 months. The mean number of recurrences (0.74 per year) was significantly decreased compared to the preceding year versus (3.2 per year). In children with SRNS, the remission rate was 38.7% (12 of 31 children) after 3 months, 48% (12 of 25) after 6 months, and 60% (9 of 15) after 12 months. The mean duration to remission was 4.2± 3.1 months. Five of 18 children (27.7%) experienced relapse after achieving remission. Blood glucose, eGFR and blood pressure were similar before and after TAC treatment.
Conclusion: Treatment with Tacrobell® was effective and safe in children with refractory nephrotic syndrome, and the efficacy of this locally produced generic form of TAC was not inferior to that known for original formula of TAC.

Abstract# P-SUN217
Current treatment survey of Primary steroid-resistant nephrotic syndrome

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Objective: Toretrospectively investigate a multicenter research of theclinicalmanifestation、pathology and current treatment of primary steriod-resistant nephrotc syndrome(SRNS) in China, and to evaluate the causality.
Methods: 577 children diagnosed for the first time of primary SRNS were reviewed from pediatrics department during the period of 2008 to 2011 of 35 hosptials in China, they should complete the unified questionnaires and collect the informations, including age, gender, disease duration, relevant auxiliary examination results, clinical manifestations renal biopsy, treatment programs and so on. The data were summarized and analyzed.
Results: According to theinvestigation, the onset of majority number of primary SRNS were male and children of school age. Simple nephrotic syndrome was more common than the nephritis type. All the childhood patients had different levels of edema, hypoproteinemia, proteinuria and hyperlipidaemia as the typical clinical manifestations, a minority of the patients progressed to renal failure. MsPGN, FSGS and glomerular minimal lesion were the most common renal pathologic types. The main types of immunofluorescence examination were IgM and C3 deposition. In evidence-based guidelines issued, children with nephrotic syndrome with high-dose methylprednisolone in 4 weeks after treatment with glucocorticoid in 2011, urine protein negative in 44% after impact, not negative patients need to continue receiving immunosuppressive therapy, and FK506 had the best effect among the different immunosuppressants.
Conclusion: Childhood SRNS cases plus every year in China. Under the clearly diagnosis of SRNS, renal biosy should be done as soon as possible. Patients could be actively sequential treatment with glucocorticoids、immunosuppressants and auxiliary drugs. Now

therapeutic options for the childhood SRNS were diversifications, but the rate of lost follow-up was high, it is necessary to establish a normalized treatment and follow-up system for childhood SRNS.

Abstract# P-SUN218

Long-term outcome of children treated with rituximab for steroid-dependent or resistant idiopahtic nephrotic syndrome in Shanghai single center

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Objective: Rituximab (RTX) has recently showed promising results in the treatment of steroid-dependent idiopathic nephrotic syndrome (SDNS) and some steroid-resistant idiopathic nephritic syndrome (SRNS).
Methods: This was a prospective single center study of 12 children treated with RTX for SDNS and SRNS, with a mean follow-up of 19 months. RTX was introduced because of side effects or relapses during therapy with immunosuppressive agents. The children received one infusion of RTX during the first course of treatment. If CD19-cell recovery (CD19>3 %), we would give subsequent RTX infusion or mycophenolate mofetil (MMF).If relapse, we would give subsequent RTX infusion or steroid and/ or tacrolimus (FK506).
Results: The ratio of male to female was 5:1(10:2), and the onset age was 2.0–8.9 years old. The follow-up duration was 12–24 months (mean, 19.0 months; median, 18.0 months). There were 10 SDNS children and 2 SRNS children. Among them, there were 10 cases with minimal change disease (MCD), 1 case with focal segmental glomerulosclerosis (FSGS), and 1 case with focal proliferative glomerulonephritis (FPGN). Five children received subsequent infusions due to CD19-cell recovery (40 %, 2/5) or relapse (60 %, 3/5). Five children relapse during follow-up, three of them reused RTX (two got remission and one was inefficacy), and two of them got remission with steroid and FK506.Treatment with RTX maintained sustained remission without relapse in 58.3% (7/12, 4 children maintained remission with MMF and 3 children without any medication) of patients and increased the duration of remission in all other patients. The growth rate of children, who stop using steroid more than one year, was more than 6 cm per year, and was much better than before. At the last follow-up, 25% of patients were free of oral drug therapy. Of those still receiving oral drugs, all doses had been decreased. No serious adverse events occurred.
Conclusion: The results of this prospective study confirm the efficacy and very good safety of RTX in the treatment of SDNS and SRNS. The optimal maintain sustained remission therapeutic protocol still need to study.

Table 1 Patient characteristics, rituximab courses, response to rituximab, and tapering of immunosuppressive treatments

patient	gender	age at NS onset (years)	renal histology steroid response	NS duration of initiation or RTX	IST before RTX	RTX courses during the first 2 years (number of infusions)	Time since last infustion of RTX (months)	Relapses during the first 2 years	Treatment at last follow-up
1	M	3.0	MCD,SDNS	66	CYC,MMF	2	5	1	MMF
2	M	4.0	MCD,SDNS	11	MMF,FK506	2	21	0	MMF
3	F	2.3	MCD,SRNS	35	CyA	2	20	0	MMF
4	M	2.0	MCD,SDNS	169	CYC,CyA, MMF	2	21	1	pred+FK506
5	M	8.9	FPGN,SDNS	26	CyA	1	18	1	pred+FK506
6	M	5.1	FSGS,SDNS	92	MMF	1	18	0	free 6 months
7	M	2.3	MCD,SDNS	98	CYC,CyA, MMF	1	18	1	FK506
8	F	3.5	MCD,SRNS	33	CyA	1	17	0	MMF
9	M	5.9	MCD,SDNS	125	CYC,CyA	1	17	0	free 3 months
10	M	4.0	MCD,SDNS	13	FK506	2	15	2	pred+MMF
11	M	2.5	MCD,SDNS	21	CYC	1	16	0	free 12 months
12	M	3.3	MCD,SDNS	58	CyA, CYC, MMF	1	12	0	MMF

Abstract# P-SUN219

Huai Qi Huang aqueous extract attenuates proteinuria and kidney injury

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Objective: Huai Qi Huang aqueous extract (HQH) consists of trametes robiniophila murr, wolfberry fruit, and polygonatum, is well known to have a protective effect in several organs and tissues in China, but its effect on the progression of renal disease remain unclear.
Methods: Here, we studied the anti-inflammatory and anti-fibrotic effects of HQH in adriamycin (ADR)-induced nephropathy in mice. Male Balb/c mice were divided at random into control, ADR

nephropathy and HQH-treated ADR nephropathy groups. ADR nephropathy was induced by a single-tail intravenous injection of ADR (10mg/kg).
Results: Administration of HQH (4g/kg) was started 7 days after ADR administration and continued throughout the experiment in HQH-treated ADR nephropathy mice. Anti-inflammatory effect of HQH were studied by evaluating the expression of IL-17. In addition, renal function, and histopathology were compared between groups. Administration of HQH significantly decreased the quantity of proteinuria and IL-17 expression in the renal region, accompanied by attenuated the progression of renal disease. The in vitro study further supported this protective effect of HQH. Human mesangial cells were treated by human recombinant IL-17 inthe presence or absence of HQH.
Conclusions: Cytotoxicity, cell proliferation and fibronectin expression were determined by Trypan blue exclusion test, *MTT assay* and ELISA, respectively. We found that IL-17 could significantly induce mesangial cell proliferation and increase fibronectin production, which was inhibited by the treatment of HQH. Taken together, these data suggest that overexpression of IL-17 in the renal region may contribute to the pathogenesis of renal disease and that HQH may have therapeutic potential in CKD.

Abstract#P-SUN220
Clinical impact of different steroid regimens in Idiopathic Nephrotic Syndrome (INS) A retrospective multicentre study

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Objective: 1.to retrospectively evaluate steroid regimens and symptomatic treatments of the first episode of INS 2.to assess prognostic factors of recurrence at 12 and 24 mos 3.to ascertain different behaviours between pediatricians and pediatric nephrologists.
Methods: Data of 231 children with onset of INS between 2007-09, were evaluated at start. A 24 mos follow-up was obtained in 144 children.
Results: Incidence was 3.5 per 100,000 children, median age at onset 3.7 yrs, M/F 2:1. 93% of children were steroid responsive, and 43% FR-SD. Steroid regimen at onset: total PDN dose ranged between 1904-6035 mg/m2, and the length 60-339 days. Median PDN dose (3876 vs 3188 mg/m2) and duration (174 vs 131 days) were higher in pediatric than in pediatric nephrolgy units. Symptomatic treatment: 54% of children received albumin infusions. Their use did not influence time to remission. Diuretics were utilized in 64% (furosemide 91%); vitamin D (44%), ASA (21%) and PPIs (45%) use was higher in pediatric centres. Prognostic factors: early age at onset was associated to the risk of FR-SD (OR, .87 [.75-.99], P<0.05). None of FR-SD subjects received a PDN dose >3400 mg/m2. Time to remission, clinical and laboratory data didn't show any correlation with relapses. IS treatment: CPM was the more commonly used (36%), CSA was preferred in higher PDN dependency, MMF showed the best 12 months relapse free survival rate (72%).
Conclusion: Age at onset is a prognostic indicator of FR-SD, while high total PDN doses seem to have a protective effect. A prospective therapeutic regimen is ongoing in the same centres.

Abstract# P-SUN221
The effect of magnesium sulfate combined with furacilin on treatment of nephrotic children complicated by cellulitis

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Objective: To investigate the effect of magnesium sulfate combined with furacilin on treatment of nephrotic children complicated by cellulitis.
Methods: 28 nephrotic children with a complication of cellulitis hospitalized in our department from Feb 2009 to Feb 2012 were enrolled and divided randomly into experimental group and control group. At the initial infection stage of cellulitis, external applications of 50% magnesium sulfate combined with 0.02% furacilin were performed while in control group were used magnesium sulfate only. Visual analog scale was adopted to assess pain intensity and the scores were analyzed between two groups.
Results: There was no statistical differences on pain intensity in the first 8 hours between two groups (P>0.05). The pain intensity was lower in experimental group in later 8~32 hours and the difference compared with control group was statistically significant (P<0.05).
Conclusion: External application of 50% magnesium sulfate combined with 0.02% furacilin can ease pain effectively in nephrotic children with a complication of cellulitis.

Abstract# P-SUN222
Short Time for Full-dose of Steroid plus Alternate-day Prednisone in Treatment of Childhood Nephrotic Syndrome

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Objective: Longtime for full-dose steroid in the treatment of childhood nephrotic syndrome, which may be one of the reasons that led to non-remission of the disease. This study was intended to propose a better steroid regimen in the treatment of childhood nephrotic syndrome.
Methods: We administered a questionnaire to 323 children who had been diagnosed as nephrotic syndrome and received regular steroid therapy. 236 cases were followed up after 6 months. All the patients weredivided into two groups. Group A received new steroid regimen (dexamethasone pulse followed by two-week oral full dose of prednisone and high-dose alternate day prednisone); Group B received the routine moderate-long course therapy of prednisone. The therapeutic effects and adverse effects of two groups were observed and compared.
Results 1. It was much more rapidly for urinary protein to disappear in group A than that in group B (P<0.05).2.The time for full dose of steroid in group A was much shorter than that in group B (group A: 23-day VS group B: mean 46-day).3.The remissive rate of group A was higher than group B (P<0.05). While the relapse rate of group A was lower than group B at the first surveys (24.28% vs. 46.00%) and follow-up (2.08% vs. 10.87%) (P<0.05).4.There were more patients who were resistant to or dependent on steroid in group B than group A (34.00%; 12.00% vs. 26.59%; 4.62%) (P<0.05).5.There were no significant differences in the height of patients between two groups, but there were more patients who had Cushingoid appearance and overweight in group B than that in group A (24.00%; 20.67% vs. 14.45%; 12.14%) (P<0.05).
Conclusions: The therapeutic effects of group A which received new steroid regimen were better than group B. The key of new steroid regimen was shorter time for full-dose steroid and prolonged dose-tapered course, which could reduce the relapse rate, avoid from side effects of steroid and keep remission for a long period.

Abstract# P-SUN223
The treatment of membranoproliferative glomerulonephritis in children with mycophenolate mofetil

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Objective: Membranoproliferative glomerulonephritis (MPGN) is a rare cause of pediatric nephrotic syndrome. There are few data about its treatment in children.
Methods and Results: There were nine children (4 girls and 5 boys) with MPGN type I, 1.8% of all patients with nephrotic syndrome in our department since 2004y, confirmed by light and/or electron microscopy. Onset was in 9 years in average (from 3 months to 14 years). Nephrotic-range proteinuria in onset was in all of them, gross gematuria in five children, arterial hypertension in four children, low C3 level in four children, GFR was slightly decreased in two children. All patients were treated with mycophenolate mofetil 1100mg/m2 per day in average (from 800 to 1400 mg/m2 per day) and prednisone 7 mg per day in average (from 2.5 to 20 mg per day) during 14-71 months (41.5 months in average). Five children achieved complete or partial remission in 13.6 months in average (from 2 to 32 months) after start of the therapy. All children with low C3 level were resistant for treatment. One patient progressed to end stage of chronic renal desease after 16 years of active disease. One child slightly decreased GRF. Two patients maintained GRF on the same slightly decreased level. Five children had normal GRF.
Conclusion: Long treatment with mycophenolate mofetil and glucocorticoids may induce clinical improvement in children with MPGN type I who have normal C3 level.

Abstract# P-SUN224
MAY BIOLOGICAL AGENTS BE USEFUL IN THE TREATMENT OF AMYLOIDOSIS CAUSED BY FMF?

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Objective, Methods and Results: A 13-year-old female patient with a history of recurrent abdominal pain, and fever periods for three years, was admitted to hospital with vomiting and increasing abdominal pain in the last five days. Her physical examination showed growth retardation and generalized edema. Laboratory examination revealed proteinuria (330mg/m2/s), hypoalbuminemia (<1g / dl), and hypercholesterolemia. Serum complement levels were normal and ANA was negative. Secondary nephrotic syndrome was thought as for initial diagnosis because of the age, growth retardation and abdominal pain episodes. Renal biopsy showed AA-type amyloidosis and homozygous M694V mutation was detected. Two mg per day colchicine was started for treatment in addition to dipyridamole, ACE inhibitors and atorvastatin. However, growth retardation, generalized edema and heavy proteinuria persisted despite after one year of colchicine treatment and a TNF-alpha antagonist infliximab treatment was administered. After six dose of infliximab therapy, serum total protein was found 5.2 g/dl, and albumin 1,9 g/dl. Patient received a total of 10 doses of infliximab therapy. Since patient developed edema, proteinuria, and low serum albumin concentration (<1 g / dl) after tenth dose of infliximab therapy, resistance was considered and treatment was discontinued. Interleukin receptor antagonist (anakinra) therapy was initiated. During anakinra treatment, proteinuria was decreased and acute phase reactants improved. Anakinra treatment was stopped after six months due to the patient was rejected any more using that treatment and end stage renal failure was developed.
Conclusion: There is limited data on the treatment of amyloidosis caused by FMF in children. Although biological agents may be useful in the treatment of amyloidosis caused by FMF, the progression of illness despite treatment with these agents has been reported in many patients. Patient presented here first responded infliximab therapy, however, patient became unresponsive to treatment. Likewise, anakinra was effective initially, but patient was rejected any more using that treatment and end stage renal failure was developed.

Abstract# P-SUN225
Single-center Analysis of Tacrolimus Treatment in Children with Refractory Nephrotic Syndrome

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Objective: the treatment of children with steroid-resistant (SR) and steroid-dependent (SD) nephrotic syndrome (NS) is still remaining intractable clinical problems. Tacrolimus, a calcineurin inhibitor, was gradually used in the above patients since a few years ago. We aimed to evaluate the efficacy and safety of Tacrolimus for inducing remission in children with SR/SD NS.
Methods: All cases of SR/SD NS received Tacrolimus at our center between January 2009 and January 2013 were reviewed. The initial dose of Tacrolimus was 0.10~0.15mg/kg.d , the course of treatment was 6-24 months . The Tacrolimus valley point was detected every 1-3 month.
Results: 36 patients with SR/SD NS were treated with Tacrolimus for 2~22-month periods. Male: female is 23:13, aging from 2.5 to 14 years olds (median age 7.2 years olds). SR: SD is 10:26. All the patients were follow up for 2 to 48 months (median 21.3 months). we observed Complete remission was achieved in 72.2% patients, Complete or partial remission was achieved in 83.3%. But 5 cases with recurrent proteinuria during the course of reduction or withdrawal. The time to response was 8-67 days (median 34 days). Before received Tacrolimus, renal biopsy was performed in 29 patients. Histopathological analysis of the biopsy revealed: minimal change disease (51.7%), focal segmental glomerulosclerosis (27.6%), mesangial proliferative glomerulonephritis (13.8%), IgM nephropathy (3.4%), and membranous nephropathy (3.4%). Side effects were mild and transient: five cases of gastrointestinal manifestation, three cases of elevated urine NAG, 1 case of acute kidney injury, and 1 case of diabetic ketoacidosis.
Conclusion: Tacrolimus is an effective and well-tolerated therapeutic option for the treatment of SRNS or SDNS in children. However, more investigations are required to observe the occurrence of relapses of the NS during long-term follow-up.

Abstract# P-SUN226
Cyclosporin A Nephrotoxicity Evaluated by Repeated Renal Biopsy in Children with Nephrotic Syndrome

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Objective: CsA is a very effective treatment for steroid-dependent (SDNS) and steroid-resistant nephrotic syndrome (SRNS) in children, however its unpleasant adverse effect, nephrotoxicity, becomes a major concern. There are no reliable clinical and biologic markers for CsA nephrotoxicity (CsAN) and performing renal biopsies is the only approach to detect early signs of renal damage caused by CsA. Little information is available in children with NS regarding histological analysis after CsA treatment. We aimed to assess the prevalence and histological charactristic of CsAN in children with NS.
Methods: The clinical and histological findings of 7 children (median age 9.1years, range 4.1-15.8 years, male:female 5:2) with NS treated with CsA were analysed retrospectively. The starting dose of CsA was 5 mg/kg/d, and the desired drug level was kept at 100-150 ng/ml. Serial renal biopsies were performed before and after CsA therapy.
Results: Patients with NS at an average age of 5.2 years (range2 – 10.2 years), 4 (57.1%) of them were diagnosed SDNS and 3 (42.9%) were

SRNS . Cyclophosphamide were previously administered in all patients. 5 cases were diagnosed MCD and 2 cases was FSGS in the first renal biopsy. The median duration of CsA therapy was 17.1 months (range 12-27 months). All patients went into part or complete remission during CsA treatment. There were 4 cases FSGS and 4 cases MCD after performing the second renal biopsy. Of these patients, 4 cases had mild tubulointerstitial changes, 2 cases moderate and 1 case was tubulointerstitial lesions graded as severe. However, only 1 case moderate tubulointerstitial changes was characterized as striped interstitial fibrosis corresponded to typical CsAN tubular change. 1 case with mild tubulointerstitial changes showed glomerular vascular pole hyperplasia corresponded to isolated CsAN vascular lesions.
Conclusion: Mild to moderate CsAN occurs in approximately one third of patients who have SDNS and are treated with CsA in our group. Considering progressive tubulointerstitial lesion itself can develop with time in patients with NS who are not treated with CsA, arteriolar lesions are generally regarded as more reliable indicators of CsA nephrotoxicity.

Abstract# P-SUN227
The relationship of prednisone-response duration with the prognosis of children with primary nephrotic syndrome

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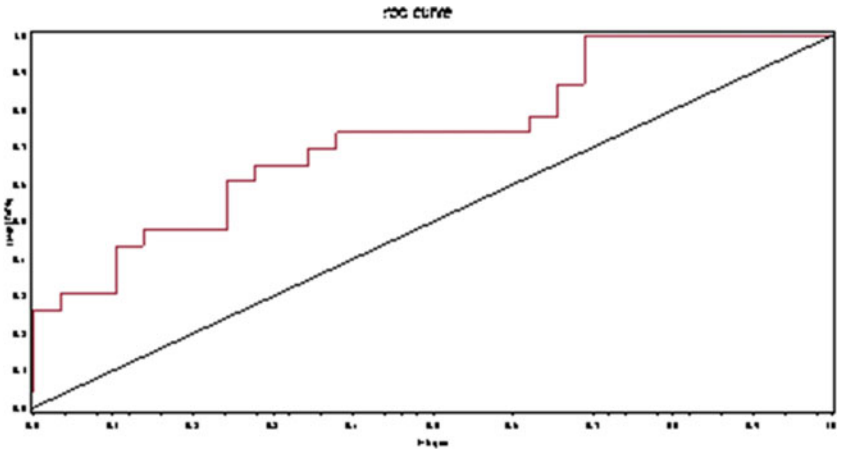
Objective: To observe the relation of the time of urine protein turning to negative (TPN,days) and prognostic correlation factors in children with primary nephrotic syndrome steroid-sensitive type(SSNS).
Methods: Excluding infectious factors, 52 children with SSNS treated in our unit initially from Jan, 2010 to Jun,2012 with at least 8 months follow-up visit. To investigate the effectiveness of receiver operation characteristic curve(ROC curve) in evaluating the value of TPN in whether SSNS relapse or not, and calculate the evaluating boundary values.
Results: In 52 cases of children of the 23 patients with relapse, not relapse (29), relapse rate was 44.2%, relapse in children 7 cases of steroid dependence, accounting for 13.5% of the total number of cases. Drawing ROC for TPN in whether SSNS relapse or not curve as follow. ROC Curve area of TPN was 0.716, there was a statistical difference (P<0.01),95% confidence interval :[0.808 to 0.970]. Along with the extension of time, the recurrence rate rise gradually, sensitivity gradually decline, specificity gradually rise. Using ROC Curve to evaluate its prognostic value is 9 days, the sensitivity and specificity were 65%.
Conclusion: The prognosis of Children's SSNS may be related to TPN, the faster in TPN, the lower in relapse rate, the better in prognosis. The best evaluating for its prognostic value is 9 days.



Abstract# P-SUN228
STANDARD VERSUS LONG TERM CORTICOSTEROID THERAPY IN THE TREATMENT OF INITIAL EPISODE OF NEPHROTIC SYNDROME IN CHILDREN

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Objective: To study the relapse rate and side-effect profile of standard and long-term corticosteroid therapy in the treatment of initial episode of nephrotic syndrome in children.
Methods: This is a prospective cohort study done in the pediatric department of a tertiary care hospital in New Delhi,India. 60 children between the age group of 1-12 years with initial episode of nephrotic syndrome were randomly allocated into standard regimen (SR) group (6 weeks daily prednisolone followed by 6 weeks alternate day) and long-term regimen (LTR) group (4 weeks daily prednisolone followed by alternate day tapering over 5 months). Children were followed up weekly for the first 6 weeks, fortnightly till the completion of the steroid therapy and then monthly for a total period of one year from the date of initiation of steroids. Height, weight, blood pressure and body mass index(BMI) was recorded during each visit. Cushingoid facies, striae and hirsutism were graded as mild, moderate and severe.
Results: The relapse rate in the LTRgroup was 20% as compared to 76.7% in SRgroup at the end of 1-year follow-up. In the LTRgroup the mean time of onset of first relapse after the completion of therapy was 6 months as compared to 3.2 months in the SRgroup. Multiple relapses (2 or more) were present in 1 child (3.3%) in the LTRgroup as compared to 17 children (56.7%) in the SRgroup. The steroid dose used in the treatment of initial episode, did not differ greatly in the two groups (123.8mg/kg over 3 months in the SRgroup Vs. 126.5mg/kg over 6 months in the LTRgroup). The average cumulative dose of steroids given over one-year follow up was more in the SRgroup (220.6mg/kg) as compared to LTRgroup (151.7mg/kg). A statistically significant difference was observed in the incidence of cushingoid facies and hirsuitism in the 2 groups (LTRgroup showing a lower

incidence than the SRgroup). No significant difference was noted in the incidence of striae, BMI and hypertension in the 2 groups.
Conclusion: Long-term steroid regimen was more effective in preventing relapses and had lesser side-effects than the standard regimen group in treatment of initial episode of nephrotic syndrome in children.

Abstract# P-SUN229
Effects to the intraocular pressure level using glucocorticoids for renal diseases in children

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Objective: To investigate the effects of intraocular pressure level about the receive of glucocorticoids dose, treatment course for renal diseases in children.
Methods: Collect renal diseases in children of the use of systemic glucocorticoids from February 2010 to November 2011 as the observation group, the normal children as the control group. The observation group need six months follow-up visits, and changes of intraocular pressure level should be observed about before using glucocorticoids, after half month, 1 month, 2 months and 6 months with prospective observational study. SPSS17.0 version of the software was used for data analysis. The correlation analysis was conducted between the average amount of hormone (mg / Kg) and the intraocular pressure value(mmHg) on the use of hormone after 1 month and 2 months.
Results: Through 2 independent samples T test used between the observation group with hormone before and the control group showed that the difference was not obvious between the intraocular pressure value of these two groups($P>0.05$). The observation group before using hormones in children had a total of 70, and there was 68,53,49 follow-up after using hormones half month one month, two month respectively. The intraocular pressure value of the two groups had significant and statistical difference at half month, one month, two months.($P< 0.05$); The Pearson correlation analysis which was conducted between the average amount of hormone (mg / Kg) and the intraocular pressure value on the use of hormone after 1 month and 2 months showed that there was a positive relationship between the two($p< 0.05$).
Conclusion: Renal diseases in children with systemic glucocorticoids can cause increased intraocular pressure. This study has confirmed that there is a certain relationship between glucocorticoids dose, treatment course and the intraocular pressure value. The larger the amount of hormones, the more obvious the increase of intraocular pressure value. Therefore, rational use of drugs, the strengthening of monitoring intraocular pressure, patients informed and coordinate checks are the keys of the prevention of glucocorticoid induced ocular hypertension and glaucoma.

Abstract# P-SUN230
Diagnosis and Treatment of Chinese Childhood Patients with Steroid-sensitive, Relaping/Steroid-dependent Nephrotic Syndrome : A National Collabortive Survey of 37 Hospitals

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Objective: To survey the diagnosis and treatment of steroid-sensitive , relaping/steroid-dependent nephrotic syndrome (SSNS,RNS/SDNS) in Chinese children.
Methods: Questionnaires concerning children with SSNS, RNS/SDNS were designed. A nation-wide survey was conducted and data of hospitalized children (younger than 18 years old) with SSNS, RNS /SDNS in 2008 and 2011 were analyzed.
Results: 37 hospitals in 27 cities, 4 municipalities and 2 autonomous regions were participated in this study. 3726 hospitalized children were diagnosed as PNS accounted for 20.0% of the hospitalized cases with urologic-kidney diseases. The male to female ratio was 3.2:1 and the mean age at the diagnosis was 4.1 years. The mean duration of pre-diagnosis was 12 days. 2753 (73.9%) cases were diagnosed as simple NS and 973 (26.1%) as nephritic NS. 76.4% PNS cases were the first episode and 28.2% were the relaping cases. 97.0% cases were diagnosed as SSNS, 5.7% as SDNS and 18.8% as frequently relaps NS (FRNS) .At NS diagnosis, the proteinuria was 3+-4+, median quantitive proteinuria for 24 hours was 120.0mg/kg, mean plasma albumin was17.8 +/- 6.0g/L and mean cholesterol was10.0 +/- 3.1mmol/L. The most common pathological type of 368 (9.9%) children underwent renal biopsy was MCD (40.2%), followed by MsPGN (32.9%), FSGS (12.8%). Oral prednisone (2mg/kg/d) was the main therapy for the first episode cases. The median time of proteinuria remission was 9 days. 96% cases reached complete remission in 4 weeks and 3.7% in 4-8 weeks. The median time for using full dose of corticosteroid (GC) was 31 days and total time for using GC was 10 months .35.0% FR/SD cases were treated with full dose of GC again, 82.3% of them reached remission and the median time was 9 days. 52.9% FR/SDNS were treated with immunosuppressant and the first choice was CTX(51.4%), then CsA (27.3%) ,MMF(17.1%)and FK506(9.9%).
Conclusion: Hospitalized children diagnosed as PNS account for 20.0% of the hospitalized cases with urologic-kidney diseases.The evidence-based guideline on diagnosis and treatment of SSNS ,RNS/SDNS (for trial implementation) conducted by Chinese Association of Pediatric Nephrology in 2009 was suitable for Chinese children with PNS .

Abstract# P-SUN231
Evaluation of the two steroid regimen in idiopathic steroid sensitive nephritic syndrome

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Objective: To evaluate the different effect in idiopathic steroid sensitive nephritic syndrome(SSNS) with the two different steroid regimen.
Methods: Regimen1(ISKDC regimen) means prednisone, 60 mg/m^2/day with a maximum of 80mg, once daily for 4 weeks followed by 40 mg/m^2 on alternate day with a maximumof 60mg given for a further 4weeks. Regimen1 consists of prednisone, 60 mg/m^2/day in divided doses till remission prolonged for 6 weeks followed by 6 weeks alternate day prednisone at a dose of 40 mg/m^2/day. 100 cases of initial therapy of SSNS were evenly distributed to the two regimen (group1, group2) and would be followed up for 1 year. The cases of steroid resistant nephrotic syndrome were excluded.
Results: The graph of research data have been shown as follows:

		Group1 (50cases)	Group2 (50cases)	P
Recurrence	1time/year	9	4	0.082
	2time/year	8	1	0.055
	≥3time/year	5	1	0.059
Complication	Infection	19	22	0.17
	Height (SD)	-1.86SD	-1.96SD	0.76
	Hypertension	2	3	0.87

Hyperglycemia	0	0	
Cataract	2	6	0.031
Osteoporosis	0	5	0.022

Conclusion: Longer initial course of corticosteroid therapy could decrease the relapse rate of SSNS in China, but it also raise mobidity of some complication such as osteoporosis and cataract.

Abstract# P-SUN232

Duration of Treatment with Calcineurin Inhibitor in Steroid Resistant Nephrotic Syndrome: Is Therapy Withdrawal Feasible?

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Objective: While calcineurin inhibitors (CNI) have established efficacy in inducing & maintaining remission in patients with steroid resistant nephrotic syndrome (SRNS), the optimal duration of therapy is not established. This retrospective study compared disease course & outcomes in patients with SRNS that were continued on or discontinued CNI beyond 2 yr of satisfactory therapy-induced remission.

Methods: Case records of patients with SRNS, 1-18 yr-old, treated with CNI between 2005-12 were reviewed. Patients in complete or partial remission following therapy with CNI for ≥2 yr were eligible if data on disease course was available for subsequent ≥1 yr, during or off CNI therapy.

Results: Of 66 patients (37 boys; 33 initial steroid resistance; 41 minimal change) treated with tacrolimus (n=33), cyclosporine (30) or both (3) agents for ≥2-yr, 32 discontinued CNI with (12) or without (22) switch to mycophenolate mofetil (MMF), while 34 continued CNI for 20.7±6.7 months (Table). Similar proportions of patients continued on or discontinuing CNI relapsed or required alternative agents; decline in eGFR was comparable over 22.3±13.1 mo. The time to first relapse or recurrence of frequent relapses or steroid resistance was similar (Fig.).

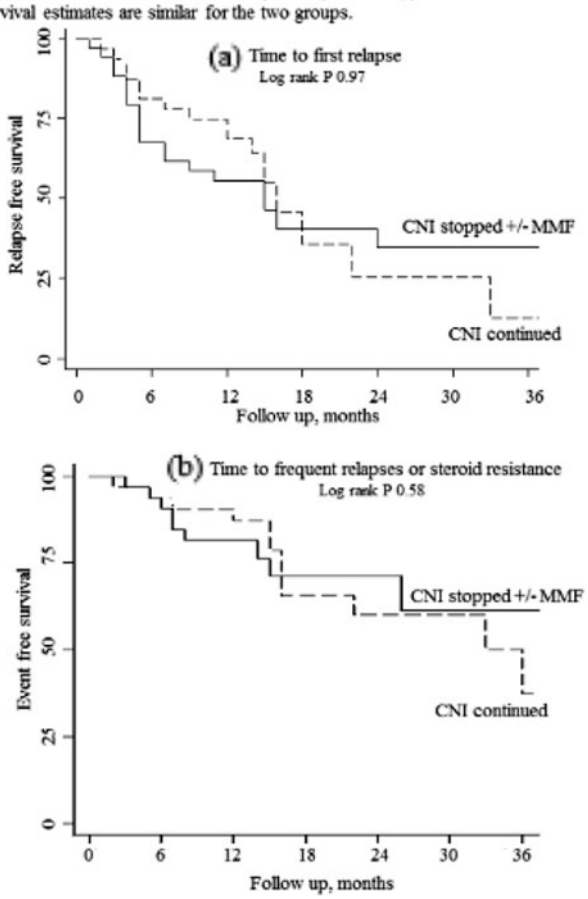
Conclusion: This retrospective review of short term outcomes suggests that therapy with CNI can be withdrawn or switched to MMF beyond 2-yr in patients with SRNS without increasing the risk of disease relapses. Prospective clinical trials should examine the relative safety and efficacy of CNI withdrawal versus prolonged therapy in patients with SRNS that respond to CNI.

Table. Characteristics and outcomes of included patients.

	CNI stopped±MMF	CNI continued
n (boys)	34 (16)	32 (21)
Initial resistance	15	18
Minimal change/focal segmental glomerulosclerosis	22/11	20/14
Age, mo at onset	41.8+34	34.6±24.5
At resistance	59.8+43.3	47±27.5
eFGR, ml/min at onset	90±27.6	85.1±27
At 2 yr of CNI	89.5±29.8	87±23.9
At follow up	87.6±24.9	87.7±29.8
At follow up, mo	23.8±16.1	22.1±10.1
Relapse	21	20
Frequent relapses	9	8
Non remission	2	1
Partial remission	2	2
eGFR<30 ml/min	0	1
Nephrotoxicity (n with biopsy)	2 (8)	3 (19)

Inter group P were NS

Figure. Survival free of (a) relapse and (b) frequent relapses or steroid resistance in patients continued or discontinued beyond 2-yr of therapy with CNI. Note that the survival estimates are similar for the two groups.



Abstract#P-SUN233

RITUXIMAB (R) VERSUS CYCLOPHOSPHAMIDE (C) IN THE TREATMENT OF STEROID AND CYCLOSPORINE A DEPENDANT NEPHROTIC SYNDROME (SCDNS)

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Objective, Methods and Results: To evaluate the risk/effectiveness ratio we compared R and C in the treatment of children with Steroid and Cyclosporin A dependant Nephrotic Syndrome (SCDNS). Patients: 29 children with SCDNS, in all kidney biopsy was obtained: 12 of them (group R: 8M/4F; mean age 9.0 yrs, mean disease duration: 5.7 yrs) were treated with two (a week apart) i.v. infusions of R at the dose of 365 mg/m2 BA; the other 17 children (group C: 7M/10F; mean age 7.7 yrs, mean disease duration: 4.3 yrs) received C at dose of 2 mg/Kg/day for 8 weeks by mouth. Both R and C were started when NS remission was achieved by steroids. None patient of Group R received C and vice versa. Proteinuria was monitored every 15 days in both groups; in group R CD19 and CD20 lymphocytes before and after

infusion and every two months were monitored; in group C leucocyte count every week was evaluated during treatment. Results are depicted in table:

	Group R n. 12 ptz	Group C n. 17 pts	p
Kidney Biopsy	IgM Nephropathy: 9 Minimal Changes: 3	IgM nephropathy: 11 Minimal Changes: 6	
Side Effects during treatment	Rash: 3	Leukopenia: 5, Alopecia: 1	
Side Effects following treatment	Urticaria: 1	None	
Withdrawal of previous drugs	3 pts (25%)	17 pts (100%)	<0.001
Decrease of ongoing drug dosage	9 pts (75%)	/	
Pts presenting NS relapse after 6 months of drug withdrawal	2/12 (17%)	8/17(47%)	<0.001
Pts relapse free after 12 months of treatment stopping	1/6 (20%)	8/16(50%)	<0.05

Conclusion: Our results indicate that R is more effective than C in reducing the number of NS relapses during the first 6 months after treatment, but this result can only be achieved with the concomitant use of Prednisone and/or CSA, albeit at a reduced dose. In contrast C allows for the suspension of any other drug. At 12 months, then, the percentage of persistent remissions obtained with C is significantly higher than that obtained with R. Side effects are limited to the infusion in case of R, during treatment with C a transient leukopenia is observed. Both drugs, therefore, are useful in the management of SCDNS helping to reduce the use of Steroids and CSA. However, the longer duration of remission, with no further maintenance therapy induced by C has to reevaluate this old, but still current medication.

Abstract# P-SUN234

Advantages and disadvantages of rituximab versus oral immunosuppression for high degree steroid dependent nephrotic syndrome – an anonymous patient survey

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Objective: To evaluate advantages and disadvantages for rituximab versus oral calcineurin inhibitors for remission maintenance in children with high degree steroid and calcineurin inhibitor dependent idiopathic nephrotic syndrome.
Methods: We evaluated prospectively in an anonymous patient survey both treatment strategies in patients between 10 and 18 years who were on oral immunosuppressive treatment (outpatient follow up every two to three months) and who were switched to RTX treatment with an 18-month B cell depletion period using repeated RTX infusions and monthly CD19 monitoring. The patients completed an anonymous questionnaire with potential advantages and disadvantages of oral immunosuppression and RTX treatment. At the time of the survey the patients had completed at least 12 months of oral immunosuppression and 12 months of RTX induced B cell depletion.
Results: We included 15 patients (6 girls).The relapse number per patient in both treatment periods was 0.8 and 0.6 respectively ($p>0.05$). 12/15 patients "preferred" RTX treatment to oral immunosuppression. The main reasons were: "Not afraid to forget oral treatment" (13/15); "don't need my parents to manage my treatment at home" (11/15). "I feel free at home and I don't think about my disease" (12/15). RTX disadvantages were: "too many outpatient visits for blood sampling" (6/15). I don't feel well during the RTX infusion (2/15). Advantages of oral immunosuppression were not mentioned. Main disadvantages were "fear to forget" (13/15) and "I feel different from the others because I have to take pills twice a day".
Conclusion: Adherence to longterm oral medication is difficult to achieve. Among the studied pre/adolescents, the wish to "feel free" and "to be like the others" seem to be the main reasons why RTX is the preferred treatment option for 80% of high degree SDNS patients.

Abstract# P-SUN235

Repeated administration of rituximab for refractory nephrotic syndrome in children

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Objective: Recently, several non-controlled clinical trials have suggested that rituximab (RTX), a chimeric monoclonal antibody inhibiting CD20-mediated B-cell proliferation and differentiation, is effective for children with refractory nephrotic syndrome (NS), though an established regimen does not exist. An investigation into refractory NS reported the peripheral blood B-cell count to decrease for about 100days upon single RTX administration, before NS relapsed. This study was conducted to clarify whether long-term remission of refractory NS may be obtained by repeated administration of RTX and maintaining a decreased peripheral blood B-cell count.
Methods: RTX at 375mg/m^2/time was repeatedly administered every 3 months, a total of 4 times to 5 children with steroid-dependent NS; then, the clinical indicators before and after administration were compared by the Wilcoxon signed-rank test.
Results: The median age at the start of RTX administration (range) was 14 (10-17) years old. Regarding the renal tissue, minor changes were seen in 4 cases, with 1 case of focal segmental glomerulosclerosis. The median (range) observation period was 6.3 (0.9-8.4) years before RTX administration and 2.9 (1.4-3.4) years following commencement of RTX administration. The changes in the clinical indicators before and after RTX administration were as follows {median value (range)}: (1) Annual number of relapses: before administration: 1.4 (1.1-3.5) times/year, after administration: 0.0 (0.0-0.3) times/year; (2) Steroid dosage: before administration: 0.80 (0.23-0.96) mg/kg/day, after administration: 0.03 (0.02-0.27) mg/kg/day; (3) Peripheral blood B-cell count: before administration: 196 (94.6-371) count/μl, during administration: 2.72 (0.920-116) count/μl, with all items significantly declining compared to before RTX administration ($p<0.05$). Relapse occurred in 2 cases following the start of RTX (period from starting RTX to relapse was 2.2 years and 1.9 years, respectively). No serious side effects or infectious diseases were seen.
Conclusion: Repeated administration of RTX against refractory NS in children may be a useful therapeutic option.

Abstract# P-SUN236

A case report in a Chinese girl with tuberculosis preceded the onset of the nephrotic syndrome: Remission after treatment with Tacrolimus and prednisolone

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Objective: Tuberculosis (TB) is still a major health problem particular in the developing countries. Diagnosis of TB in children is more challenging than in adults. It has been reported that the occurrence of tuberculosis in the nephrotic syndrome (NS) may interfere with the response to steroid therapy and may also have a detrimental effect on renal function.
Methods and Results: We report on a teenage girl (weight: 50kg) with NS, who fulfilled the International Study of Kidney Diseases in Children Criteria for NS-edema, hypoalbuminemia, proteinuria, and hypertcholesterolemia. She was also found TB infection which made through clinical findings, history of exposure to a positive source case, a positive TST (TB Skin Test), a positive T-spot test, positive microbiological results in urine and sputum (acid-fast bacilli). With a regime of 4 drugs (isoniazid, rifampin, pyrazinamide and ethambutol) treatment about 2 months, the girl had good response to the TB infection with negative microbiological results in urine and sputum, but remained heavy proteinuria and severe edema. She had no response to 8-week prednisolone (60mg/d) plus 2 pulses of methylprednisolone and received the renal biopsy. The renal pathological result showed minimal change disease and acid-fast bacilli in renal tissue was negative. She was added with Tacrolimus. She got partial remission of NS after Tacrolimus had been given 3 months and complete remission of NS after Tacrolimus had been given 7 months. At the same time prednisolone tapered and stopped in 18 months. Tacrolimus had been used for 17 months till now and there was no relapse of NS and no side effects on renal function.
Conclusion: All children in nephrotic syndrome should screen the TB infection, especially in the developing country. Effective treatment of TB can protect the children from severe TB infection although given immunosuppressant agents in NS children.

Abstract# P-SUN237
Inhibition of Inosine 5`-Monophosphate-Dehydrogenase (IMPDH) Activity by Mycophenolic Acid (MPA) in Children with Nephrotic Syndrome

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Objective: MPA is a potent, reversible, uncompetitive inhibitor of IMPDH, the key enzyme in the de-novo purine biosynthesis in proliferating T- and B- lymphocytes. Free MPA that is not albumine bound, is the pharmacologically active moiety. MPA is increasingly used as an alternative treatment in children with frequently relapsing and steroid dependent nephrotic syndrome in order to reduce steroids. Recent data depict the clinical relationship between MPA exposure and risk of relapse. So far there are no data on the interaction of MPA, free MPA and IMPDH in respect of a pharmacodynamic monitoring of MPA therapy in children with nephrotic syndrome.
Methods: 5 children (1 girl), age 7.1±1.8 years, suffering from minimal-change glomerulonephritis received a single treatment regimen with MPA, daily dose 887±76 mg/m^2 BSA. IMPDH activity was determined before initiation of MPA. Complete pharmacokinetic/ pharmacodynamic (PK/PD) profiles were performed 2-4 weeks thereafter. All patients had a serum-albumin concentration > 3.5 d/dL at time of profile. Plasma concentrations of MPA (EMIT-Assay®), free MPA (HPLC-MS) and IMPDH activity (HPLC from lysed lymphocytes) were determined before and 0.5, 1, 2, 1.5, 2, 4, 6, 8, 12 hours after administration of MPA.
Results: There was an inverse association between MPA plasma concentrations and IMPDH activity. PK and PD parameters: Basal IMPDH activity before treatment: 91.3±5.8 μmol/s/mol AMP. MPA-AUC$_{0\text{-}12}$: 65.9±13.4 μg/ml. Free MPA-AUC$_{0\text{-}12}$: 0.89±0.42 μg/ml. IMPDH-AEC$_{0\text{-}12}$ (Area under enzyme activity-time curve): 380.7±133.6 μmol/s/mol AMP.
IMPDH-AEC$_{0\text{-}12}$ did not correlate with MPA-AUC$_{0\text{-}12}$ but did with free MPA-AUC$_{0\text{-}12}$ (r^2=0.69) and with free MPA-C$_{max}$ (r^2=0.91, P=0.04). Maximum inhibition of IMPDH activity was 74% (59-94%).
Conclusion: We could show for the first time that MPA as single treatment regimen inhibits IMPDH activity in children with nephrotic syndrome comparably to its effect in pediatric renal transplant recipients under combined immunosuppressive therapy (maximum inhibition of IMPDH activity 64% (29-87%). There is a PK/PD association of free MPA exposure and IMPDH activity that might have the potential to optimize future therapy.

Abstract#P-SUN238
Therapeutic drug monitoring of tacrolimus in children with idiopathic nephrotic syndrome

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Objective: This study investigates the tacrolimus (Tac) pharmacokinetic (PK) parameters in children with idiopathic nephrotic syndrome.
Methods and Results: Tac is a therapeutic option for children with steroid dependent idiopathic nephrotic syndrome. The assessment of Tac exposure is required in clinical practice because of its narrow therapeutic index and the high inter-patient variability of its PK parameters. Limited data are available on the PK of Tac in patients with nephrotic syndrome.
We conducted seven 8-hours pharmacokinetic profiles among 6 children with idiopathic nephrotic syndrome. Tac concentrations were determined using a validated immunoenzymatic assay.
Tac dose and PK parameters (estimated 0-12h area under the concentration-time curve (AUC$_{0\text{-}12}$), minimum whole-blood concentration (C$_{min}$), maximum whole-blood concentration (C$_{max}$) and time to achieve maximum whole-blood concentration (t$_{max}$)) are presented in Table 1. The 7 whole blood Tac concentration-time profiles demonstrated a high inter-patient variability. We observed a decrease in Tac exposure (Tac AUC$_{0\text{-}12}$) associated with a decrease in Tac C$_{max}$ in this population compared to published PK parameters in a population of paediatric renal transplant recipients. Furthermore, there was a significant discrepancy between Tac C$_{min}$ and Tac AUC$_{0\text{-}12}$.
Conclusions: Tac C$_{min}$ appears to be an unreliable tool for the estimation of drug exposure in patients with idiopathic nephrotic syndrome. Tac monitoring with AUC$_{0\text{-}12}$ may avoid Tac under-exposure in this population of patients.

Tac PK parameters	Median	Percentile 25	Percentile 75
Daily dose (mg/kg)	0.17	0.1	0.22
AUC$_{0\text{-}12}$ (h X ng/ml)	96	84	111
C$_{max}$ (ng/ml)	11.1	10	16.5
C$_{min}$ (ng/ml)	6	5.2	7
t$_{max}$(mn)	180	120	240

Nephrotic syndrome: Treatment complications

Abstract# P-SUN239
Steroid-induced psychosis in an 11 years old girl with steroid dependent nephrotic syndrome on full dose oral steroids

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Objective, Methods and Results: Delirium is a transient, reversible cause of cerebral dysfunction which manifests clinically with a wide range of neuropsychiatric abnormalities. Clinical hallmarks are decreased attention span and a waxing and waning type of confusion. Steroid-induced psychotic disorder is one of the serious adverse effects of corticosteroid therapy. It has been rarely reported in children, though a well-known complication in adulthood. We report an 11-year-old girl of steroid-induced psychotic disorder in a steroid dependantnephrotic syndrome who was treated with antipsychotics. Neuroimaging and CSF analysis were noncontributory. Risk factors precipitating psychosis in the case were: severe illness, exposure to medication (steroids), electrolyte disturbances notably hypocalcemia, hypomagnesemia, hypokalemia, hypoalbuminemia and dehydration. She was managed with correction of electrolyte and metabolic abnormalities, steroid dosage reduction and antipsychotic therapy, after which she recovered. Medications were continued after discharge along with low dose steroids.
Conclusion: This is the rare case of steroid-induced psychosis in a girl with nephrotic syndrome.

Abstract# P-SUN240
Leflunomide (LEF), a potential new second-line agent for the treatment of idiopathic nephrotic syndrome (INS)

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Objective: 50% of children with INS receive treatment with a second line agent due to frequent relapses (FR), glucocorticoid (GC) dependence or resistance. Currently used medications have limitations related to high cost or potentially treatment-limiting adverse effects (AE). We hypothesized that LEF, a mild immunosuppressant with anti-TNF-α and antiviral activity, and a favorable AE profile is a potential alternative to currently used second-line agents. Here, we give a first account of the introduction of LEF in patients with NS and an analysis of its efficacy and tolerability.
Methods: Observational study / retrospective review of clinical and laboratory data.
Results: Five patients ages 4.7 - 18.3 years (median 12.7 years) were treated with LEF over 3 – 24 months (median 3.8 months): three children with FR/GC-dependent, histologically proven minimal change disease (MCD; n=2) or focal-segmental glomerulosclerosis (FSGS; n=1), one with treatment recalcitrant collapsing glomerulopathy (CG), and one with recurrent FSGS post kidney transplant (R-FSGS). The starting dose of 20 mg once daily target was titrated to achieve steady-state trough levels of 40-80 mg/L. All 3 patients with MCD and GC-responsive FSGS remained in remission with LEF monotherapy over a median duration of 11.4 months, with current drugs levels between 47 and 60 mg/L. Treatment of the patient with CG was stopped after 3 months due to lack of response and inability to achieve trough levels above 10 mg/L. The patient with R-FSGS, previously in partial remission with anti-TNF antibody therapy, remained stable after changing to LEF (trough 30-40 mg/L) and reducing the concurrent dose of mycophenolatemofetil. Two of 5 patients revealed a transient rise of liver enzyme activities <2 fold the upper normal, which resolved without dose change. No hematological or other abnormalities were noted.
Conclusion: LEF may represent an effective, alternative second line agent for GC dependent/FRNS and, potentially, R-FSGS. Additional, long-term observations are needed to corroborate the preliminary findings and ascertain the absence of clinically important AE before planning a prospective trial and refining indications for its use.

Abstract# P-SUN241
Tachyphylaxis to Cyclosporin A in Children with Refractory Nephrotic Syndrome

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Objective: Cyclosporin A (CYA) is an essential drug for children with steroid dependent (SD) or steroid resistant (SR) nephritic syndrome (NS). CYA has excellent effects to prevent the relapse of SDNS and to introduce the remission of SRNS. However, these patients often have considerable dependency to CYA. Recently, as long-term use of CYA increases, the tachyphylaxis to CYA is becoming the considerable problem. Tachyphylaxis often makes the disease return to steroid dependent or frequent relapsing again.
Methods:134 idiopathic NS patients had been treated in our department from 2004 to 2011. They had various clinical courses and 33 were SRNS. CYA was used in 74, and combined with or without other immunosuppressants. In almost of them, CYA was effective initially.
Results: 5 of 74 (6.8%) patients, however, showed the tachyphylaxis to CYA subsequently. [Case 1] At the age of 2 years old, her SRNS developed. mPSL pulse therapy and CYA could introduced the remission. CYA and small dose PSL could maintain the remission for 18 months, however NS became SD and SR thereafter. [Case 2] His NS developed at 8 years old and relapsed frequently. Between 15 to 30 months from the onset, relapse was infrequent by CYA. However, the relapse became frequent again in spite of using CYA. [Case 3] Her NS developed at 8 years old and was SR. We could obtain the remission with chlorambucil. After 4 years, relapse was found and became frequent. From 15 years old, CYA could maintain the remission and after 3 years CYA was discontinued. However, NS shows secondary resistance to CYA now. [Case 4] His FRNS developed at 4 years old. Although various therapies were performed, he suffered relapses. At the age of 21 years old, CYA was started and the relapse did not develop for 15 months. However relapse became frequent again subsequently. [Case 5] Her NS developed at 5 years old. CYA was started at nine months later of the onset for frequent relapses. She did not suffered relapse for 27 months from the CYA start. However, It came to recur frequently again subsequently.
Conclusion: CYA is very useful and essential for refractory NS. However, since many patients have the dependency to CYA, the duration of treatment tends to be prolonged. It is necessary to hurry measures to the tachyphylaxis.

Abstract# P-SUN242
HEMOGLOBIN A1c LEVEL IN NEPHROTIC CHILDREN GETTING ORAL PREDNESOLON

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Objective: Steroids may raise the blood glucose level as a systemic effect. Glycated hemoglobin (Hba1c) is being used with increasing frequency to monitor long term blood glucose level and its estimation provides an accurate index of the mean concentration of blood glucose during preceding two to three months. Due to this, the potential effect of oral prednisolon on HbA1c levels in children with 1st attack Nephrotic syndrome was investigated.
Methods: It is a case control study, done in OPD of Apollo Hospitals Dhaka during January 1012 to 1st March 2013.Thirty Nephrotic children with 1st attack who were completing their 12 weeks steroids therapy were enrolled as study group. Age and sex matched child who attended OPD for other illness, and who have no family history

of diabetes regarded as control. HbA1c level was estimated in Nephrotic patient just end of their 12 weeks of prednisolon therapy.
Results: The mean age of study (n=30) and control (n=30) group were 4.56+/-1.54 and 4.90+/-1.06 years. Male and female ratios were 1.0:0.76 and 1.0:0.88 in case and control group respectively. Age and sex difference between the groups were not significant. The mean HbA1c value was 5.00 +/-0.28 in case and 4.43+/-0.35 in control group. HbA1c level in children with Nephrotic child was significantly higher than control group (p<0.0001). The calculated mean blood sugar (HbA1c×35.6- 77.3 = blood sugar mg/dl, by using a formula by Rohlfing, et al.) level was 99.75+/-9.80 and 80.30+/-12.48 in case and control group. This differences was also very significant ((p<0.0001).
Conclusion:Nephrotic child getting steroid have significant higher level of HbA1c then their healthy counterpart though the level is not diabetic level. Long term evaluation should done to find out the effect of these findings.

Abstract# P-SUN243
Impact of cumulative doses of cortisone on growth and bone mineral density in patients with nephrotic syndrome

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Objective: Corticosteroids are the treatment of choice in patients (pts) with idiopathic nephrotic syndrome (NS) to induce remission and treat subsequent relapsing episodes. Cumulative doses of cortisone are supposed to have a long term negative effect on growth and bone mineral density (BMD). The study analyzed the impact of cumulative doses of corticosteroids on growth and BMD in children with NS.
Methods: A retrospective study was done from 1992 to 2011 in children with NS. For each pt, the cumulative dose of cortisone received during the following period was calculated in [mg/kg/day]. The mean cumulative dose of cortisone was correlated first with growth expressed in Z-score [SD] (=standard deviation) and secondly to spine BMD (in [g/cm^2] Z-score SD obtained by dual energy X-ray absorptiometry (DEXA). Impact of cumulative doses of cortisone was assessed using linear regression. Then we analyzed impact on growth and spine BMD related to doses levels of cortisone [mg/kg/day] : low dose (<0.2); medium (0.2 to 0.4) and high (>0.4).
Results: 30 pts were included (21 boys, 9 girls) with a median (M) age of 3.7 years old (interquartile range (IQR) 2.6-4.8) at onset of NS. 23/30 (76%) had minimal change disease, 5/30 (16%) focal segmental glomerulosclerosis, other etiologies (8%). 15/30(50%) were corticosteroid-resistant NS (n=7) or corticosteroid-dependant NS (n=8). The M follow-up was of 9.8 years (IQR 6.6-11.7) and the pts presented a M of 8.5 relapses (IQR 4-13). The M cumulative dose of cortisone received by the pts was 0.27 mg/kg/day (IQR 0.18-0.35). Growth and spine BMD were negatively associated to the cumulative dose of cortisone p=0.001 and p=0.037, respectively. Patient with high cumulative dose of cortisone had lower final height Z-score (-1.46 [SD], SD 0.84) compared to pts with medium dose (-0.15, SD 0.95; p=0.008) or low dose (+0.5, SD 0.47; p<0.001). In contrary no difference was observed in spine BMD according to the different levels of cortisone.
Conclusion: In pts with NS, followed during almost 10 years, cumulative doses of cortisone were significantly associated with delay growth and a decrease in BMD. Delay growth was more severe according to level dose of cortisone however this level effect was not observed for BMD.

Abstract# P-SUN244
ASSESSMENT OF THE HYPOTHALAMIC-PITUITARY-ADRENAL AXIS IN CHILDREN AFTER A FIRST FLARE OF NEPHROTIC SYNDROME TREATED BY ALTERNATE-DAY CORTICOSTEROIDS

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Objective: A supra-physiological intake of corticosteroids is a well known risk factor for the development of adrenal insufficiency. The risk is considered to be lowered in case of alternate-day therapy. However, the integrity of the hypothalamic-pituitary-adrenal (HPA) axis after a first flare of steroid-sensitive nephrotic syndrome (SSNS) treated by daily steroid-therapy during 1 month then on alternate-days during 3.5months has never been demonstrated. We ought to investigate the function of the HPA axis in children after a first episode of SSNS.
Methods: Eleven patients with a first flare of SSNS were included in the study : 7 males, 5 females. The median age at diagnosis was 4.3 years (range 210.4 years). All patients received the standard steroid regimen recommended by the French Pediatric Nephrology Society which consists of prednisone at a dose of 60 mg/m2 qd for 4 weeks, followed by 60 mg/m2 qod for 8 weeks, then slowly tapered within 6 weeks. A systematic laboratory assessment including measurement of basal cortical levels and response to short synacthen test was performed 48h after completion of the 18 week steroid regimen.
Results: All patients had normal responses on the short synacthen test, with a peak cortisol above the cut-off level (>550 nmol/l), whatever the basal cortisol level (normal or low). None of them presented any clinical manifestation of adrenal insufficiency.
Conclusion: Children with SSNS treated with 4 weeks of daily prednisone followed by 14 weeks of alternate-day prednisone have normal HPA axis function. Therefore, the above prednisone regimen can be safely withdrawn without performing HPA explorations in children with a first episode of SSNS.

Abstract# P-SUN245
Changes in body-weight, serum leptin and ghrelin level of steroid-sensitive nephritic syndrome

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Objective: To understand the changes in body- weight, the leptin and ghrelin level of children with **steroid-sensitive** (SSNS), to explore its relationship with the change of body- weight.
Methods: The subjects of this study were 40 cases of PNS patients, and they were treated with glucocorticosteroid(GC) treatment and manifested the steroid sensibility. Before the case group was taken GC, after they were taken for GC 1 to 2 months, and when the GC dose was reduced to 10-20mg for oral administration every other day (plateau stage), detected the levels of serum leptin, soluble leptin receptor and ghrelin and so did in the control group, and monitored the height and body weight in the case group.
Results: 1) Changes in body-weight: After the GC treatment was carried out for 1 to 2 months, BMI levels of 13 children were reaching the overweight level; and BMI levels of 5 children were reaching the obesity level; although BMI levels of 7 children were less than 85 percentile, the increase of body-weight was more than 10%. When the GC treatment was in plateau stage, there were still 9 cases of children with BMI > 85 percentile. 2) Change of

free leptinindex(FLI), ghrelin level:After the children were applied GC for 1 to 2 months, the serum FLI was significant higher than that of control group (P = 0.018, t = -2.47),the FLI and ghrelin was negatively correlated, (P = 0.03, r = -0.357). In the body-weight increase group, the serum ghrelin level was significant lower than that of stable body-weight group (25.17 +/- 6.31vs 30.3 +/- 6.57, P = 0.023, t = 2.38). There was no significant difference in FLP between the two groups (24.86 +/- .53 vs 31.64 +/- 12.9, P = 0.085, t = -1.77).
Conclusion: The body weight of SSNS are often increased at the begining, but most children can be returned to the normal level as the GS dose is reduced to the plateau stage. The one whose body-weight is significantly increased, his serum ghrelin level will be significant increased and negatively correlated with FLI.

Abstract# P-SUN246
Long-term prognosis and risk factors for relapse in patients with steroid-dependent nephrotic syndrome treated with rituximab

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Objective: Rituximab (RTX) provides an effective option for the treatment of patients with refractory steroid-dependent nephrotic syndrome (SDNS). We therefore evaluated long-term prognosis and risk factors of relapse in patients with SDNS treated with RTX at a single center.
Methods: Patients who received RTX for continuing SDNS despite immunosuppressive agents (ISs) were included in this study. We analyzed the risk factors for first relapse after RTX treatment using Kaplan-Meier and multivariate Cox proportional hazard methods.
Results: Eighty-one patients (age, 3.1 +/- 1.8 years) were included in the study. Most patients were able to discontinue steroids except for five patients who could reduce their dose to <5 mg/day prednisolone. The median numbers of relapses per year were 1, 1, 1, 0.5 and 0 for years 0, 1, 2, 3 and 4 after RTX treatment, respectively. These were significantly lower than before RTX treatment (4 per year). The median height SDS were -1.06 and -1.02 at 1 and 2 years after RTX treatment, respectively, which represented significant improvement compared with before RTX treatment (-1.37). Additional RTX was administered in 39 patients. ISs were continued in most patients except for two patients who received no ISs after RTX treatment. At the last observation, only five patients were able to discontinue ISs. None of them experienced life-threatening adverse events. History of steroid-resistant nephrotic syndrome (SRNS) (p=0.0174) and discontinuation of ISs after RTX (<0.0001) were significant risk factors of earlier relapse according to univariate analysis. In multivaiate analysis, history of SRNS (hazard ratio = 2.13, p = 0.0366) and discontinuation of ISs after RTX (hazard ratio = 8.80, p = 0.0002) were also significant risk factors of earlier relapse.
Conclusion: RTX is a promising and effective option for preventing relapse in patients with refractory SDNS receiving ISs. Most patients in this study were able to discontinue steroids. A history of SRNS and discontinuation of ISs were risk factors for earlier relapse after RTX treatment. New treatment strategy for patients with SRNS is need to be developed in the future.

Abstract# P-SUN247
Bone metabolism in children with nephrotic syndrome treated with glucocorticosteroids

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Objective: Aim of the study was to assess bone mineral density and serum concentration of bone metabolism markers in children with nephrotic syndrome (NS).
Methods: Twenty five children with NS in the age from 8.0 to 16.5, mean 9.4 +/- 3.7 yrs, were involved into the study. Median number of relapses of NS was 6 (1 - 22). All patients were treated with prednisone and vitamin D (800 IU/24h). In all patients at onset of the study and after 12 months following parameters were evaluated: bone mineral density of total body (TB-BMD) and lumbar spine (L-BMD) by dual energy X-ray absorptiometry (DEXA) expressed as Z-score, serum calcium, phosphorus, parathormone (iPTH), alkaline phosphatase (ALP), bone alkaline phosphatase (BAP), osteocalcin (OC), albumin, creatinine, $25(OH)D_3$, $1,25(OH)_2D_3$ and urine calcium/creatinine ratio (uCa/Cr). All measurements were performed during remission of NS.
Results: After 12 months we observed a significant decrease in mean values of TB-BMD Z-score (from -0.24 +/- 1.34 to -0,74 +/- 1.31, $p<0.05$) and in mean serum level of $25OHD_3$ (from 31.7 +/- 16.3 to 23.7 +/- 9.3, $p<0.05$). No significant differences were found in others studied parameters. At onset and after 12 months 8 out of 25 (32.0%) children had serum level of $25OHD_3$ below 20 ng/mL. In the initial period negative correlations were found between L BMD Z-score and ALP, BAP and phosphorus serum level (r= -0.45, -0.47, -0.45, $p<0.05$ respectively) and between TB-BMD Z-score and uCa/Cr (r=-0.42 $p<0.05$), after 12 months between L BMD Z-score and BAP, OC (r=-0.47, -0.52 $p<0.05$, respectively), positive correlation between L BMD Z-score and $25OHD_3$ serum level (r=0.45, $p<0.05$). On multivariate analysis, BAP was the strongest predictor of L BMD Z-score (beta=-0.49, $p<0.05$).
Conclusion:1. Children with NS should be supplemented with vitamin D during steroid therapy in a dose possible higher than 800 IU/24h to prevent osteopenia.2. Serum BAP concentration seems to be a good indicator of spongy bone metabolism in children with NS treated with glucocorticosteroids.

Abstract# P-SUN248
The observation of glucocortieoid-induced osteoporosis in pediatric kidney diseases by quantitative ultrasonometry

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Objective: To observe the glucocorticoid-induced osteoporosis(GIOP) by quantitative ultrasonometry in children using glucocorticoid with kidney diseases, analysis its influencing factors. Also to assess the significance of quantitati-veultrasound(QUS, Sunlight company) in diagnosis of GIOP.
Methods: The tibiaradialbone mineral density(BMD) were obtained in 67 cases of the pediatric kidney diseases during the treatment of corticorcoid by (QUS), 12 cases were also measured by dual energy X-Ray absorptiometry(DEXA), and the clinical data of gendre, age, body mass index, administration time and daily dosage of glucocorticoid were also collected and analysed. The as-sociation between the time of glucocorticoid, daily dosage of glucocorcoid and the different degrees of BMD were analyzed by logistic regression analysis.
Results: Total of 67 patients(male 45,famale22) were divided into four groups according to the reference standard of Asian children BMD data provided by Sunlight company, the normal BMD (Z>0, 41 patients), the mild osteoporosis(-1z<0,18>Z-score=(current value-reference value at current age)/one standerd deviation. T-score=(current value-Young Ref.value)/one standerd deviation. Both QUS and DEXA were highly correlated with BMD in our patients being measured. The time

of glucocorticoid treatment and daily dosage of glucocorticoid in the abnormal BMD group were significantly higher than the normal BMD group (P<0.05). The time of glucocorticoid treatment and daily dosage of glucocorticoid were negatively correlated with radial bone BMD. Analysis showed that the time of glucocorticoid, and the daily dosage of glucocorcoid were both the risk factors of GIOP.
Conclusion: QUS is a better method for evalution of BMD and diagnosis of GIOP compared with DEXA in children. The daily dosage of glucocorticoid and the time of glucocorticoid treatment are both the risk factors of GIOP.

Abstract# P-SUN249
The Effects of Rituximab therapy in Children with Steroid-dependent Nephrotic Syndrome

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Objective: To explore the effects of Rituximab treatment in children with steroid-dependent nephrotic syndrome (SDNS).
Methods: 9 children with SDNS, who hospitalized from 2011.10 to 2013.3, relapsed during the therapy of steroid and one or more immunosuppressive agents. And they were treated with rituximab 1 to 2 times (375mg/m^2/per time). The efficiency and side effects of rituximab treatment were be observed.
Results:(1) 9 children (male: female: 5:4) with SDNS, aging from 6 to 17 years olds (mean age 9.4±3.4 years olds). And the course of disease when they got rituximab was from 36 to 108 months with the mean of 66.4±26.4 months. The dosage of steroid dependent was from 6.82 to 30mg/ m^2/d (the mean was 12.9±7.23mg/ m^2/d). And 7 of them who got renal biopsy were MCD. They got treatment of steroid only after rituximab, and followed up for 1 to 17 months (mean 9±6.3 months). (2) Efficiency: The B cell were suppressed obviously after treating with rituximab in two weeks (CD20<1%, *P*<0.05). The B cell depletion lasted for 1 to 15 months (mean 6.3±5.0 months). At the last follow-up, 3 patients (33.3%) relapsed after using rituximab. But 44.4% patients (n=4) was free of oral steroid and sustained complete remission. Of those still receiving steroids except the last patient got rituximab one months age, all doses had been decreased(*P*<0.05) and with complete remission. The rate of complete remission was 88.9%. (3) Side effects: When using rituximab, only one patient had got rash with accelerated pulse and breathing, the blood pressure was normal. And 2 patients underwent upper respiratory tract infection in control later.
Conclusion: From this study, we found that Rituximab was efficacy and safety for treatment of children with SDNS, but also, can taper the dosages of steroid in SDNS.

Abstract# P-SUN250
PREDICTIVE FACTORS OF EFFICACY OF MYCOPHENOLATE MOFETIL (MMF) IN CHILDREN WITH STEROID-DEPENDENT IDIOPATHIC NEPHROTIC SYNDROME (SDNS)

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Objective: MMF has been used for over 10 years to treat SDNS, but its optimal use is not clearly defined. The understanding factors influencing efficiency would better define its place among other immunosuppressive drugs.
Methods: we performed a monocentric retrospective study, including 96 patients with SDNS and a follow-up of 4.2 years (1-12) after the onset of MMF treatment. We defined MMF sensitive patients (MMF+, n = 74) by a 50% decrease of relapse rate and/or a 60% decrease of steroid maintenance dose. Comparison of characteristics of these patients with those of MMF resistant patients (MMF-, n = 22) were performed by univariate analysis and multivariate logistic regression.
Results: MMF+ patients had had a shorter time to remission at the first flare (9.5 *vs* 15 days, p=0.02), a shorter disease duration (22.2 *vs* 94.5 months, p=0.001), and a lower total number of relapses (4 *vs* 8, p=0.009). They were younger at the initiation of MMF (6.7 vs10.1 years, p=0.02) than MMF-patients, and less of them were currently treated with cyclosporine (20.3% *vs* 54.5%, p<0.01). If considering the year before the onset of MMF, MMF+ patients had a higher relapse rate (3.0 vs. 1.5 relapses/year, p=0.001) and thus a higher cumulative dose of corticosteroids (7083.3 *vs* 3983.6 mg/m^2/year p=0.005). The age at initiation of MMF was an independent factor associated with efficacy (OR = 0.80, 95% CI [0.69, 0.93], p <0.01), so that children aged less than 5.8 years have a higher chance of MMF efficacy (p<0.02).
Conclusion: MMF is more effective in SDNS when patients are young with a short duration of illness, had had many recent relapses and did not have previously received ciclosporin. The young age at initiation of MMF is an independent prognostic factor of MMF efficiency.

Abstract# P-SUN251
Observation of curative effects between CsA and FK506 in children with refractory nephrotic syndrome

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Objective: To observe the effects between CsA and FK506 for children with refractory nephrotic syndrome.
Methods: 87 children with refractory nephrotic syndrome were retrospectively analyzed in this study, and follow-up at least 6 months. The children were divided into two groups according to the effect of prednisone response: SRNS, SDNS/FRNS. The treatments were divided into CsA and FK506, prednisone (1mg/kg/d) was simultaneously used in the initial stage of the treatment with CsA or FK506.
Results: (1). In 87 cases of children, include 34 patients with SRNS, 53 patients with SDNS/FRNS. The pathological characteristics were include 62 cases of MCD, 12 cases of FSGS, 4 cases of MesPGN, and 2 cases of MN. Pathological types of 3 patients were transfered from MCD to FSGS. (2) In SRNS group: 23 of 30 cases were got CR (76.7%) after treatment of CsA; otherwise, the relapse rate was 43.7% (10/23). After treatment of FK506 for 5 patients, the rate of CR was 80% (4/5), relapse was 25% (1/4). In SDNS/FRNS group: After treatment of CsA for 36 patients, the rate of CR was 97.2 % (35/36), relapse rate was 45.7 % (16/35); after treatment of FK506 for 21 patients, CR was 90.5 % (19/21), relapse rate was 31.6 % (6/19). No statistically difference was found between CsA treatment and FK506 treatment (*P*>0.05). (3) In MCD group: After treatment of CsA for 48 patients, CR was 72.9 % (35/48), relapse rate was 40 % (14/35); after treatment of FK506 for 15 patients, CR was 73.3 % (11/15), relapse rate was 36.4 % (4/11). In FSGS group: After treatment of CsA for 8 patients, CR was 50% (4/8), relapse rate was 25 %(1/4); after treatment of FK506 for 4 patients, CR was 50% (2/4), relapse rate was 50% (1/2). There are no statistically significant difference in two treatments (*P*>0.05).
Conclusion: There are different pathological types in children with refractory nephrotic syndrome, most of them were MCD. Calcineurin inhibitor, such as CsA and FK506 were chosen to treat these patients. But there were no statistically significant between CsA treatment and FK506 treatment in these patients.

Abstract# P-SUN252
Dynamic changes of the serum inhibin B in chilhood patients underwent cyclophosphamide pulse therapy

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Objective: As a valuable marker of spermatogenesis, many researchs of inhibinB(INH-B) were limited in adult with reproductive functional disturbance. Our aim was to explore the fluctuation of INH-B in cyclophosphamide (CTX) pulse therapy-induced gonad damage in puberty males .
Methods: Test the concentration of serum INH-B, FSH, LH and TT in 31 case of early and middle puberty males underwent cyclophosphamide pulse therapy, then analyse the correlation of each index.
Results: (1) 16 of 31 patients' secondary sexual characteristics were no difference under different CTX accumulated dose. (2) The concentration of FSH, LH, TT in 9-11.9 years old groups and FSH in 12-15 years old groups had significant difference in different CTX accumulated dose (0.024, 0.02, 0.027, 0.006, respectively). FSH was earlier in elder groups than younger groups to be discrepant. (3) INH-B declined with the CTX accumulated dose increasing. Compared with control group and before treatment , the difference was significant when CTX accumulated dose>60mg/kg(0.01,0.01,respectively). (4) Serum INH-B/FSH declined remarkably with the CTX accumulated dose increasing and it was earlier in elder group than younger group to be discrepant, too.
Conclusion: (1) INH-B as a marker of steroli cell function is superior to FSH, LH, TT and INH-B/FSH in assessing CTX pulse therapy induced the gonad damage. (2) The decline of INH-B is significant when CTX accumulated dose>60mg/kg. It indicated that we should alter subsequent immunosuppressive agents to elude the CTX -induced gonad damage over 3 times cyclophosphamide pulse therapy.

Abstract# P-SUN253
Lurching Gait in a Child with Steroid Sensitive Nephrotic Syndrome May Portend Severe Osteonecrosis

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Objective: Osteonecrosis (ON), also known as ischemic, avascular or aseptic necrosis of bone, results in collapse of the normal architecture of the skeletal framework. Clinically, it results in progressive joint pain and loss of function. The condition has usually been described in children on glucocorticoids (GC) for immunosuppression post renal transplantation, inflammatory bowel diseases or for connective tissue disorders. We describe an unusual case of steroid dependent nephrotic syndrome that developed extensive osteonecrosis. The objective is to make physicians managing childhood nephrotic syndrome (NS) aware of this uncommon complication of GC in children, as earlier diagnosis may lead to a significantly improved outcome.
Methods: Clinical information and details of steroid treatment were obtained from the case records of the patient.
Results: This 11 year old boy, a case of steroid dependent NS, presented for review and was noticed to have a lurching gait. On examination he had mild fullness of both knee-joints and tenderness while other joints were within normal limits. X-ray of the right knee joint showed minimal irregularity of the right femoral condyle. MRI was suggestive of bilateral extensive bone infarcts in distal femora and tibiae with focal lesions in the distal femoral, distal and proximal tibial epiphyses, talus, calcaneum and right cuboid suggesting avascular necrosis. The treatment details revealed that this 35 kilogram boy had received a cumulative dose of 8000 mg over 1.5 years. Withdrawal of steroids and rest led to resolution of symptoms. Children with NS are known to receive higher cumulative doses of GC for NS but osteonecrosis is rarely documented. Presence of high GC sensitivity due to increased number of GC receptors is postulated to explain this patient's susceptibility to development of this complication.
Conclusions: The onset of steroid induced osteonecrosis may be insidious. This case highlights the importance of investigating musculoskeletal pain in patients with NS receiving corticosteroids.

Abstract# P-SUN254
Steroid-induced diabetes mellitus and related risk factors in pediatric nephrology patients

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Objective, Methods and Results: Glucocorticoids (CS) are traditionally used for treatment such diseases as Systemic lupus erythematosus with renal involvement (SLE, LN) and Nephrotic syndrome (NS). However, they can cause diabetes mellitus (SDM) and worse the course of the main disease.The aim of the study was to determine the risk factors for SDM development in patients with SLE, LN and NS who receive high doses of steroids.We performed a retrospective analysis of the medical records of 15 patients (11 girls) with LN(n=13) and steroid-resistant NS(n=2) seen at the Republic Center of Pediatric Nephrology Minsk. All patients were treated according to international protocols and guidelines for the treatment of SLE and NS. SDM was established according to the recommendations of the Report of WHO Consultation, 1999. Our patients were divided into two groups on the basis of whether SDM had developed (n=7) or not (n=8). In all SDM patients diabetes mellitus type 1 was excluded. CS dosage and duration of the treatment were similar in both groups. Age, body mass indexes (BMI), daily doses of prednisolone and cytostatics (cyclophosphamide, cyclosporine) and serum cholesterol level were compared between two groups. 7/15 patients with SDM had plasma glucose concentrations of 11.1 mmol/L or greater 2 hours after lunch. Mean age (14.7±0.77yrs) and cholesterol concentration (9.2 ±1.22mmol/L) after prednisolone treatment in the SDM group were higher than those values in the non-SDM group (13.5±1.12 yrs and 6,16±0.72 mmol/L respectively, $p<0.05$). BMI for SDM - 22.95±1.602 kg/m^2, for non-SDM 20.71±1.47 kg/m2, p =0.01.
Conclusion: All the patients with SDM received high doses of CS (50 mg/daily or more) and developed SDM nearly 3.17±1.5 yrs (2 mths-10 yrs) after the beginning of pathogenic therapy. All of them were successfully treated from SDM with metformin and diet correction.We identified hyperglycemia, hypercholesterolemia and high BMI as risk factors for SDM in patients with nephrology diseases. High daily doses of glucocorticoids (50 mg or more) also predisposed to earlier development of SDM. Monitoring the plasma glucose concentration 2 hours after lunch may be useful to detect SDM in these patients.

Abstract#P-SUN255
Behavioural abnormalities in Nephrotic children on steroid therapy

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Objective: Glucocorticoid therapy in children with nephrotic syndrome can lead to many adverse effects including behavioural problems. The present study was undertaken to differentiate and quantitate abnormalities in individual dimensions of behaviour among different subgroups of patients with Nephrotic syndrome on steroids by using a standard Child behaviour checklist (CBCL) and to study association

between behavioral changes and illness related variables as number of relapses, the cumulative steroid dose and steroid dependency.
Methods: prospective,cross sectional hospital based study. We assessed behaviour patterns in 200 children and adolescents with steroid-responsive idiopathic nephrotic syndrome aged 2-15 years in a tertiary care setting. 100 healthy children matched for age and gender served as controls. The Achenbach Child Behaviour Checklist (CBCL) was used to assess individual behaviour. Patients were sub-grouped according to age (2-4 and 4-15 years) and disease status first attack before and after 12-week prednisolone(POST-FANS), infrequent relapsers, frequent relapser and steroid dependent.
Results: Besides somatic complaints, POST FANS exhibited maximum scores in comparison to other subgroups in 2-4 years. In 2-4 years FR/SD showed maximum scores only for somatic problems whereas in 4-15 years, maximum scores for all behavioural subscales were observed in FR/SD. Significantly elevated behavioural abnormality scores for dimension assessed in POST FANS for anxiety (2-4 years) and in FR/SD for withdrawl and somatic problems (4-15 years).Total and individual behavioural scores showed close association with cumulative prednisolone dose and total no. of relapses specially in elder age group (4-15 years). Gender and age of disease presentation did not play any significant role in behaviour abnormality.
Conclusion: Significant correlation existed between steroid use and behavioural abnormalities. Observed behavioural changes occurred almost exclusively at the higher dose ranges of prednisolone.A possible threshold dosage below which behavioural effects occurred were thought to be unlikely.

Abstract# P-SUN256
Short-term Effect of ACTH in Children with Steroid-dependent and Frequent Relapses Nephrotic Syndrome

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Objective: To investigate the short-term effect of ACTH in children with steroid-dependent and frequent relapses nephrotic syndrome.
Methods: 20 patients with steroid-dependent and frequently relapsing PNS enrolled in this study, which included age at 3 to 16 years old, whose dosages of GC of maintaining no relapse were ≤1mg/kg on alternate days, whose adrenal function were insufficient. They were assigned to two groups. In group A (n=11), ACTH was given at 1U/kg/day slow intravenously for three consecutive days per month till two months after GC was withdrawn. GC was further reduced by 1.25~5 mg every month after three courses of ACTH treatment. In group B (n=9) was prescribed GC exclusively. GC decrement, relapse frequency, change of adrenocortical function, height, and weight of the two groups were assessed before and after starting ACTH treatment in 3, 6, and 12 months.
Results: In group A, 7 of 11 cases successfully stopped GC after starting ACTH treatment for 12 months. 3 of 11 cases obviously decreased the dosage of GC and were continuing the monthly ACTH treatment. 1 of 11 cases stopped ACTH for two times relapses and changed to Tacrolimus. Totally, 10 cases had received 9-12courses of ACTH at 12 months, average 11.10±1.10courses. In group B, when steroid was reduced below the depending dosage, 5 of 9 cases relapsed and 4 had no relapse. The times of relapse were 1.22±0.67 times averagely following 12 months. There were no serious adverse reactions during ACTH treatment. There was no significant ($p>0.05$) differences in weight and height between the two groups at each time point. But the difference of weight gain and height gain was statistically significant($p<0.05$) between the two groups at 12 months.
Conclusion: Our study showed a satisfactory short-term clinical efficacy of ACTH treatment for NS with steroid-dependent and frequent relapses. However, a prospective controlled study is needed.

Abstract# P-SUN257
Comparison of two low-dose ACTH stimulation tests on evaluation of adrenal function in children with primary nephrotic syndrome

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Objectives: To comparison of low-dose ACTH stimulation tests on evaluation of adrenal function in children with primary nephrotic syndrome.
Methods: 17 patients(dose of prednisone< 1mg/kg) with nephrotic syndrome and 7 control subjects were rolled. On the first day, all subjects were injected ACTH intravenously at 08:00. Serum cortisol was measured just before the ACTH administration, and 20 and 30 min later(the first method).On the next day, all subjects were injected ACTH intravenously at 14:00. After the ACTH injection, blood was taken every 10 minutes for a period of 1h for measurement of serum cortisol(the second method). Adrenal function was evaluated. We adopted cortisol levels of 497 nmol/l or more as normal adrenal response to low dose of ACTH stimulation.
Results: In healthy group, all subjects showed normal adrenal function in the first and the second method. Cortisol levels at 30 minutes were all >497 nmol/l. Cortisol levels at 0, 20 and 30min points in the first method did not differ from those in the second($p>0.05$). In 17 patients, 3 cases (17.65%)and 7 cases (41.18%)showed subnormal responses in the first and the second method respectively. Detection rate of subnormal responses was significantly higher in the second method($p<0.05$) . In the first method,5 of the 17 patients showed subnormal responses at 20 minutes and two of above five cases turned to normal responses at 30 minutes. However, 10 of the 17 patients showed subnormal responses at 20 minutes and none of above 10 cases achieved normal responses at 30 minutes in the second method.Comparison of function of adrenal cortex at 20 and 30 minutes showed that there were diffrence in the first and second method($p=0.025$,$p=0.008$, respectively). Comparison of cortisol levels at at 0, 20 and 30 minutes in the first and second method showed that there were diffrences at 0 minutes and amplification of 30-20mins and there were no diffrences at any other points.
Conclusions: Low dose of ACTH test in the second method for evaluation of adrenocortical function in children with primary nephrotic syndrome is more accurate.

Abstract# P-SUN258
The efficacy and follow up of cyclosporine A using in children with refractory nephrotic syndrome

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Objective: To evaluate the efficacy of cyclosporine A plus prednisone in the treatment of refractory nephrotic syndrome in children.
Methods: The 26 refractory nephrotic syndrome children were treated with CsA plus prednisone,3~6mg/(kg·d), Po, The duration of treatment was 3 to27months(mean12.69±6.44mos).The 24h quantitative urinary proteins, serum cholesterol, urea nitrogen, creatinine, N-acetyl beta amino glycosidase enzymes and cystatin C were detected before and after treatment, and evaluated the adverse effection of CsA.
Results: 26 cases, 12 cases of steroid-resistant NS, 6 cases of steroid-dependent NS and 8 cases of frequent relapse NS were included. 16 patients(61.54%)were complete,8 patients(30.77%) were partial remission, 2 cases(7.69%)were non-remission, The total remission rate was 92.3%. 24 hours urine protein was 3.01g and 0.63 g before treatment and after treamentrespectly, it was significant differences in the statistics ($p<0.01$); serum cholesterol was 7.723.86 mmol/L and 7.153.23 mmol/L; nitrogen urea was 3.931.44 mmol/L and 4.041.27: mmol/L,

creatinine 33.3813.16(μmol/L and 35.643.53μmol/L serum N-acetyl beta amino glycosidase enzymes was 18.964.86 u/L and 20.455.85 u/L before treatment and after treamentrespectly, it was no significant differences in the statistics (P>0.05). The response to CsA was no significant differences in SRNS, SDNS and FRNS. Children complete remission, follow-up to 6 months, 9 months ,12months and18 months of the recurrence rate is 37.5%, 31.25%, 18.75%and12.5%. 8 cases already end treatment 3 ~ 6 months, all without recurrence. The main adverse effects of CsA included hirsutism, tremble, gastrointestinal reaction and so on, and liver kidney toxicity is not obvious in the therapy course.
Conclusion: CsA plus combination with prednisone to treat children refractory nephrotic syndrome has a significant curative effect ,the steroid-sparing effect of CsA in SRNS/SDNS/FRNS was excellent,it can reduce relapse that alter the regime of CsA maintainable therapy over one year.

Metabolic diseases

Abstract# P-SUN259
Renal involvement in Children with HepatorenalTyrosinemia Referred for Liver Transplantation

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Objective: Hereditary tyrosinemia type 1 is a rare autosomal recessive inborn error of metabolism caused by deficiency of fumarylacetoacetate hydrolase enzyme that manifests with severe liver and kidney impairment. The aim of this study was to evaluate clinical, laboratory and imaging characteristics of renal involvement in children with hereditary tyrosinemia type 1 who referred for liver transplantation.
Methods: The medical records of all children less than 14 year who were diagnosed and treated as hereditary tyrosinemia type 1 and referred for liver transplantation between March 2005 and March 2010 were reviewed. The diagnosis was established according to clinical manifestations, high serum alfa-fetoprotein levels and positive serum succinylacetone. The paraclinical tests including liver and renal function tests, serum alfa-fetoprotein, tyrosine and succinylacetone levels, and also the results of abdominal ultrasonographic and computed tomographic (CT) findings were extracted from their medical files.
Results: Of 45 children with HT1, 64.4% were boys with mean age of 3.75 +/- 1.28 year. The most common clinical presentations were jaundice (37.9%), vomiting (26.7%), and polyuria (17.8%). The most common paraclinical findings were positive serum succinylacetone and high serum alfa-fetoprotein levels that were seen in all of the patients. The mean blood urea nitrogen and serum creatinine levels were 11.2 +/- 5.1 mg/dL, and 0.5 +/- 0.2 mg/dL, respectively. Eight (17.8%) patients had evidence of renal tubular acidosis.Renal ultrasonography of the patients showed nephromegaly in 35.6%, nephrocalcinosis in 6.8%, and increased echogenicity of renal cortical parenchyma in 6.7% of the patients. The most common findings on CT scan were enlarged kidneys in 22.2% of patients. Liver biopsies indicate cirrhosis in all patients.
Conclusion: This study indicates delay in diagnosis and treatment of HT1 in our region. The rate of renal involvement in our patients is lower than other reports.

Abstract# P-SUN260
Different aspects of kidney function in well- controlled congenital hypothyroidism

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Objective: Congenital hypothyroidism (CH) increases the prevalence of kidney and urogenital malformations. There are limited studies considering different aspects of kidney function in well-controlled CH patients. Here in, we evaluated some features of kidney function in euthyroid children suffering from CH who have been receiving thyroxin hormone since early life.
Methods: This cross sectional study was conducted on 74 children aged 2-15 years old (36 CH patients and 38 normal children) from March 2010 to October 2011 in Isfahan, Iran. Inclusion criteria for CH patients include euthyroidism at the time of survey and initiation of replacement therapy at the age of early neonatal period. Kidney ultrasound was applied for all participants. Serum biochemistry (Urea, Creatinine, Sodium, Potassium, Magnesium, calcium and cystatin-C), urine electrolytes, fraction excretion of electrolytes (FE) and microalbumin were measured.
Results: The male/ female ratio was 0.8/1 and 1.5/1 in the case and control groups, respectively. The mean age and height did not differ significantly between case and control groups, p>0.05. Evaluating kidney by ultrasound revealed that only AP diameter of the right kidney was significantly higher in CH patients than healthy subjects, p<0.05. No significant difference was observed between GFRs in patients with CH and healthy children, p>0.05. The mean values of FENa and FEK but not FEMg were significantly higher in cases than controls.
Conclusion: Increased FENa and FEK may be a manifestation of impaired tubular maturation in CH. More longitudinal studies should be carried out to evaluate kidney function in CH patients precisely.

Abstract# P-SUN261
URINARY KIDNEY INJURY MOLECULE-1 (KIM-1) AND NEUTROPHIL GELATINASE-ASSOCIATED LIPOCALIN (NGAL) IN CHILDREN AND ADOLESCENTS WITH HYPERURICEMIA

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Objective: Recent studies demonstrated the hyperuricemia causes tubulointerstitial damage. Several tubular damage markers recently have been discovered. Kidney injury molecule (KIM-1) is a transmembrane glycoprotein that is upregulated and shed into the urine during the early stages of proximal tubule injury. Another biomarker for early detection of kidney injury is neutrophil gelatinase-associated lipocalin (NGAL). The aim of this study was to check whether urinary KIM-1 and NGAL urinary levels of KIM-1 and NGAL in patients with hyperuricemia.
Methods: The study included 88 adolescents (60 males and 28 females) aged median 16 (11-18.5) years, divided into 2 groups: 59 patients with hyperuricemia (serum uric acid > 4.8 mg/dl in girls and > 5.5 mg/dl in boys) and 29 patients with normouricemia- reference group. Inclusion criteria: normal renal function, patients who were not receiving antihypertensive or lowering uric acid medications to the time of the study. Exclusion criteria for entry into the study: heart failure, diabetes mellitus, renal or hepatic dysfunction, hematological disease, thrombocytopenia, systemic inflammatory conditions, autoimmune diseases.Urinary KIM-1 and NGAL in urine was evaluated using

a commercially available kit. Urinary KIM-1 and NGAL levels were expressed in nanograms per milliliter and then normalized for urine creatinine. Data analysis was performed using the computer program Statistica 10.0.
Results: Concentrations of urinary KIM-1, KIM-1/creatinine ratio, urinary NGAL, NGAL/creatinine ratio were increased in the group with hyperuricemia compared with the reference group ($p<0.01$). There was a positive correlation between both urinary KIM-1/creatinine and NGAL/creatinine ratio levels and serum uric acid ($r = 0.67$, $p<0.01$), serum creatinine ($r = 0.28$, $p<0.01$), serum urea ($r = 0.25$, $p<0.01$), and negative with eGFR ($r = -0.22$, $p<0.01$).
Conclusion: Urinary KIM-1 and NGAL are increased in teenagers with hyperuricemia. Further studies are required to confirm a potential application of urinary KIM-1 and urinary NGAL as useful biomarkers for the diagnosis of early phase of kidney damage in patients with hyperuricemia.

Abstract# P-SUN262
Renal tubular dysfunction in children with sickle cell hemoglobinopathy

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Objective: Children with sickle cell disease (SCD) are remarkably more prone than others to renal dysfunction. The kidneys, as one of the systemic long term hazards in SCD, may be affected by both the hemodynamic changes of chronic anemia as well as by the consequences of vaso-occlusion. The aim of this study was to evaluate the proximal tubular function in a group of Saudi children with established SCD.
Methods: This study was conducted in Al-Khafji Joint Operations (KJO) Hospital, in Saudi Arabia during the period from June 2011 to August 2012. Thirty four children; Group I (18 males and 16 females) with SCD (HBSS), and 27 children; Group II (17 males and 10 females) with sickle cell trait (HBAS) were evaluated for urinary excretion of retinol binding protein (RBP) and - Beta 2 microglobulin(β2 MG).
Results: Group I patients showed a significantly impaired urinary concentrating ability compared to that of group II (417 +/- 94 mOsm/kg vs 581+/-165 mOsm/kg). The urinary excretions of RBP and beta-2-microglobulin were significantly higher in Group I than in Group II. The values were 762.01+/-124.20 ug/L and 841.84+/-389.02 ug/L versus 198.12+/-42.24 ug/L and 298.3+/-38.11 ug/L respectively.
Conclusion: Significant proximal tubular dysfunction was a feature in SCD group, indicated by high urinary RBP and beta-2-microglobulin excretion. Assessing the urinary excretion of these low molecular weight proteins in children with sickle cell disease at different points of diagnosis may add key clinical information to the follow up of renal tubular function in patients with SCD.

Abstract# P-SUN263
An association between kidney stone composition and urinary metabolic disturbances in children

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Objective: To determine kidney stone composition in children and to correlate proportional stone fractions with urinary pH and accompanying metabolic urinary risk factors.
Methods: We studied 135 pediatric patients with upper urinary tract lithiasis in whom excreted stones were available for analyses. Composition of stones was analyzed using laboratory commercial test. A 24-h urine assessment included volume, pH and daily excretions of calcium, oxalate, uric acid, cystine, creatinine, phosphate, magnesium and citrate.
Results: The majority of kidney stones were mixed. Calcium oxalate was the major component of 73% stones, followed by struvite (13%) and calcium phosphate (9%). Uric acid was present in almost half of stones but in rudimentary amounts. The calcium oxalate content in calculi showed significant positive correlations with calciuria, oxaluria, magnesuria and acidification of urine. The percent content of struvite presented distinctly reverse relationships with regard to above urinary parameters. The calcium phosphate stone proportion revealed positive but not significant correlations with urine pH and phosphaturia and negative with calciuria.
Conclusion: The mixed composition of kidney stone in children may lead to difficulties in identification of the specific lithogenic factors and thus, urinary stone analysis in children should rather complement than replace urine metabolic evaluations.

Abstract# P-SUN264
Abnormal renal tubular handling of phosphorus in Sickle Cell Disease

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Objective: Persistent or intermittent elevation of serum phosphorus(P) has been reported in adults with sickle cell disease(SCD) . Elevated P levels have been correlated with reduced life expectancy and cardiovascular mortality. As pediatric data is limited we evaluated factors that contribute to P homeostasis in children with SCD
Methods: We conducted a cross sectional study evaluating renal tubular handling of P in 24 subjects (mean age 15.5+/- 2.4 yr) with SCD and normal glomerular filtration rate(GFR). Serum creatinine(Cr), Cystatin C, biochemical data including 25-(OH)Vit D,PTH and FGF23 were measured. Intact FGF23 (IFGF23) levels were measured by ELISA kit (normal 22-60 pg/mL) and C-terminal FGF23(CFGF23) by immunotopics (Normal 220 RU/ml). The tubular re-absorption of P(TRP) and maximum re-absorption of P (TMP/GFR) were calculated using established formulas.
Results and Conclusion: Of the 24 children ,22 were African American (15F). GFR by serum Cr was 143+/-30 ml/min/1.73m2 and per Cystatin C was 135+/-8.6 ml/min/1.73m^2. Most had Vit D deficiency (15.6+/-6.1ng/ml), normal serum Ca (9.4+/-0.5 mg/dl) and alkaline phosphatase(ALP)(13361.7 U/L)but increased serum P for age (5.1+/-0.7mg/dl). TRP was elevated in most patients for serum P with levels of 96.3+/-2.1% and TMP/GFR at 4.9+/-0.6mg/dl(normal 2.6-4.4). IFGF23 concentrations were elevated at 81.2+/-38.3pg/ml and CFGF23 at 444.7+/-350.3RU/ml while the average PTH values were 50.4+/-26.7 pg/ml (normal 15-65). Linear regression analysis showed significant correlations of serum P with age ($r=-0.56$,$p=0.004$),LDH ($r=0.52$,$p=0.0108$), TMP/GFR($r=0.98$, $p<0.0001$),Log IFGF23 ($r=0.46$,$p=0.04$) and ALP ($r=0.66$,$p=0.0007$). Correlation existed between TMP/GFR and Log IFGF23 ($r=0.5$,$p=0.01$) but not with PTH or VitD. Multiple regression analysis yielded significant correlation of TMP/GFR on serum P($R2=0.97$, $p<0.0001$).

Abstract# P-SUN265

HYPERCALCIURIA IN CHILDREN WITH CERTAIN URINARY AND GASTROINTESTINAL PATHOLOGY

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Objective: Hypercalciuria (HC) is one of the problem in nephrology occuring 13% in the world [52,58,113]. Prevalence of HC in children varies: 0.6% in Japan, 38.6% in Kazakhstan [119].
Study carried out to learn characteristics of HC in certain urinary and gastrointestinal pathology. To study specific features of idiopathic HC characteristics of HC bone mineral density (BMD) in HC cell membrane in HC. To develop diagnostic algorithm of HC
Methods: Blood,urinechemistry,urinecitrate,fecal culture ultrasound, BMD and cell membrane peroxidas were used.
Study carried 103 children into 4 groups, in 2005-2007 at Nephrology and Gastroenterology Dep of Pediatric Faculty of Russian Medical University and Children Communicable Disease Centre. In I group 29 with calcium oxalate crystalluria (CaOx) and nephrocalcinosis,while II group 22 with idiopathic HC. III group 38 with gastrointestinal (GI) disorders (constipation,pancreatitis and nonspecific ulcerative colitis) in IV group 36 healthy kids.
Results and Conclusion: 52.6% of children with idiopathic HC had increased Parathyroid Hormone (PTH) while the blood calcium (Ca) were normal. Rest 47.4% had reduced level of PTH on normal blood Ca. The children with GI disorders had an increased PTH and decreased blood Ca. Normal PTH and Ca were found in children with CaOx whereas children with nephrocalcinosis had increased PTH and decreased blood Ca. Among with HC osteopenia and osteoporosis were revealed in 60% and 15%. Osteopenia was in 75.9%, osteoporosis in 10.3% in idiopathic HC. Among with HC and GI disorders osteopenia found in 77.8% whilst osteoporosis in 11.1%.

Abstract# P-SUN266

Renal function of children with primary hyperoxaluria type 3

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Objective: Three types of primary hyperoxaluria (PH) have been described. PH3 patients are supposed to present with less severe phenotype than PH1 and PH2 but their clinical characteristics are still poorly explored. PH3 corresponds to mutations in the 4-hydroxy-2-oxoglutarate aldolase (*HOGA1*) gene. We report on four cases of pediatric PH3. We included all children presenting with *HOGA1* mutation identified in the Hospices Civils of Lyon. Renal function was estimated with the 2009 Schwartz formula (eGFR, ml/min per 1.73m^2); urinary oxalate/creatinine (Uox/cr), glycolate/creatinine (Uglyc/cr) and calcium/creatinine (Uca/cr) ratio were measured.
Methods and Results: Case 1 was a 5 month-old girl with maternal history of renal stones but no consanguinity, presenting with urinary tract infection (UTI), bilateral nephrolithiasis and impaired renal function (eGFR 64). Uox/cr was increased; Uca/cr was normal. Two *HOGA1* mutations were identified: p.Arg70X and c.700+5G>T. She did not require interventionnal urological procedures. Case 2 was a 9 year-old girl without family history or consanguinity, presenting with bilateral nephrolithiasis and normal renal function (eGFR 108). Uox/cr was slightly increased and Uglyc/cr was normal. Two *HOGA1* mutations were identified: c.3A>G and c.700+5G>T. She required surgery for hydronephrosis and lithrotripsy (ESWL). Case 3 was a 22 month-old boy with positive family history and consanguinity, presenting with UTI, normal renal function (eGFR172) and silent 15 mm bladder stone. Uox/cr was increased ;Uglyc/cr and Uca/cr were normal. A homozygous *HOGA1* mutation was identified: p.Gly287Val. He required cystotomy to remove bladder stone. Case 4 was an 11 month-old girl without familial history or consanguinity, presenting with UTI, bilateral nephrolithiasis, nephrocalcinosis and normal renal function (eGFR 127). Uox/cr was increased. Two *HOGA1* mutations were indentified: c.700+5G>T and p.Glu315Del. She required ESWL and J-J tube.
Conclusion: In contrast to early impaired renal function in PH1 and PH2 and to preliminary data on renal function in PH3, one of our patients presented at 5 months of age with impaired GFR. We also reported a novel c.3A>G substitution in *HOGA1* gene.

Abstract#P-SUN267

Cystatin C as an Early Marker of Diabetic Nephropathy in Children with Type 1 Diabetes Mellitus

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Objective: Microalbuminuria is a sensitive marker to detect early nephropathy in diabetes mellitus.Hypothesis: Cystatin C has a better correlation than serum creatinine with microalbuminuria in type 1 diabetes mellitus (T1D).Subjects: A hundred patients with stable T1D and 66 sex-matched healthy children.
Methods: Fasting blood sample was drawn for HbA_1C, creatinine, and cystatin-C and a 24 hour urine aliquot was collected to measure microalbumin, creatinine, and volume to estimate glomerular filtration rate (eGFR) based creatinine, cystatin-C, and creatinine+cystatin-C. Binary logistic regression analysis, Chi-square, ANOVA, and Student's T test were used to analyze data. $P<0.05$ was considered significant.
Results: Median serum creatinine and serum cystatin-C were different in patients and controls ($P<0.05$). eGFRs based cystatin-C in overall were higher than eGFRs based creatinine, or eGFR based creatinine+cystatin-C. About 37.5% children with T1D had microalbuminuria that was associated with GFR bases cystatin-C less than 60 and more than 130 ml/min/1.73m^2 ($P<0.05$). GFR based creatinine was lower compared to eGFR based cyatatin-C in T1D regardless of microalbuminuria ($P< 0.05$). The frequency of chronic kidney disease classification based on eGFR basedcreatinine and eGFRbasedcystatin-C were statistically different between controls and patients. GFR based cystatin-C seemed to overestimate and eGFR based creatinine underestimate.
Conclusion: There was higher correlation between abnormal eGFR based cystatin-C and microalbuminuria in diabetic children. eGFR based creatinine could detect higher rate of GFR less than 60ml/min/1.73m^2.

Abstract# P-SUN268

A NOVEL MEVALONATE-KINASE MUTATION IN A CHILD WITH AA AMYLOIDOSIS

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Objective: We report a case of renal AA amyloidosis presenting as the cortico-resistant nephrotic syndrome (NS) in a preschool child affected by partial mevalonate-kinase (MK) deficiency (MKD), also known as hyperIgD syndrome (HIDS), an inherited autoinflammatory (periodic fever) syndrome (AIS). Moreover, amyloidosis rarely manifests itself during childhood.
Methods and Results:A 4-year-old Caucasian girl with a negative family history presented with features of NS. Over the previous 2 yrs, she had been suffering with recurrent fever episodes lasting 3 days at 2-4 week intervals, and a putative diagnosis of PFAPA (periodic fever, adenitis, pharyngitis, aphtae) syndrome was considered. IgD was normal, IgA mildly increased, serum amyoid A (SAA) fluctuated from normal to 200 mg/l. After the standard corticosteroid (CS) treatment of NS had failed to induce remission within 6 wks, renal biopsy was performed demonstrating AA amyloidosis with focal segmental glomerular and vascular involvement. While genetic analysis for different types of AIS was pending, colchicine was added to the CS treatment followed by daily anakinra injections with a good response. Mutation V377I and a novel deletion in exon 5 C152WfsX6 (c.450_453delGGTG) were identified in the *MVK gene*. The latter terminates the protein six amino acids after the deletion occurs, effectively making the protein shorter. Within 6 months of treatment, the girl's proteinuria stabilised with normal GFR. To date, there have been no other signs of organ involvement. Despite ongoing anakinra, she continues to experience occasional fever episodes at an interval of 1-4 months. These fever episodes associated with temporary increases in proteinuria and SAA (with the latter parameter remaining below 10 mg/l during afebrile intervals) are managed by 1-2 days of CS treatment. The girl's has had no relapse of NS.
Conclusion: the MKD/HIDS syndrome has so far been reported in only a few cases of AA-amyloidosis. Long-term follow-up will tell us more about the prognostic significance of the newly described MK gene mutation. The girl's condition between attacks is good, but small proteinuria persists. Nevertheless, her prognosis is dubious.

Abstract# P-SUN269

Xerodermapigmentosum-Cockayne syndrome with nephrotic syndrome

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Objective: Xerodermapigmentosum–Cockayne syndrome (XP/CS) is an extremely rare disorder caused by an impaired capacity for DNA repair, which results in severe photosensitivity and neurological symptoms. Renal dysfunction is also regarded as an important prognostic factor in CS patients, but few cases have been reported, and its mechanism is unknown. A male infant in whom XP/CS was suspected on the basis of clinical symptoms, including severe photosensitization, severe psychomotor retardation, short stature, undescended testes, microcephaly, microphthalmia, optic nerve atrophy, and cerebral calcification, and in whom severe proteinuria and renal tubular dysfunction were also present from infancy, was examined pathologically and genetically.
Methods: Open renal biopsy was performed at age 1 year 2 months, and pathological examination was performed. We measured a level of 8-OHdG is a marker of oxidative stress of DNA. Complementation test with plasmid host cell reactivation assay and gene analysis were performed.
Results: A diffuse increase of the mesangial matrix was apparent with the collapse of some loops and focal glomerulosclerosis. Irregularities and duplication of the loop walls were present in only a few cases, while cellular infiltration and fibrosis of the interstitium were evident. Fluorescence staining was negative in all cases. This findings are similar to that in CS patient. Complementation studies and gene analysis confirmed the diagnosis of XP group D (XPD).
Conclusion: It is a first report in Japan that XPD/CS patient developed nephrotic syndrome, and a compound heterozygote including the G47R and a novel mutation R616G is identified. However, 8-OHdG is not in proportion to a amount of the urinary protein, the mutatioin may correlates with the clinical severity.

Abstract# P-SUN270

Initial alterations in glucose transporters in diabetic kidney: oxidative stress rola

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Objective: Diabetes type 1 is the most frequent form in childhood and renal involvement is a severe complication. Early renal alterations are ill defined. We studied initial changes in expression and location of glucose/sodium transporters (SGLT1 and SGLT2) and GLUT1 and GLUT2, in a murine diabetic model, resembling human Type 1 diabetes. We correlated these changes with increased oxidative stress, since this stress has been described in diabetes. We explored several sources of anion superoxide radicals: NADPH oxidase, uncoupling of nitric oxide sintase (NOS), xantine-xantine oxidase system and mitochondria.
Methods: Diabetes was induced by streptozotocin (70 mg/kg, i.v.,s.d.) in Wistar female rats. After 21 days, renal glucose handling was studied. Expression of glucose transporters (SGLT1, SGLT2, GLUT1 y GLUT2) was analyzed by Western blot and their distribution by confocal microscopy. Superoxide anion production was studied in Percoll isolated glomeruli, proximal and distal tubules.
Results: Diabetic rats displayed hiperglycemia, weight loss, polydipsia, polyuria and polyphagia. Glucose renal clearance, fractional excretion and urinary excretion were increased. SGLT1, SGLT2 and GLUT2 were increased while GLUT1 decreased. We identified NADPH oxidase and NOS as superoxide anion sources, whereas xantine-xantine oxidase system and mitochondria were not involved.
Conclusion: We describe for the first time initial alterations in expression of renal glucose transporters, with early activation of pro-oxidant enzymes, NADPH oxidase, and subsequent uncoupling of NOS, leading to oxidative stress.

Abstract# P-SUN271

American and Brazilian children with urolithiasis: similarities and disparities

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Objective: Urolithiasis is increasing in children and its incidence varies worldwide. Considering the different racial, socioeconomic backgrounds

and geographic locations the aim of this study was to identify the demographic and biochemical differences between American and Brazilian children with urolithiasis.

Methods and Results: We evaluated the data of 222 American children and 190 Brazilian children at the time of the diagnosis obtained from their medical records, seen at CMH in Kansas City MO US and at Clinics Hospital in Belo Horizonte MG Brazil, between January 1999 and December 2010. Clinical data included age at diagnosis, gender, BMI, imaging technique used. 24-h urines were analyzed for volume, creatinine, calcium, uric acid, citrate, oxalate. Blood was analyzed for creatinine, electrolytes, and minerals.

	American children	Brazilian children	p
Gender	Male 48%	Male 51%	
Age at diagnosis (years)	11.8±3.8	8.2±3.2	0.001
BMI Z-score	0.36	0.01	0.00001
Overweight (Z-score >2)	15%	2.1%	
Imaging technique US/CT	73%/27%	98%/2%	
Urine flow < 1.0ml/kg/hour	63%	49%	
Hypercalciuria (> 4.0mg/kg/day)	47%	69%	
Calcium/citrate ratio (> 0.33)	54%	41%	
Hypocitraturia (< 180mg/g creatinine)	10%	9.5%	
Hyperuricosuria (factored for GFR)	6.4%	9.5%	
Idiopathic absorptive hyperoxaluria	1.4%	1.6%	
Cystinuria	0.5%	1.0%	
No abnormality	9.0%	13.0%	

Conclusion: Despite some differences between the populations, like younger age and leaner body mass among Brazilian children, and some differences in the frequencies of various etiologies, the leading causes of urolithiasis among both US and Brazilian children are "oliguria", hypercalciuria and high Ca/citrate ratio. In neither country is obesity per se more frequent in stone patients compared with the general population. US was the most preferred imaging technique excluding more frequent use of CT as the reason for the increase in incidence of pediatric urolithiasis. Although we observed some differences between the 2 populations, overall etiologies were quite similar justifying combining efforts in addressing the problem.

Abstract# P-SUN272

Urinary uric acid excretion in pediatric urolithiasis: which cut-off value to use?

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Objective: The gold standard for normal urinary uric acid (UA) excretion is <815 mg/24h/1.73 m^2 BSA. Due to difficulties in 24h collection in pediatrics, hyperuricosuria is often defined based on random urine UA/Cr ratio (normal <0.65), or UA/Cr factored for GFR [UA/Cr x serum Cr(SCr), normal <0.57]. The latter is regarded as more accurate but requires blood work for SCr determination. These cut-off values were established in healthy children; not in pediatric urolithiasis population. Hence the aim of this study was to examine their validity in such population.

Methods: Based on electronic records, we analysed all children diagnosed between January 1999/December 2010 with radiologically documented primary urolithiasis with diagnostic 24-h urine. Data extracted: age at diagnosis, body surface area, 24-h urine volume, creatinine, uric acid, and serum creatinine.

Results: After excluding six, there were 188 patients who had their urine tested for UA expressed in mg/24h/1.73m^2 BSA and UA/Cr ratio. In 149 UA/Cr was also factored for GFR. Age at diagnosis: 11.9 +/- 3.7 years. Nine patients had UA >815 mg/24h/1.73 m^2 BSA, 46 had UA/Cr ratio >0.65; 12 had UA/Cr x SCr>0.57. Compared to the gold standard the sensitivity of UA/Cr ratio was 64% and specificity 78%; when factored for GFR sensitivity was 30% and specificity 93%. The area under the ROC curve for UA/Cr ratio was 0.802 (95%, CI: 0.706-0.898) and that for the GFR corrected 0.766 (95%, CI: 0.661-0.871). The positive predictive value (PPV) of UA/Cr ratio was 15%; the negative predictive value (NPV) 97%; and after factoring for GFR PPV was 25% and NPV 95%.

Conclusion: The current cut off values for urine UA/Cr ratio and UA/Cr factored for GFR are good tools to screen hyperuricosuria but not to positively diagnose it. Furthermore, in school-age children UA/Cr factored for GFR does not provide an advantage, thus the need for serum creatinine determination can be omitted.

Abstract# P-SUN273

Should pediatric idiopathic hypercalciuria be treated with hypocalciuric agents?

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Objective: The issues related to the need for hypocalciuric therapy, its nature and duration, in children with Idiopathic Hypercalciuria (IH) remains to be determined. This treatment may be required not only to protect against stone formation but also against low bone density, documented in many of these patients. The aim of this study was to examine whether thiazides have a beneficial effect on bone mass in children with IH.

Methods: We have followed 40 children with IH (62.5% male) aged 10.5 +/- 3.5 yr, for median time of 6.0 yr (4.5-8.3). Initial approach consisted of dietary modifications for 4 months (high fluid intake, normal dietary intake of calcium, protein, sodium and potassium). In case of no normalization of calcium excretion with dietary measures, potassium citrate (K-citrate) was added (0.5-1.0 mEq/kg/day), to the dietary measures for 2 months. Treatment with thiazide was initiated (0.5-1.0 mg/kg/day) in association with K-citrate if there was no improvement of calciuria levels after 2 months on alkali treatment and/or if the symptoms continued. Patients took K-citrate alone or combined with thiazides for at least 1 year. Initial bone densitometry (BMD) was performed before patients started treatment with K-citrate, and the final BMD was conducted at the end of follow-up. Nine patients took K-citrate alone (G1) and 31 received K-citrate and thiazides (G2).

Results: There were no differences in age, BMI Z-scores, biochemical and mineral parameters between G1 and G2 before and after treatment.

BMD Z-score of the lumbar spine (L1-4) increased significantly with treatment in G2 from -1.7 to -1.4 (p=0.04; U-Test Mann-Whitney) but there was no improvement in G1 (from -1.3 to -1.6; p=0.16).
Conclusion: Our results point to a beneficial effect of thiazides on BMD in children with IH. We speculate that thiazide may have a role in achievement of positive calcium balance and consequently optimal peak bone mass, and suggest further prospective randomized studies on the effect of thiazide therapy in children with IH.

Abstract# P-SUN274
Does FGF23 play a role in pediatric idiopathic hypercalciuria?

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Objective: Various mechanisms were proposed as pathophysiology of idiopathic hypercalciuria (IH). Based on suggestion by Worcester & Coe (2008), the aim of this study was to explore a potential role for FGF23 in pediatric IH.
Methods: We studied 29 controls (19M) and 58 children with IH (35M); of whom 24 before treatment (untreated) and 34 after 6 months treatment either with K-citrate alone (20) or combined with thiazides (14). Plasma FGF23 was assessed using C-terminal ELISA. We also measured serum PTH, 25OH Vit D, P calcium, creatinine; and 24h urine calcium (UCa), phosphate and creatinine.
Results: No differences in age were noted between controls (15.4±8.3) and patients (16.0±5.0), nor between untreated (16.8±5.4) and treated (15.5±4.7), and no difference in gender distribution. The incidence of lithiasis in the untreated (75%) and treated patients (76%) was the same. Plasma FGF23 in controls was 85.5±34.8 compared with all patients 69.6±52.0 RU/mL (p=0.0019). However, FGF23 in untreated patients 77.6±36.9, was not different from controls, whereas in treated patients it was 64.0±60.4, significantly lower than in controls (p<0.0001) and untreated children (p=0.02). In all patients combined there was a tendency of correlation between FGF23 and UCa (r=0.22;p=0.09). There were no differences between the untreated and treated IH children regarding serum creatinine, calcium, 25OH Vit D, PTH, urine creatinine or phosphate. Treated patients had significantly lower UCa 2.5±0.7 vs. 5.6±1.2 mg/kg in untreated (p<0.0001); higher TP/GFR 4.0±0.6 vs. 3.4±0.7 (p<0.001) and serum P 4.4±0.5 vs. 4.0±0.6 mg/dl (p=0.007).
Conclusion: Treatment of IH patients resulted in significantly lower UCa excretion rate, lower plasma FGF23 and elevated TP/GFR and serum P, without significant changes in serum PTH. We conclude that the reversal of hypercalciuria may directly or indirectly affect phosphate metabolism, perhaps via calcium retention in bone or changes in 1, 25 (OH) 2Vit D metabolism. Further studies on this topic are needed.

Abstract# P-SUN275
Cystinotic proximal tubular epithelial cells demonstrate impaired endocytosis and altered endocytic compartments

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Objective: Nephropathiccystinosis is a lysosomal storage disorder caused by deficiency of cystinosin (CTNS), the lysosomalcystine/H+ co-transporter, leading to lysosomalcystine accumulation. Cystinosis patients usually suffer from renal Fanconi syndrome progressing towards ESRD by the age of 10 years. Treatment with cysteamine prevents cystine accumulation and slows down the deterioration of GFR, but does not restore Fanconi syndrome. Here we have explored the role of cystinosin in endocytic membrane trafficking, a key determinant of the reabsorptive property of proximal tubular cells (PTC).
Methods: We performed a detailed characterization of endosomal compartments and endocytosis in PTC obtained from urine of a healthy volunteer and a cystinosis patient bearing a homozygous 57-kb deletion of the *CTNS* gene, which results in a complete absence of cystinosin. We also confirmed our observations on HK-2 cells with downregulated*CTNS* using specific siRNA.
Results: We studied endocytosis and degradation/recycling of various cargo proteins, including ligand of megalin, which plays a central role in protein reabsorption in proximal tubules, and transferrin. We demonstrated that surface binding of megalin ligand GST-RAP is significantly reduced in cystinosis cells. Processing of the ligand upon internalization was slowed down in cystinosis cells in comparison with the control. Similarly, transferrin recycling was slowed down, indicating a general change in endocytic recycling and trafficking. We found that acute cystinosin down-regulation achieved by siRNA did not alter the identity of the endocytic compartments (as evaluated by the distribution of early and late Rabs) but did induce abnormal redistribution of late endosomes and lysosomes indicating a possible involvement of cystinosine in controlling endo-lysosome motility.
Conclusion: We demonstrated altered endocytosis and changes in endocytic compartments in cells deficient for cystinosin. These findings contribute to the study of mechanisms of proximal tubular dysfunction in cystinosis.

Abstract# P-SUN276
The Importance of Ultrasound in the evaluation of Nephrocalcinosis in Neonate and Young Children

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Objective: Importance of ultrasound in assessing nephrocalcinosis and its severity, particularly using a high-frequency transducer. Importance of combining the radiologic findings with other tests in diagnosing its etiology.
Methods: Our study included 20 patients diagnosed with nephrocalcinosis in their first 15 months of life, during a 10-year period. In patients' examination was used ultrasound, using also linear-array transducer for a focused examination of the renal pyramids. All patients underwent different blood, biochemical, histological, genetic tests etc. to explore the origin of nephrocalcinosis.
Results: Three patients were graded as 1st Grade nephrocalcinosis, 4 patients as 2nd Grade, 13 patients as 3d Grade. All the patients had bilateral nephrocalcinosis. Eight patients were diagnosed with Renal Tubular Acidosis, 5 patients with Vitamin D intoxication, 3 patients with Oxalosis, 2 patients with Fanconi Syndrome, 1 patient with Bartter Syndrome and 1 patient as Idiopathic. main complaint was delay in development (14 pts). Most of the cases were diagnosed with Tubular Renal Acidosis. The linear array transducer helped in the grading process and better evaluation of the pyramid echogenicity using the focused technique.
Conclusion: The first-choice examination for assessing nephrocalcinosis and in its grading and follow-up is ultrasound, using a linear-array transducer also. Main cause of nephrocalcinosis is Tubular Renal

Acidosis. Main reason of presenting to the doctor is delay in development. Different radiologic findings may help suggesting the underlying etiological process.

Abstract# P-SUN277

Prominent renal complications in Methylmalonic Academia with or without Homocysteinemia

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Objective: To better characterize methylmalonic academia with or without homocysteinemia in children.
Methods: Detailed clinical data were collected and analyzed. Both of the two children accepted renal biopsy. For gene analysis of *MMACHC* and *MUT*, genomic DNA was analyzed by using PCR and direct sequencing.
Results: Case one is the second child of nonconsanguineous, healthy parents. Her older sister died of renal failure at age 3. The patient presented with microscopic hematuria and moderate proteinuria, without hypoalbuminemia or renal dysfunction, at age 4. Physical examination showed premature beat and mild development retardation. Lab examination showed macrocytic anemia, remarkable elevated urinary methylmalonic acid (50.71mg/g creatinine) and plasma homocysteine (100.83umol/L). Renal biopsy showed thromboticmicroangiopathy. The compound heterozygous mutations in *MMACHC* gene were found. After vitamin B12, folic acid and L-carnitinebetaine supplementation, significant improvement was observed. Hemoglobin increased to normal, urine protein became negative and Plasma homocysteine decreased gradually. Case 2 is the only child of nonconsanguineous, healthy parents. He presented with repeatedly vomiting at age 0.5, and renal dysfunction at age 13. At age 16 when presented to our hospital, physical examination showed malnutrition, hypertension and mild development retardation. Lab examination showed anemia, myocardial hypertrophy and pulmonary hypertension, without proteinuria or hematuria. Remarkable elevated urinary methylmalonic acid (over 2000mg/g creatinine) was found, while plasma homocysteine was normal. Renal biopsy showed glomerular proliferation and sclerosis. The compound heterozygous mutations in *MUT* gene were found. In contrast to case 1, this patient was not reactive to vitamin B12. Calcium channel blockers were given to control his blood pressure. He is now still in follow up.
Conclusion: Prominent renal complications can be found in Methylmalonic Academia patients with or without Homocysteinemia, but their renal manifestations and pathological features are different. Gene analysis showed they had mutations in different genes.

Abstract# P-SUN278

Urine Proteomic Analysis in Cystinuric Children with Renal Stones

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Objective: The gene mutations found in children with cystinuria cannot solely explain kidney stone formation, suggesting that specific proteins may serve as promoters of cystine precipitation, aggregation or epithelial adherence. We aimed to identify proteins unique to cystinuria and kidney stone by performing urine proteomic analysis.
Methods: We compared urinary proteomes of 2 children with cystinuria and kidney stones and 2 healthy children (measurements performed in duplicate), using mass spectrometry (MS) total ion current quantification of proteins. Proteins of interest were selected based on the number of assigned peptides that map to a particular protein (more than 5), and unique peptides that have been identified for each protein (more than 2) as a threshold to be well above observed technical variations in MS experiments.
Results: Of the 665 proteins identified by proteomic analysis, 152 were found only in children with cystinuria and kidney stones, 12 of which met the selection criteria (Table). Additionally, these children were found to have 2-4 times higher urinary levels of ceruloplasmin, and lower levels of osteopontin and uromodulin compared to controls.

Accession Number*	Protein	MW (kDa)	No. of assigned peptides**	No. of unique peptides**	Sequence coverage (%)***
ANXA1	Annexin A1	39	14/12	9/8	32/29
FIBB	Fibrinogen beta chain	56	129/91	25/21	66/49
ITIH2	Inter-alpha-trypsin inhibitor	106	33/81	12/11	27/16
TRFL	Lactotransferrin	78	185/11	36/3	60/6
MMP9	Matrix metalloproteinase 9	78	26/15	9/7	18/12
PERM	Myeloperoxidase	84	88/6	19/5	32/3
PLSL	Plastin-2	70	42/8	14/4	33/11
PON1	Serum paraoxonase	40	23/74	9/14	48/55
TBA1B	Tubulin alpha-1B chain	50	9/13	8/4	27/15
VIME	Vimentin	54	10/9	8/4	21/14
NGAL	Neutrophil gelatinase-associated lipocalin	23	110/40	10/6	66/45
TAGL	Transgelin-2	22	13/7	6/4	50/33

*Human; **Values presented in each patient
*** % of sequence that has been identified for each protein

Conclusion: Children with cystinuria and kidney stones have a different urinary polypeptide profile compared to healthy controls. These unique proteins merit further investigation. Proteomic analysis may be useful to identify potential disease biomarkers and novel therapeutic targets.

Abstract# P-SUN279

CYSTAGON® ADHERENCE IN PATIENTS WITH CYSTINOSIS: DETERMINANT FACTORS AND AGE EFFECT

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Objective: long-term outcome of cystinosis is based on the correct administration of cysteamine. To evaluate the adherence to Cystagon® treatment ina large group of Spanish patients with cystinosis.Population: 34 pediatric and adult patients (21 male). 13(38%) ≥ 18 year old.
Methods: report of voluntary and anonymous survey. Answers: patient (15/34), mother (11/34), father (4/34), parents (5/34).
Results: age at diagnosis 1y; 0.57-1 (md; interquartile). Cystagon® initiation: 1y; 0.8-1.85 (md; interquartile). 16/34 (55%) kidney transplant (KT) recipients; 5 retransplanted. Age at the1st KT 10y; 8.75-13.75 (md; interquartile). Education: primary (38%), secondary (24%), university (15%). Knowledge about cystinosis: multiorgan involvement (4.1 systems), ocular97% and renal 91% identified. Disease impact in patients <18y: school (29%), social (14%), "feeling different" (10%); in patients ≥ 18 y: "feeling different" (62%), professional (39%), job absenteeism (31%). Referent physician: pediatricnephrologist 94%, nephrologist 63% in <11 vs. ≥11 y. Follow-up withophtalmologist 83% vs 38% in <11 vs. ≥11 y. Physician expertise: pediatricnephrologist (94%), nephrologist (44%). Cystagon® given by patient's mother(100%) or father (83%) <11y old, vs. patient (94%) in ≥11y. 4 daily doses 89%<11y vs. 56% ≥11y; with fixedschedule in 94% vs. 50% in <11 or ≥11y, and progressive loss of alarms or reminderswith time. 44% disgusting smell complaint.No motivation for treatment compliance: 0% vs. 38% in <11 vs. ≥11 y. Newformulations (65%) and better education (42%) to improve adherence weredemanded.
Conclusion: despite disease impact, adherence to Cystagon® treatment decreases over time. Patients are interested in new formulations andbetter knowledge about the disease in order to improve adherence. Patient self-careand professional education promoting strategies are needed.

Abstract# P-SUN280

From a polyclonal to a monotypic glomerulopathy in lysinuricprotien intolerance

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Objective, Methods and Results: Lysinuric protein intolerance (LPI) is a rare systemic inherited defect of cationic amino acid (lysine, arginine and ornithine) transport at the basolateralmembrane of intestinal and renal tubular cells caused bymutations in SLC7A7 encoding the y+LAT1 protein. The symptoms are diverse: vomiting, diarrhea, failure to thrive, hepatosplenomegaly, bone marrow abnormalities, osteopenia, episodes of hyperammonemic coma, mental retardation, impaired immune response, chronic renal failure and pulmonary (mainly pulmonary alveolar proteinosis). Glomerulosclerosis, immune glomerulonephritis and tubulo interstitial nephritis has been described with unexplained pathogenesis. A boy was diagnosed with LPI at 13 years-old. At 14 he presented a nephrotic syndrome (NS) due to a lupus-like glomerulopathy with doubles contours, mesangial proliferation, polyclonal sub endothelial deposits (IgG, A, M), parietal C3 and C1q deposits, and positive anti DNA plasma antibodies. He received steroids and mycophenolatemofetil. The NS improved, creatinineclairance stayed normal. Two years later, free of steroids but still receiving mycophenolatemofetil, NS recurred. Biopsy showed the same glomerulonephritis but with monotypic Ig G1 kappa deposits, parietal and mesangial C3 deposits. Neither C1q deposits nor plasma anti DNA antibody were present anymore.
Conclusion: The evolution from a polyclonal to a monotypic immune glomerulonephritis is very unique. Immune dysfunction potentially attributable to nitric oxide overproduction secondary to arginine intracellular trapping, is a known complication of LPI potentially explaining alveolar proteinosis, renal disease, hemophagocyticlymphohistiocytosis with subsequent activation of macrophages, various auto-immune disorders and an incompletely characterized immune deficiency. The implication of LPI itself and/or the immunosuppressive treatment in this surprising evolution is a matter of debate.

Abstract# P-SUN281

Chitotriosidase enzyme can be used as a screening marker and a therapeutic monitor for NephropathicCystinosis

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Objective: NephropathicCystinosis is an inherited leading cause of renal Fanconi syndrome in children. Mutations of the CTNS gene lead to accumulation and crystallization of cystine inside different cells. Cysteamine is the only specific treatment, and so far, cystine content in white blood cells (WBC) is the main diagnostic tool and the only therapeutic monitor. Chitotriosidase enzyme is a human chitinase produced by activated macrophages. It is elevated in many lysosomal disorders, and is established as a therapeutic monitor for enzyme replacement therapy in Gaucher disease. We aim to investigate the potential of chitotriosidase as a screening marker and a therapeutic monitor for nephropathiccystinosis.
Methods: Chitotriosidase activity was measured in the plasma of 38 patients with nephropathiccystinosis, and compared with matched 54 normal controls and 24 renal disease patients. Chitotriosidase levels were also correlated with cystine content in WBC for 23 patients. Different concentrations of cystine crystals were incubated with control human macrophages in-vitro to investigate macrophage activation by assaying tumor necrosis factor alpha (TNF-a) in culture supernatant. Chitotriosidase release was also investigated by assaying chitotriosidase activity and mRNA expression in the cell lysate.
Results: Chitotriosidase activity in nephropathiccystinosis (<1-3880, median 138 nmol/ml/h) was significantly elevated compared to normal controls (<1-72, median 14 nmol/ml/h) and renal patients (2-144, median 39 nmol/ml/h), P<0.001 for both. Chitotriosidase activity also correlated with cystine content in WBC (r = 0.78). After incubation in cell culture cystine crystals were visualized by light microscopy inside macrophages. TNF-a, released in supernatant, increased up to ten folds after cystine crystal incubation and correlated with crystal

concentration. Chitotriosidase activity and mRNA expression were significantly increased after incubation with cystine crystals.
Conclusion: Chitotriosidase is a promising screening marker for nephropathiccystinosis among the clinically suspected and a promising therapeutic monitor for cysteamine therapy.

Abstract# P-SUN282
Dyslipidemia And Microalbuminuria As The Risk Factors Of Diabetic Nephropathy Manifestation In Belarusian Children with Type 1 Diabetes Mellitus

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Objective: was to evaluate correlations between microalbuminuria (MA), glomerular filtration rate (GFR), cholesterol (Ch), triglycerides (TR), fructosamine (FA) and glycatedhaemoglobin (HbA1c) levels, as the major risk factors of diabetic nephropathy (DN) development in adolescents with type 1 diabetes mellitus (DM1).
Methods: History data and MA, GFR, Ch, TR, FA and HbA1c results from 66 medical cards of children with DM1, who were observed at Minsk children's endocrinologicalcentre in 2007-2013, were analyzed retrospectively. Statistical analysis was performed by SPSS 16.0 using characterized by the median, (3-97 percentiles) due to small patients' sample.
Results: Depending on MA level patients were divided into 2 groups. The 1st group includes 49 children (female(f)/male(m) - 53.1%/46.9%) in ages of 15.9 (11.7 - 17.9) yrs with MA level 7.2 (0 - 24.8) mg/day[1], the 2nd - 20 ones (f/m - 65%/35%) in ages of 15.9 (11.8 - 17.4) yrs with MA 61.3 (30 - 228.2) mg/day[1], ([1] p=0.0001). All children had similar diabetes duration 5.6 (1.5 - 15.8) & 6.8 (2.3 - 12.6) yrs, in the 1st & 2nd groups respectively, (p> 0.05). Most kids had late Tanner stages (T4-5): 85.7 % & 70 % in the 1st& 2nd groups properly. FA levels had increased trend in the 2nd group 428.0 (266.0 - 627.0), in regard to the 1st - 399 (267.0 - 597.0) mkmol/l, (p> 0.05). Increased Ch& TR levels (5.46 (3.08 - 6.78) & 1.11 (0.39 - 3.3) mmol/l) were noticed in the 2nd group concerning the 1st - 4.54 (3.01 - 6.45) & 0.68 (0.33 - 4.11) mmol/l, (p=0.05 & 0.03), properly. There was a tendency to elevated GFR levels in the 1st group 132.8 (75.4 -204.8) (p>0.05). Linear regression revealed 44.9% probability of MA rising in cases of elevated Ch levels (p=0.01) and 28.5% - with increased TR concentration (p=0.03). GFR levels growth had 46.9% probability in cases of risen TR level (p=0.002).
Conclusion: Elevated cholesterol and triglyceride concentration have influenced glomerular filtration rate and microalbuminuria levels, which seem to be early predictors of diabetic nephropathy development in adolescents with type 1 diabetes mellitus.

Abstract# P-SUN283
Diagnosis and treatment of cystinosis in Russia

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Objective: Analysis of the results of methods of diagnostics and treatment in children with cystinosis in Russa.
Methods: Since 2007 to 2012 50 children with suspicion of cystinisis were examined. The diagnosis was confirmed in 17 patients.
Results: The disease onset took place in these patients in 12,34 +/- 16,46 months. The diagnosis was established just on the basis of the combination of the Fanconi syndrome and specific keratopathy on the average in 42,47 +/- 42,39 months. Molecular genetic research with the determination of the specific mutations of the CTNS gene was carried out in 10 cases. Novel mutations of the CTNC gene (c.785 G>A, p.W262X; c. 433 C>T, p. Q145X; c. 518A>G) were found. The 57kB deletion was detected in 4 cases. However, there were not essential differences in disease symptoms depending on mutation variants. 5 children progressed to ESRD at the age 90 +/- 39,8 months. Only 4 children who started cysteamine treatment before age of 2 are stable. Five kidney transplantations performed. Two sisters without the specific treatment died.
Conclusion: Despite the recent progress, cystinosis remains to be underdiagnosed in Russia. A joint effects from the medical community must be aimed on early diagnosis based on molecular genetic studies and efficient treatment.

Abstract# P-SUN284
Primary hyperoxaluria type 2 (PH2)

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Objective: Genetic diagnosis is performed for the diagnosis of primary hyperoxaluria which is a metabolic disorder causing kidney stones in children, but not all cases can be identified. Urinary Gas Chromatography-Mass Spectrometry (GC/MS) screening is useful for differentiation of the disease from other metabolic disorders. We conducted urinary GC/MS and genetic testing in a family with familial stone.
Methods: An 8-year-old girl (the third daughter) had bilateral renal stones. Because she had a family history of stone (grandfather, father, and older brother), urinary GC/MS was performed, and an increase in glycerate level was observed. The family members (grandfather, parents, and three brothers) and the patient underwent measurement of urinary oxalate and L-glycerate, and genetic screening.
Results: L-glycerate was found in the oldest daughter, the oldest son, and the third daughter, and genetic analysis showed homozygous mutation of c.864_865delTG, common in east Asians. The father and mother had heterozygous mutation without L-glycerate. The urinary oxalate level of the third daughter increased to 1.69 mg/mg Cr (< 0.15), but the grandfather and second daughter without genetic mutation showed a slight elevation of the urinary oxalate level.
Conclusion: Although the grandfather and father with a past history of urolithiasis had an increase in the urinary oxalate level, the increase was not considered to be associated with PH2. Prior to genetic screening, pre-examination using GC/MS is useful.

Abstract# P-SUN285
LONG-TERM OUTCOME IN CYSTINOSIS: PROGNOSIS IS IMPROVED BUT GROWTH FAILURE PERSISTS IN OUR SERIES

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Objective: treatment with cysteamine has modified cystinotic patients' outcome, but there is limited long-term data.To know the natural history of cystinosis in our series.
Methods: comparison of two subgroups of patients withinfantile cystinosis diagnosed before/after 1980. Results express as m±SD, ormd [interquartile]
Results:30 cystinotic patients (10 male) from 26 families. Current age 40.5 ± 5.7 y (diagnosis<1980, n=16), & 12 [9-19.8] (diagnosis≥1980, n=14). Age at diagnosis 1.4±1.3y; md 1[1-2] vs. 1.48±2.4 y; md 1[1-2]

(ns).Years of follow-up 18.5 [6.8-29.3] vs. 11 [8-18.8] (p<0.09). Baseline: Z-Weight-3 [-3.5; -2.6] vs. -2.1 [-2.92; -1.38] (p<0.05), SDS-Height -3.2 [-4.9;-1.3] vs. -1.9 [-2.6; -1.65] (p=0.05). Age ofcysteamine start unknown vs. 1[1-4.7] y. Basal IL cystine levels unknown vs.5.6 [2.5-7.6] nmol half-cystine/mg prot. Mean follow-up cystine levels unknown vs.2[1.1-3.1] nmol half-cystine/mg prot. Last visit: Z-Weight -2.4 [-2.5; -1.76] vs. -0.8 [-1.6; -0.3] (p<0.0001), Z-Height-4.9 [-5.5; -3.9] vs. -1.4 [-2.4; -1] (p<0.0001), with 0/16 & 11/14 patientson rhGH. Weight catch-up in both subgroups observed (p<0.003 &<0.0009), but staturedeterioration in subgroup <1980 (p<0.007), and steady Height (ns) w/ocatch-up in the subgroup ≥ 1980 seen. Dialysis 12/16 (75%) at 10.5 ± 3.6 y vs. 1/14 (7%) at 11 y. KTx 9/16(56.2%) at 13.2 ± 2.1 y (4 retransplant), vs. 4/14 (28.6%) at 12 [12-17] y (1retransplant). Morbidity: 2/16 blindness (12.5%) vs. 1/14 myopathy (7%) & 3/14rickets (21.4%).Exitus 11/16 (69%) at 15 [9.5-25.5] y (due to infection 5/11;3/11stroke; lymphoma 1/11; unknown 2/11; lost 1/11), vs. 0/14. Social: 3/4 employed,0/4 emancipated vs. 11/14 students, 3/14 employed, 1/14 married.

Conclusion:life and renal outcome hassubstantially improved in cystinotic patients treated with cysteamine. However,growth retardation and systemic involvement persist, including ESKD later on.

Abstract# P-SUN286

Clinical course and prognostic factors in urolithiasis detected within the first year of life

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Objective: Urolithiasis in infants <1 year old disappear in 1/3, regress in 1/3, and progress in 1/3 of cases. The factors affecting this course are not known in detail. We evaluated the factors affecting the change in calculus size to specify infants requiring follow up.

Methods: Medical records of children with urolithiasis diagnosed at <1 year were examined retrospectively for the following parameters: presenting signs/symptoms, gender, gestational age, birth weight, family history of urolithiasis, feeding history, malnutrition, vit D dose, medications, metabolic/urologic abnormalities, treatment modalities and characteristics of stones (number, size, radiodensity, localization, change in size). Patients with regressing/disappearing (Group 1), stable (Group 2) and progressing (Group 3) stones were compared.

Results: There were 117 patients (M/F:66/51; age 6.2±2.8 months). Prematurity and malnutrition rates were 17% and 19%, respectively. Most common symptom was restlessness (27%), while 23% were asymptomatic. Most calculi were in kidneys (92%); 44% were ≤3 mm. Metabolic abnormalities were present in 51%, UTI history in 41%, urinary malformation in 15%. 48% received no treatment, 41% medical and 10% interventional treatment. Group 1 (52% of cases) had lower malnutrition and radiopaque stones compared to Groups 2 (30%) and 3 (18%). Asymptomatic children were younger, had lower birth weight, higher rates of prematurity and urological malformations. Stone growth or recurrence was not different between untreated and medically treated patients. Neither patients with or without spontaneous stone regression nor patients with or without recurrent stones were different for the parameters studied.

Conclusion: Presence of malnutrition and radiopaque stones are more commonly associated with progressing stone size. However, patients with regressing or progressing stones were not different with regard to metabolic or anatomic risk factors.

Abstract# P-SUN287

Hyponatremia and intravenous fluid prescription in pediatric surgical patients

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Objective: To determine the frequency of hyponatremia and the intravenous fluid (IVF) prescription practices used in pediatric surgical patients.

Methods: We performed a retrospective chart review of previously healthy patients with a period of nothing by mouth greater than 12 hours, newborn to 18 y, who were admitted for a surgical procedure at the Hospital Central "Ignacio MoronesPrieto", from January to October 2012. We defined hyponatremia as a serum sodium concentration ≤ 135 mmol/L.

Results: A total of 223 charts were reviewed, 95 (42.6%) had one initial serum sodium level recorded, and from these, just 26 had a second sample recorded. Hyponatremia was detected in 35 (37%) patients at admission, and hypernatremia in one (1.7%). Mean age, weight, fasting time, gender, diuretic prescription and type of surgery were similar between those with and without initial hyponatremia. The sodium concentration in the IV fluids prescribed was 3.8 ± 1.7 mmol/L for hyponatremic patients and 4.8 ± 2.7 mmol/L for non hyponatremic (p=0.1). Only 10 (28.5%) of the initial hyponatremic patients had a second serum sodium level recorded, and from these 5 (50%) persisted hyponatremic, and 5 (50%) had hospital-acquired hyponatremia group No one had hypernatremia at the second serum sodium sample.

Conclusion: Hyponatremia is the most frequently encountered electrolyte disorder in hospitalized patients. The most frequent clinical setting for acute hyponatremia is after elective surgery, we found it in 37% of our patients before surgery. There is a high reluctance by surgeons to review the IV fluids protocol management, less than 50% of patients admitted for surgery in our unit have electrolyte levels recorded at admission, and from these only 37% have a follow up levels. Renal function is not routinely evaluated. We have to conduct prospective studies to determinate the associated factors to hyponatremia pre and post-surgical, as well as the role that renal function plays.

Hypertension & Obesity: Experimental

Abstract# P-SUN288

The effect of uric acid on the vascular endothelial cells by oxidative stress and its cell injury

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Objective: To observe the effect of oxidative stress, cell apoptosis and necrosis in human vascular endothelial cells(HUVEC) stimulated by uric acid(UA).

Methods:HUVEC were cultured in vitro,stimulated by UA of different concentrations(0,0.05,0.1,0.2,0.30g/L) with different time (6, 12, 24, 48h).Flow Cytometry was used to analyze cell apoptosis, necrosis and level of ROS;Spectrophotography was used to test concentration of superoxide anion(O_2^-); ELISA was used to test expression of NADPH,XO,eNOS,COX-2 and LOX.DPI(an inhibitor of NADPH), Allo(an inhibitor of XO),eNOSR(an inhibitor of eNOS) and UA were co-cultured with HUVEC,and then to test expression of NADPH,XO,eNOS,COX-2 and LOX.

Results:1.HUVEC apoptosis increased after stimulated by UA of different concentrations(0,0.05,0.1,0.2,0.3 g/L) with different time (6,12,24,48h),and it increased following increased concentration or extended time of UA;HUVEC necrosis significantly increased as cultured with UA of0.3g/L or 48h. 2.Both expression of ROS and O_2^- increased after stimulated by UA of different concentrations (0, 0.05, 0.1, 0.2,0.3g/L) with different time (6,12,24,48h), and it gradually increased following increased concentration or extended time of UA; the expression of ROS and O_2^- had significant increase as cultured in the0.3g/L or 48h of UA. The express of ROS and O_2^- was positively related to cell apoptosis.3.After cultured with different concentrations

of UA(0,0.05,0.1, 0.2,0.3g/L) for 24h,the produce of NADPH,XO and eNOS increased following increased UA, and they were positively related to cell apoptosis;but express of COX-2 and LOX had no obvious change,and were no related to cell apoptosis. 4. As HUVEC had been co-cultured with different oxidase inhibitors and UA for 24h, the expression of NADPH,XO and eNOS was activated, DPI inhibited the level of NADPH and eNOS,Allo inhibited the level of XO and eNOS,eNOSR inhibited level of eNOS,and both of DPI,Allo and eNOSR can decreased express of ROS and O_2^-.

Conclusion:1.UA induced HUVEC injury in a concentration-depended and time-depended manner. 2.UA induced HUVEC injury through activating oxidative stress and mainly by activing NADPH and eNOS.

Abstract# P-SUN289

Effects of WNK3 kinase on sodium chloride cotransporter channel in Cos-7 cells

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Objective: To explore the relations between WNK3 and NCC and to determine whether through lysosomal degradation or through protein synthesis pathway the NCC expression was regulated by WNK3 kinase in Cos-7 cells.

Methods: HA-tagged NCC plasmid and different doses of HA-WNK3 plasmids were simultaneously transfected into Cos-7 cells. The NCC protein expression was checked by immunofluorescence and western blot. In order to determine the pathway, Cos-7 cells were transfected NCC with or without WNK3. Further more, Bafilomycin A1, a proton pump inhibitor which blocks the lysosomal degradation pathway, was added to NCC and WNK3 transfected cells. On the other experiment, 48 hours after transfection, NCC with or without WNK3 transfected cells were incubated in DMEM containing 100 ug / ml cycloheximide for 4 hours. Then these cells were cultured in normal medium for 0 , 0.5 , 1 , 2 , 4 , 8hours respectively. Cell lysates were subjected to SDS-PAGE and immunoblotted with anti-HA or anti-actin antibodies.

Results: The WNK3 kinase increased NCC expression in the Cos-7 cells with a dose-dependent tendency. The total protein expression of NCC was significantly increased in the cells after treated with Bafilomycin A1. The inhibition of NCC by CHX was reversible once CHX was removed from medium. NCC expression recovered faster in cells with both WNK3 and NCC than in cells simply with NCC.

Conclusion: WNK3 kinase enhances the sodium chloride cotransporter expression in Cos-7 cells likely through both protein synthesis and lysosomal degradation pathway.

Abstract# P-SUN290

Increased Expression of LXA4 in Mice with Obesity-related Glomerulopathy

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Objective: The pathogenesis of obesity-related glomerulopathy (ORG) has not been fully elucidated, recent studies have indicated that activation of glomerular inflammatory factors has played a unique role in the development of ORG. Lipoxin (LXA4), which is endogenously produced lipid mediator, promotes the resolution of inflammation. this experiment was set to detect serum LXA4 and glomerular LXA4 mRNA and protein expression in order to explore its possible role in ORG.

Methods: Clean grade 35d age c57b1 / 6 male mice were randomly divided into obese group (20) and control group (20). The obese group was fed with a high-fat high-energy diet, whilst the control group was fed with a normal diet. 8 weeks later, the two groups were assayed with ELISA for urinary microalbumin series proteins including urinary albumin (Alb), transferrin (TRF), retinol binding protein (RBP), and β2-microglobulin (beta2-M). Blood samples were also assayed with ELISA for serum LXA4. Kidney tissue was fixed, sectioned and stained, and examined under both light and electron microscopy for histopathological changes. Renal tissue RNA was extracted and real-time quantitative RT-PCR was carried out to measure the expression of *LXA4* mRNA. LXA4 protein expression was assayed with Western Blotting. The difference between the two groups was assessed with a SPSS 13.0 software.

Results: Compared with the control group, the obese group had significantly higher urinary Alb, TRF, RBP and β2-M and serum LXA4 level ($P_a < 0.01$). LXA4 mRNA and protein expression of the renal tissue of the obese group was significantly higher ($P_a < 0.01$). Histopathological examination found that the obese group had glomerular hypertrophy. Electron microscope revealed epithelial cell foot process fusion, more lipid droplets in the cytoplasm of renal tubular epithelial cells, thickening of basement membrane, loss of the three-layer structure, with sections insert into the segment mesangial.

Conclusion: ORG mice appear abnormal urine microalbumin; the increased expression of LXA4 inserum and renal tissue may play an important role in ORG.

Abstract# P-SUN291

Two different approaches to restore renal nitric oxide and prevent hypertension in young spontaneously hypertensive rats: L-citrulline and nitrate

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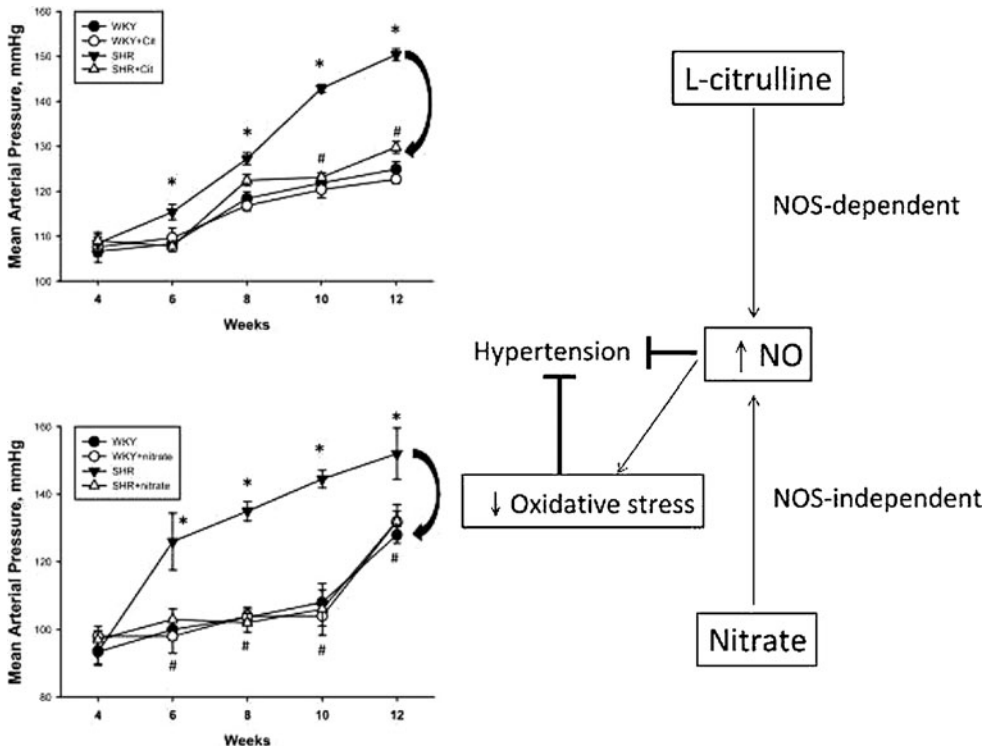

Objective, Methods and Results: Nitric oxide (NO) deficiency mediates oxidative stress in the kidney is involved in the development of hypertension. NO synthesis occurs via two pathways: NOS-dependent and NOS-independent. We tested whether the development of hypertension is prevented by restoration of NO by dietary L-citrulline or nitrate supplementation in young spontaneously hypertensive rats (SHRs). Male SHRs and normotensive Wistar Kyoto (WKY) control rats, aged 4 weeks were assigned to 4 groups: untreated SHRs and WKY rats, and SHRs and WKY rats that received 0.25% L-citrulline for 8 weeks. Our second series of study was replaced L-citrulline to 1 mmol/kg/day sodium nitrate. All rats were sacrificed at age 12 weeks. We found the increases of blood pressures of SHRs were similarly prevented by dietary supplementation of L-citrulline or nitrate. Both treatments restored NO bioavailability and reduced oxidative stress in SHR kidneys. L-citrulline therapy reduced levels of L-arginine and asymmetric dimethylarginine (ADMA, an endogenous inhibitor of NO synthase) while increased the L-arginine/ADMA ratio in SHR kidneys. Nitrate treatment reduced plasma levels of L-arginine and ADMA concurrently in SHRs.

Conclusion: Our findings suggest that both NOS-dependent and -nondependent approaches in prehypertensive stage toward augmentation of NO, preventing the development of hypertension in young SHRs.

Abstract# P-SUN292

Urinary angiotensinogen in adolescents with primary hypertension

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Objective: Experimental and epidemiological studies have demonstrated that urinary angiotensinogen (AGT) is a novel biomarker for the intrarenal activity of the renin-angiotensin system in hypertension. Many large epidemiological studies reported that elevated serum uric acid level is associated with hypertension. Several plausible mechanisms have been proposed to explain how hyperuricemia is related to hypertension, however clinical studies have suggested that the renin-angiotensin system plays an important role in it. We aimed to determine the relationship between urinary angiotensinogen excretion and serum uric acid in hypertensive patients.

Methods: Patients and methods: Examined children and adolescents were divided into two groups: HT-55 patients with confirmed primary

hypertension and reference group-33 patients with white-coat hypertension. In addition, a group of children and adolescents with HT were divided into two subgroups: HT HU (+) - patients with hypertension accompanied by hyperuricemia (serum uric acid level 5.5 mg/ dL) and HT HU (-) - patients with hypertension and normal serum uric acid levels. Immunoenzymatic ELISA commercial kit was used to measure AGT urinary concentration. The AGT levels were expressed as urinary AGT/ cr. ratio in nanograms per milligram creatinine (ng/ mg cr.).
Results: The median urinary AGT levels and AGT/ cr. ratio in HT subjects were significantly higher when compared to the reference group ($p< 0.01$) and were higher in patients with HT and hyperuricemia than in patients with HT and normouricemia ($p< 0.01$). Urinary AGT levels and AGT/ cr. ratio showed strong positively correlation with serum uric acid ($r=0.63$, $p< 0.01$; $r=0.47$, $p< 0.01$, respectively). The relationship between AGT/ cr. levels and serum uric acid levels after controlling for age, gender and BMI-Z-score continued to show significant association.
Conclusion: Increased AGT and AGT/ cr. levels were found in children and adolescents with hypertension accompanied by hyperuricemia. Although large, multicentre, prospective studies are needed to confirm this observation.

Abstract# P-SUN293
Renal Markers of Inflammation and Behavioral Changes in Children with Obesity-related Hypertension

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Objective: The aim of the study was to evaluate parental rating of behavior in obese hypertensive children and to examine the relations with indicators of renal inflammation.
Methods: Between 7-17 year-old children was included. It consisted of; hypertensive obese Group 1 (n = 24), healthy controls Group 2 (n = 27), normotensive obese Group 3 (n = 22). The Children in Group 1 (before and after treatment), 2 and 3 were assessed for urinary microalbumin, N-acetyl-beta-D-glucosaminidase, IL-8, RANTES, MCP-1, IP10 and MIG levels. Behavioral Assessment Scale (CBCL/6-18) was applied to all groups for previous 6 month.
Results: The microalbuminuria and urinary NAG levels were lower, inward orientation and attention problem ratings are reduced in groups 1 after treatment. Pre-treatment of urine IL-8, RANTES, IP-10, MCP-1 and MIG levels were lower in Group 1. While pre-treatment IL-8 levels (57,93 pg/mgkre) of group 1 was higher than group 2 (11 pg/mgkre), after then there was no differences between these two groups (7,4 vs 11 pg/mgkre respectively). In group 3, IL-8 and RANTES levels (54,47 vs 16,84 pg/mgkre respectively) were higher than group 2 (11 vs 6,6 pg/mgkre, $p<0.008$). While pre-treatment IP10 levels were higher in group 1 (47,85 pg/mgkre) than group 2 and 3 (21,69 vs 10,85 pg/mgkre respectively), after the treatment there were no differences between groups ($p<0,008$). There were any correlation between cytokine or chemokine levels and behavioral scoring.
Conclusion: Our results suggest that anti-hypertensive therapy improves glomerular and tubular function and also inward orientation and attention problem ratings. While IL-8 and RANTES appears to increase due to obesity, IP10 appears to be more sensitive to hypertension. Screening of behavioral problems for hypertension may provide the early diagnosis and treatment in obese hypertensive children.

Abstract# P-SUN294
Ambulatory Blood Pressure Monitoring of Children with Beta-thalasemia Major - Preliminary Report

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Objective: Heart disease is one of the most reasons of death in beta-thalassemia major. A few studies about blood pressure changes have been done in children. The aim of this study was to assess hemodynamic changes by ambulatory blood pressure monitoring.
Methods: In this cross sectional study 30 patients (range: 4-18 years old) with beta-thalassemia major evaluated with 24h ambulatory blood pressure monitoring (ABPM) from March 2011 to May 2012. Exclusion criteria were: Ejection Fraction (EF) < 50% and glomerular filtration rate <90 ml/min/1.73 m^2 . Hypertension (HTN) was defined by mean blood pressure index >=1 with or without load blood pressure >25%. Dipper statues was defined by 10% decreased in nighttime vs. daytime mean arterial blood pressure. T-Student test, non Parametric Test, and 2x2 tables were used for analysis. $P<0.05$ was significant.
Results: Overall abnormal high blood pressure was detected in 16.7% of patients. Whole day ABPM showed hypertension in 6.7% of children. During daytime measurements, systolic hypertension was seen in 3.3% (load 3.7%) and diastolic in 6.7% (load 3.3%). These figures for night time evaluation were 6.7% (load 3.3%) and 10.3% (load 6.9%), respectively. Non dipper statues detected in 56.7%. There was no statistical correlation between abnormal blood pressure and age, sex, body mass index, hemoglobin, numbers or rates of blood transfusion, or serum ferritin ($P<0.05$).
Conclusion: ABPM is a useful instrument for early detection of hemodynamic change in children with beta-thalassemia major.

Abstract# P-SUN295
Hyponatremic Hypertensive Syndrome in a young child

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Objective: Hyponatremic hypertensive syndrome is characterized by unilateral renal artery stenosis with secondary hypertension and glomerular and tubular dysfunction due to hyperfiltration and activation of the renin-angiotensin-aldosterone system (RAAS). Presenting symptoms include weight loss, polyuria, polydipsia, enuresis, weakness, headache, clouding of consciousness, and various neurological and behavioral changes.
Methods and Results: A 2-year-old boy presented with a short history of polydypsia, polyuria and anorexia. On physical examination there were signs of severe dehydration, tachycardia and malignant hypertension. He was admitted for invasive monitoring and treatment. Blood analysis revealed hyponatraemia, hypokalemia, hyperreninemia, hyperaldosteronism, high anti-diuretic hormone levels and natriuresis. Diagnostic evaluation including angiography showed a small non-functioning right kidney, with a right renal artery stenosis. Initial treatment consisted of volume repletion and electrolyte correction. Blood pressure was controlled with intravenous antihypertensive drugs. Renal artery angioplasty was impossible due to complete obstruction of the renal artery. Therefore, nephrectomy of the right kidney

was performed. After nephrectomy electrolyte alterations normalized and blood pressure remained stable without medication.
Conclusion: Hyponatremic hypertensive syndrome secondary to renal artery stenosis is a rare phenomenon in children, but should be suspected if hypertension is associated with hyponatremia. It may be more common than previously thought. The pathophysiology of this phenomenon is complex and principally based on counteracting mechanisms in both kidneys. Renal artery stenosis activates the RAAS leading to high blood pressure which subsequently causes pressure natriuresis in the normal contralateral kidney causing volume depletion and hyponatremia. Metabolic alterations and hypertension are reversible after treatment of the artery stenosis. Clinicians should be alert of the signs and symptoms because cure may be possible with timely diagnosis and treatment.

Abstract# P-SUN296
Blood Pressure in Malay and Chinese Children Age 7 Years Old Born Small and Appropriate for Gestational Age

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Objective: Low birth weight has been associated with increased risk for hypertension in childhood and adulthood. Lower nephron number, narrower arteiolar caliber, loss of modulatory role of the blood vessel endothelium, and increased of salt sensitivity were associated for the disease. Ethnicity also influence for difference of blood pressure. Multi-ethnic study in Indonesia was never done before. The aim of this study was to determine and compare systolic and diastolic blood pressure in Malay and Chinese children age 7 years old born small-for-gestational-age (SGA) and appropriate-for-gestational-age (AGA).
Methods: This was a historical cohort analytic study in HasanSadikin and Limijati Hospital Bandung from November-December 2009. Subjects were consisted 40 healthy Malay and 40 healthy Chinese children age 7 years old, born as mature SGA and AGA. Data analysis was done using t test to determine difference of systolic and diastolic pressure in 7 years old Malay and Chinese children born SGA and AGA. The analysis was considered significant at $p<0.05$.
Results: this study showed for the Chinese and Malay children consisted of 20 AGA and 20 SGA for the each group. The mean systolic {107.5(5.2) compared to 92.8(2.7) mmHg} and diastolic {69.9(3.4) compared to 67.8(2.1) mmHg} in SGA group were higher than AGA group ($p<0.001$). Mean systolic and diastolic in Chinese SGA group were higher than Malay SGA group ($p=0.005$ for systolic and $p=0.03$ for diastolic), but there was no differences of blood pressure between Chinese and Malay children in AGA group ($p=0.56$ for systolic and $p=0.55$ for diastolic).
Conclusion: SGA group has higher systolic and diastolic blood pressure than AGA group in 7 years old children, and the Chinese children have higher blood pressure than Malay in SGA only.

Abstract# P-SUN297
Comparison Between Oscillometric and Intra-arterial Blood Pressure Measurements in Critically Ill Preterm and Full-term Neonates

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Objective: The aim of our study was to determine the accuracy of the blood pressure (BP) measured by the non-invasive oscillometric
Methods: Compared tothe invasive intra-arterial method in critically-ill preterm and full-term born neonates admitted to the Neonatal intensive care unit(NICU). We alsoevaluated the effect of gestational age (GA), weight and day of life on BP measured by the intra-arterial method. 101 neonates between the GA ofweeks with umbilical or radial arterial lines were enrolled in the prospective single center study. Intra-arterial systolic BP, diastolic BP andmean arterial pressures (MAP) were recorded every minute and aggregated into 5 minute increments by averaging the readings for that interval.Oscillometric BP was obtained per NICU protocol. When 2 or more oscillometric readings were obtained within a 5 minute interval, the readingswere averaged. For comparative analysis, only the simultaneously recorded intra-arterial and oscillometric readings were included. GA, dailyweight and day of life were obtained in each enrolled subjects. 1,492 paired invasive and non-invasive measurements were available for analysis.
Results: There was statistically significant difference ($P < 0.0001$) between the oscillometric and intra-arterial BP (MAP 3 mmHg +/-10 mmHg, systolic7.1 mmHg +/-11.9 mmHg, and diastolic BP 2.2 mmHg +/- 10.1 mmHg). However, when hypotension was present (MAP<30 mmHg) the trendreversed and intra-arterial BP was significantly higher than the oscillometric measurements ($p<0.001$). There was statistically significantdifference ($p < 0.0001$) when the intra-arterial systolic, diastolic and MAP readings were analyzed with respect to increasing weight (n=82,221;MAP increased by 4.87+/- 0.026 mmHg /kg increase in weight), GA (n=63, MAP increased 0. 9 +/- 0.16 mmHg weekly increase in GA) and dayof life (n=125,580; MAP increased by 1.5 +/- 0.08 mmHg biweekly).
Conclusion: This study demonstrates that oscillometric and intra-arterial BP are notcomparable and do not correlate. It also demonstrates that BP increases with increasing weight, GA and day of life.

Abstract# P-SUN298
High Blood Pressure in Children with Chronic Kidney Disease (CKD) correlates with 1,25(OH)2 VitaminD and not 25(OH) vitamin D

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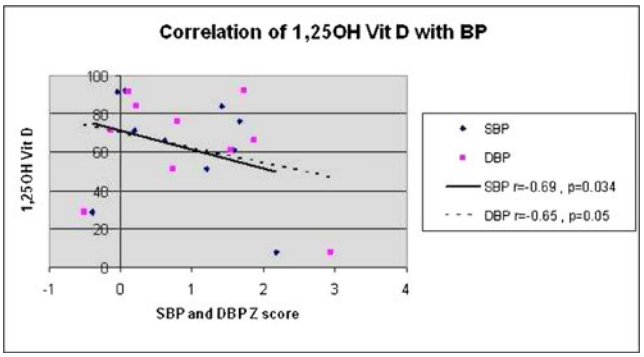
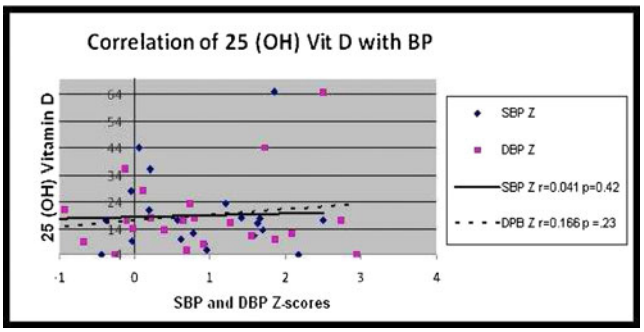
Objective: Vitamin D deficiency is well known for its musculoskeletal complications in children and adults. In vitro studies have suggested 1, 25(OH)2Vit D (1,25 Vit D) as a vascular protective agent by its effect on the endothelium. However, limited studies are available looking at the effect of Vitamin D on blood pressure in children.1,25Vit D levels will negatively correlate with blood pressure.To assess the effect of Vitamin D level on Blood Pressure, eGFR and PTH in children with Hypertension.
Methods: We enrolled 46 patients (25 patients with CKD, 9 primary hypertension (PH), and 12 Control (C). We collected data on age, sex, race, cause of kidney disease, eGFR, Ht, Wt, BMI, BP percentiles and z scores, electrolytes, calcium, 25 vit D, 1,25 vit D, PTH. Spearman coefficient was used to determine the correlation between Vitamin D, SBP z score, DBP z score, GFR, and PTH using SPSS version 2.0.
Results: SBP %'ile was significantly higher in pts with PH (87.7 +/- 17.6) and CKD (75.4 +/- 27.6) than C (43.5 +/- 26.9) and DBP%'ile significantly higher in PH (90 +/- 10.6) and CKD (77 +/- 24.6) than C (46.4 +/- 18.9).eGFR (ml/min/1.73m2) was significantly lower in patients with CKD (70.2 +/- 37.6) than C (106 +/- 27.7). 86 % patients had Vitamin D level <30 ng/ml. Mean 25 Vit D level was 14 +/- 5.8 ng/dl. There was no correlation of 25 Vit D with SBP z-score(r= + 0.041, p=0.42) and DBP z-score (r= - 0.16, p= 0.23) 25 Vit D did not correlate with eGFR (r= + 0.290, P=0.134) or PTH (r= - 0.260,

P=0.370). 1,25 Vit D level correlated negatively with SBP (r= -0.69, p=0.034) and DBP (r= - 0.65, p=0.05) z scores.





Conclusion: Low 1, 25 Vitamin D levels may have deleterious effects on blood pressure in children. 1,25 Vitamin D levels should be measured and normalized in children with hypertension.

Abstract# P-SUN299

A Cuff-Based Method for Estimation of Central Blood Pressure in Children: Comparison with Carotid Wall Tracking and Radial Applanation Tonometry

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Objective: Amplification of systolic blood pressure above central systolic blood pressure (cSBP) is greatest in adolescents and young adults but current methodology is for estimating cSBP is difficult to use in children. We investigated use of a cuff-based method for estimating in cSBP in children.
Methods: We estimated central systolic blood pressure (cSBP) in 73 children (aged 3-18 years, 39 male, 43 with chronic kidney disease) by a cuff-based system (cBP301, Centron Diagnostics), radiofrequency ultrasound wall-tracking of the carotid artery (EsaoteArtLab system) and by transformation of a radial artery pressure waveform obtained by radial tonometry (SphygmoCor). Radial to aortic transformation was performed using the standard transfer function derived in adults. Oscillometric values of peripheral systolic (pSBP) and diastolic brachial blood pressure (DBP) from the cBP301 were used for the calibration of all cSBP values. Mean blood pressure was determined by integration of the radial waveform (calibrated from pSBP and DBP) for final calibration of aortic and carotid distension waveforms to obtain cSBP. Thus errors in determination of peripheral blood pressure were common to all methods.
Results: Values of cSBP estimated by SphygmoCor and Artlab were closely correlated, (R = 0.973, P < 0.0001) with mean difference (+/- SD) -2.4+/-3.4 mmHg. Values of cSBP obtained by the cuff device agreed well with those obtained by both SphygmoCor (R=0.927, mean difference: 3.9+/-6.1 mmHg) and Artlab (R=0.946, mean difference: -5.6+/-5.1 mmHg).
Conclusions: The "reference" methods for estimating central blood pressure used here have not been validated against true intra-aortic values in children. However, the close agreement between them suggests that, relative to pSBP, they provide a reasonable estimate of cSBP. Our results, therefore, suggest that cSBP can also be determined by a simple cuff-based method with similar accuracy.

Abstract# P-SUN300

Measuring Pulse Wave Velocity in Children: A Comparison Between Vicorder and SphygmoCor

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Objective: Pulse wave velocity (PWV), a marker of arterial stiffness, can be measured using ECG-referenced carotid and femoral tonometry, or by using simultaneous volumetric recordings from sensors in pressure cuffs. These can be applied to the carotid and femoral arteries or the brachial and femoral arteries. This simplified technique may be more suitable for use in children. The purpose of this study was to compare PWV measured over the carotid-femoral path (PWVcf) with that over the brachial-femoral path (PWVbf) using a volumetric system (Vicorder) and to compare values of PWVcf obtained by the volumetric and a tonometric method (SphygmoCor) in children.
Methods: PWVcf and PWVbf (Vicorder) were measured in 137 children with chronic kidney disease and/or hypertension (81 males, aged 3-18years),PWVcf (SphygmoCor) was also measured in a sub-sample of 106 children. Measurements were done in triplicate on each device to allow assessment of repeatability.
Results: Vicorder PWVbf and PWVcf were closely correlated (R= 0.75, P <0.0001). However, there was a significant systematic difference between measurements (mean difference 1.87+/-1.25m/s). However, VicorderPWVcf was only moderately correlated with SphygmoCorPWVcf (R=0.51, P <0.0001, mean difference 0.40+/-0.90m/s). Within subject coefficients of variation for repeated measures were 6.6%, 8.3%, and 8.6% for PWVbf (Vicorder), PWVcf (Vicorder) and PWVcf (SphygmoCor) respectively.
Conclusion: These results suggest that PWVbf measured using brachial and femoral cuffs may be slightly more reproducible than other measures of PWV and may be a reasonable surrogate for PWVcf. The technology and choice of path length appears particularly suitable for use in children. However, the volumetric and tonometric methodologies for measuring PWVcf do not appear interchangeable.

Abstract# P-SUN301

CENTRAL BLOOD PRESSURE IN CHILDREN: COMPARISON OF CAROTID WALL TRACKING AND RADIAL APPLANATION TONOMETRY

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Objective: In adults peripheral to central blood pressure amplification varies inversely with age. However, the degree of amplification in children is unknown.
Methods: We estimated central systolic blood pressure (cSBP) in 60 children (aged 5-17 years, 32 male, 40 with chronic kidney disease) by two methods: radiofrequency ultrasound wall-tracking of the carotid artery (EsaoteArtLab system) and by transformation of a radial artery pressure waveform obtained by radial tonometry (SphygmoCor). Radial to aortic transformation was performed using the standard transfer function derived in adults. Peripheral systolic (pSBP) and diastolic brachial blood pressure were obtained by auscultation using an aneroid sphygmomanometer. Mean blood pressure was determined by integration of the radial waveform for final calibration of aortic and carotid distension waveforms to obtain cSBP. Thus errors in determination of peripheral blood pressure were common to both methods.
Results: Values of cSBP estimated by SphygmoCor and Artlab were closely correlated, ($R = 0.98$, $P < 0.0001$) with mean difference (+/-SD) 2.2+/-3.3 mmHg. pSBP exceeded cSBP by 17.7+/-6.8 and 15.5+/-6.9 mmHg for SphygmoCor and Artlab respectively (each $P<0.0001$). Amplification (pSBP-cSBP) was greater in older compared to younger children with values of 12.3+/-1.5 and 20.0+/-1.7 mmHg (means+/-SE) for children < 10 years and > 15 years respectively by Artlab ($P<0.001$).
Conclusion: These methods for estimating central blood pressure have not been validated against true intra-aortic values in children. However, the close agreement between the two methods suggests that, relative to pSBP, they provide a reasonable estimate of cSBP. Our results suggest that, in this study population, peripheral amplification in children is considerable and is greatest in adolescence/early adulthood.

Abstract# P-SUN302
Awareness of adverse effects of angiotensin inhibiting medications in female adolescents treated for kidney disease and/or hypertension

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Objective: Angiotensin converting enzyme inhibitors (ACEi) and angiotensin receptor blockers (ARB) are frequently used for nephroprotection and hypertension therapy. One known adverse effect is the risk of fetal deformities if taken in pregnancy. This can be problematic in female adolescents taking ACEi/ARB, who are sexually active but not aware of the teratogenic risk involved or the contraception requirements. The objective of the study was to assess the awareness of the teratogenic adverse effects of ACEi/ARB in our female adolescents being treated with ACEi/ARBs.
Methods: This was a prospective study (questionnaire) administered to girls aged 10-18 attending the Nephrology clinic in 2010-2012 and treated with ACEi/ARB.
Results: Of 41 approached patients, 39 completed the questionnaire; median age was 15.7 years (range = 11.8 -18.1). Most patients were treated with ACEi only (n=32), 3 pts were on ARB alone, and 4 pts were on both. Seven patients (18%) claimed to not have received any information about the adverse effects of ACEi/ARB from health care providers. Ten patients (25%) stated that they had no prior knowledge of teratogenic adverse effects of ACEi/ARB, although 4/10 had received information on prior visits. Sixteen patients (41%) were unaware of contraception requirements during ACEi/ARB therapy if sexually active. However, most patients (n=37) have a contraception plan for future sexual activity.
Conclusion: A significant number of female patients < 18 years treated with ACEi/ARB had no knowledge about their potential teratogenic adverse effects or about contraception requirements despite having received the information from health care providers on prior visits. More detailed and repeated information sessions on ACEi/ARBs and contraception requirements are recommended for this population.

Abstract#P-SUN303
Clinicoradiological Features and Outcome of Multifocal Fibromuscular Dysplasia in Children: a Retrospective Multicentre Study

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Objective: Fibromuscular dysplasia (FMD) is a non-atherosclerotic non-inflammatory disease of medium-size arteries. In the pediatric population, FMD is most frequently of the medial type. Renal arteries are usually the only site involved although in some children FMD is multifocal.
Methods: The aim of this retrospective multicentre study was to review the clinical features, presenting symptoms, vascular events, management and outcome of children with FMD affecting both renal and cerebral arteries.
Results: Fourteen patients from five centres were enrolled. Mean patient age at diagnosis was 3.4 years (5 months-11 years). The diagnosis was made as part of the evaluation after the incidental finding of hypertension in twelve patients. For the remaining patients the presenting manifestations were: hemispheric transient ischemic attack (n=1), and stroke (n=1). Imaging studies revealed a predominance of internal carotid artery lesions (n=12), and main branch lesions in renal artery FMD (n=9). Percutaneous renal angioplasty was attempted in 12 patients for severe hypertension resistant to medical treatment. In 5 cases hypertension was controlled after this procedure, but it failed in the remaining cases. All patients received long-term antiplatelets agents. Osteoclastic skull trepanation was performed in 3 patients with Moya-Moya typical aspect on angiography as a consequence of multiple cerebral artery stenosis. Six patients died from cerebral ischemia (n=5) or myocardial infarction (n=1). One of them died during an anaesthetic procedure, and three others in the early post-operative period from hypotension and hemodynamic instability.
Conclusion: FMD with both renal and cerebral artery involvement is a very rare finding in children. Prognosis is poor when cerebral FMD is diffuse with Moya-Moya phenomenon. Blood pressure should be maintained at a relatively high level during all the anaesthetic procedures and after renal artery angioplasty in these patients.

Abstract# P-SUN304
Body mass index and physical activity in children with functional voiding disorders

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Objective: The relationship between body mass index (BMI) and the presence of voiding dysfunction is controversial. The present study aims to find out if the BMI of children with voiding disorders is higher than that of the general population and if there are differences between the physical activity level of these two populations.
Methods: We compared the BMI and physical activity level of 32 children between the ages of 6 and 13 (20 males) diagnosed with

functional voiding disorder (patient group) and 32 children of the same age (21 males) who had no urinary symptoms (control group).BMI was expressed as Z-score for the comparison between groups. The level of physical activity was assessed and compared between groups after the parents filled out the International Physical Activity Questionnaire (IPAQ). The result of the questionnaire was expressed categorically classifying the level of physical activity in *low*, *moderate* or *high*, and continuously quantifying energy expenditure *METs-minute/week*.
The Student's test for unpaired samples was used to compare quantitative variables and the chi-square test to compare qualitative variables. We considered a significant outcome $p < 0.05$.
Results: Children with voiding disorders had a higher BMI than those in the control group (BMI Z-score of $0.56 \pm 0.1.2$ vs -0.07 ± 0.77, $p = 0.01$). 26. 5% of children with voiding dysfunction and only 5.9% of children in the control group had a *low* level of physical activity ($p=0.03$). Energy expenditure of children with voiding dysfunction was lower than that of the control group (1964.3±2213.1 vs 2805.6 ±2303.4 METs-minute/week), although this difference was not significant ($p = 0.12$).
Conclusion: Children with voiding disorders appear to have a lower physical activity level compared to the general population.Children with functional voiding disorders have a higher BMI than the general population and, it is possible, that one of the factors contributing to this fact is the lowest level of physical activity.

Abstract# P-SUN305
An Open-label Dose-response Study of Losartan in Hypertensive Children

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Objective: A randomized, double-blind study showed that once-daily therapy with losartan reduced blood pressure (BP) in a dose-dependent manner and was well tolerated in hypertensive children aged 6 to 16 years. We assessed the dose-response relationship and the safety and tolerability of losartan in hypertensive children aged 6 months to 6 years.
Methods: This was a 12-week, open-label, parallel-group, dose-ranging study. Patients were randomized to one of three losartan dose groups: 0.1 mg/kg/day (low dose), 0.3 mg/kg/day (medium dose), or 0.7 mg/kg/day (high dose). Losartan was titrated to the next dose level at Weeks 3, 6, and 9 for patients above their goal BP and not yet at the maximal dose (1.4 mg/kg/day, not to exceed 100 mg/day). The dose response for losartan was evaluated by analyzing the slope of change in sitting systolic blood pressure (SBP; primary endpoint) and diastolic blood pressure (DBP; secondary endpoint) after 3 weeks of therapy compared with baseline. Adverse events (AEs) were recorded throughout the study.
Results: Overall, 101 patients were randomized to losartan, and 99 were included in the analysis: low dose, N=32; medium dose, N=34: and high dose, N=33. Baseline characteristics were similar across groups. Mean baseline SBP was 112.1 mmHg and DBP was 68.9 mmHg, and mean age (range) was 42 months (6-82 months). Mean sitting BP decreased from baseline in the low-, medium-, and high-dose groups by -7.3, -7.6, and -6.7 mmHg, respectively, for SBP and -8.2, -5.1, and -6.7 mmHg, respectively, for DBP after 3 weeks. No dose-response relationship was established by the slope analysis on SBP ($p=0.753$) or DBP ($p=0.643$). The safety profile was comparable between groups. The percentage of patients with drug-related AEs and serious AEs was 2.0% and 7.1%, respectively. No serious drug-related AEs were observed, and no patients discontinued study medication due to AEs.
Conclusion: Hypertensive children aged 6 months to 6 years treated with losartan 0.1-0.7 mg/kg/day had clinically significant decreases from baseline in SBP and DBP, yet no dose-response relationship was evident. Losartan, at a dose up to 1.4 mg/kg (up to 100 mg), was well tolerated in hypertensive children.

Abstract# P-SUN306
Complex surgical treatment and outcome in Takayasu Arteritis

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4 Pediatric Cardiology, Necker Children's Hospital, Paris, France
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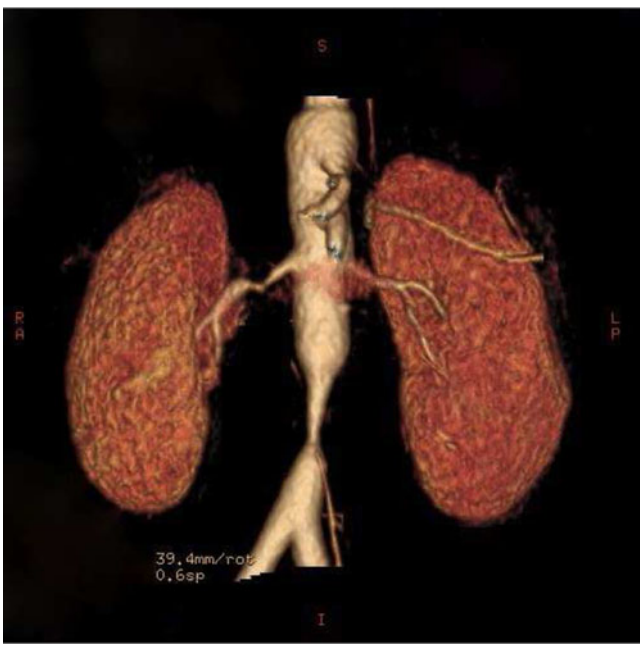

Objective : Takayasu arteritis is a rare cause of hypertension in children that may be hard to diagnose. Narrowing of the aorta and multiple branch-vessel stenosis are suggestive, although arterial aneurysms may be found. Blood pressure control can be tricky in this disease. Endovascular revascularization procedures have a high failure rate, due to the inflammation of the vascular walls.

Methods: We report the case of a patient with Takayasu arteritis who required a complex surgical procedure.
Results: A 4 year-old patient with global heart failure and hypertension was diagnosed with severe dilated cardiomyopathy. Biological, immunological and infectious tests were not contributive. Takayasu arteritis was diagnosed upon the discovery of multifocal arterial stenosis on the angioTDM involving the abdominal aorta (70%), right renal artery (50%) and several cerebral arteries, with an inflammatory aspect of the vascular walls on the angioMRI. Oral steroids and methotrexate were started but discontinued within a month because of the diagnosis of a lymph node tuberculosis. Hypertension remained uncontrolled despite 4 antihypertensive drugs and endovascular treatments. An aortic aneurysm developed post-operatively. A surgical approach was therefore decided, consisting on the replacement of the abdominal aorta with a GoreTex tube, the revascularisation of the left inferior polar artery with the splenic artery and the auto-transplantation of the right kidney on the primitive right iliac artery. Histological examination of the aorta definitively ruled out a tuberculosis arteritis and confirmed the diagnosis of Takayasu arteritis. High blood pressure recurred immediately after the surgery but was easily controlled with a combination of amlodipine and acebutolol, and the left ventricular hypertrophy improved within a few weeks. Methotrexate was resumed after a 6 monthantitubercularquadritherapy. An intensified therapy with anti-IL6 agents is considered.
Conclusion: The association of Takayasu arteritis and tuberculosis, described but not fully understood may complexify the treatment. Complex vascular surgery may be required to treat uncontrolled hypertension.

Abstract# P-SUN307
Adult guide-lines are not applicable to measure PWV path length in pediatrics

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Objective: It has been widely recognized that aortic pulse wave velocity (PWV) is a sensitive marker of arterial stiffness. In our previous multicenter study we have presented reference tables enabling the calculation of SDS (standard deviation score) values of PWV in children and teenagers.PWV is defined as the path length between the wave detecting probes divided by the transit time. Many different distance measurement procedures have been proposed, therefore, standardization of its measurement is urgently needed. A recent consensus document provides arguments for the use of 80% of the direct carotid-femoral distance as the most accurate distance estimate in adults.In the present work we aimed to assess if a transposition of the adult PWV measurement method is valid in childhood.
Methods: Data of children and adolescents participating to our previous work establishing age and height specific PWV normal valueswere re-evaluated. A total of 1008 healthy children and teenagers (mean age: 15.2 years [range: 6.5 to 19.9 years]; 495 males) were included in the study. We have recalculated PWV values using the original subtractive method path length (L_{SM}) and 80% of direct path length ($L_{(0.8)}$). We have constructed Bland-Altman (BA) plots to assess the difference between PWV_{SM} and $PWV_{(0.8)}$, andthe distancesL_{SM} and $L_{(0.8)}$ in different age groups.
Results: The concordance between PWV_{SM} and $PWV_{(0.8)}$ is excellent in children below 14 years (BA, delta PWV mean: 0.19 m/s, SD: 0.40).However, in children > 14 years, the difference increases (BA, delta PWV mean: 0.57 m/s, SD: 0.36), and there is a proportional error between PWV_{SM} and $PWV_{(0.8)}$ (BA, r: 0.18; $p<0.001$), and in parallel there is also a proportional error between L_{SM} and $L_{(0.8)}$ (BA, r: -0.24; $p<0.001$).
Conclusion: The path length measurement suggested for adults may not be transponible to children throughout all age groups without reservation. Thus we propose to keep the current tables and values, unless the validity of a particular measurement is proved.

Abstract# P-SUN308
Waist-to-Height Ratio and Elevated Blood Pressure Among Children in Taiwan

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Objective: To study the association of waist-to-height ratio (WHtR) and elevated blood pressure (BP) in children. Study design: Cross-sectional study. Setting: Six elementary schools in Taipei, Taiwan. Participants: All children aged 7 years at first grade.
Methods: We measured anthropometrics and BP during the regular health examinations among children. Main Outcome Measures: Elevated BP in children was defined as an average systolic BP or diastolic BP greater than or equal to the gender, age, and height-percentile-specific 95th percentile BP value.
Results: Among 2,334 eligible school children, the averages of systolic BP and diastolic BP increased with quartiles of WHtR. The prevalence of elevated BP in children among the first quartile of WHtR was 8.8% and increased to 31.2% among the fourth quartile of WHtR ($P < 0.0001$). Children among the first quartile of WHtR being reference, the adjusted odds ratio of elevated BP for children among the fourth quartile of WHtR was 3.10. The odds ratio of elevated BP with per 0.01 increase of WHtR was 1.11.
Conclusion: WHtR, simple to measure, is an important factor associated with elevated BP in children.

Abstract# P-SUN309
Prevalence of overweight and obesity among children and adolescents in Shenyang and the relationship to birth weight

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Objective: To determine the prevalence of overweight and obesity among children and adolescents in Shenyang and the relationship between the birth weight to overweight and obesity in the childhood.
Methods: A stratified cluster representative sample of 5800 children and adolescents aged 7-17 years from 27 schools in was Shenyang selected. The study was carried out by using questionnaire about birth weight and physical examination including weight and height. Overweight and obesity were defined according to body mass index cutpoint. The BMI cutoffs recommended by the Chinese Working Group on Obesity for Children (WGOC) aged 7-17years, the relationship between birth weight and overweight or obesity in children and adolescents was analyzed by collecting the information associated with overweight or obesity.
Results: The overall combined prevalence of overweight and obesity was 21.13% with obesity as 7.12% based on the WGOC criteria, children of 10-12 years old were high-risk population groups. The epidemic of overweight and obesity in Shenyang were level II, the incidences of overweight and obesity of high birth weight babies was

2.18 times higher than that of normal birth weight babies, the incidences of overweight and obesity between low birth weight babies and normal birth weight babies were no statistical difference.
Conclusion: Data from our study indicated that the prevalence of overweight or obesity children and adolescents are level II in Shenyang. Risk to be overweight and obesity in Adolescences and men are higher .To decrease overweight and obesity children and adolescents deserved greater attention and started from fetus period.

Abstract# P-SUN310
THE ROLE OF MICROALBUMINURIA IN CHILDREN AND ADOLESCENTS WITH ESSENTIAL HYPERTENSION

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Objective: Microalbuminuria in adults is considered to be an early marker of renal as well as systemic vascular disease. Its role in adults with hypertension has also been determined. In children with hypertension, however, its significance has yet to be established. The aim of our study was to investigate the role of microalbuminuria in children and adolescents with essential hypertension.
Methods: 117 children and adolescents diagnosed with essential hypertension at our Nephrology Unit have been included in the study and compared with 100 healthy children. One random morning urine sample was obtained from each patient for microalbuminuria measurement by immunoturbidimetry and for creatinine determination using standard technique. In microalbuminuria positive children and adolescents with essential hypertension control sample was obtained after 6-months. Microalbuminuria was defined as an albumin/creatinine ratio of $\geq$ 30 mg/g and < 300 mg/g.
Results: The prevalence of microalbuminuria in hypertensive children and adolescents was found to be 8.5% (10/117 patients). There was no statistically significant difference in microalbuminuria between hypertensive and healthy group of children (χ^2 =0.51, p=0.47). In 9 out of 10 children and adolescents with hypertension (90%) a persistent microalbuminuria after 6 months of follow-up was determined.
Conclusion: Our pilot study found no significant difference in microalbuminuria between children with hypertension and healthy population. However, its short-time persistent elevation was found in most hypertensives. Larger prospective studies are needed to finally determine its role in pediatric hypertension. It seems that follow-up of this marker might be of utmost importance.

Abstract# P-SUN311
Association between obesity and the severity of ambulatory hypertension in children and adolescents

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Objective: The goal of our study was to analyze the association between obesity and the severity of ambulatory hypertension in obese children.
Methods: White children ages 6 to 18 years referred by community physicians to our university hospital between May 2005 and December 2010 for assessment of obesity (BMI >95th percentile) were enrolled in the study. None of the patients suffered from known chronic illness nor received antihypertensive medications at the time of assessment. All patients maintained regular diet and physical exercise as recommended by their referring physicians. Patients with secondary obesity and patients with acute illnesses were excluded. A total of 109 patients ages 7 to18 years (mean ± SD age 14.1 ± 3.1) met the inclusion criteria and were included in the final analysis. Patients were divided into three groups according to body mass index (BMI) Z-scores: group 1 (n = 27): BMI >1.65 and < 3.28 standard deviation scores (SDS); group 2 (n = 55): BMI >3.29 and <4.91 SDS; group 3 (n = 27): BMI >4.92 SDS. Definition and staging of ambulatory hypertension was based on blood pressure (BP) levels and BP load, obtained from ambulatory BP monitoring (ABPM).
Results: Only 24% had ambulatory normotension, 25% had ambulatory prehypertension, 3% had hypertension, and 48% had severe ambulatory hypertension. The severity of hypertension increased significantly with the degree of obesity (p=0027). Daytime systolic, diastolic, and mean arterial BPs increased significantly with increased BMI, whereas the nighttime pressure remained elevated regardless of the degree of obesity. Isolated nighttime hypertension was observed in 25% of patients and 38% were classified as nondippers.
Conclusion: Our study shows that a significant proportion, almost 50% of obese children with ambulatory hypertension already suffer from severe hypertension at the time of diagnosis. Furthermore, there is a significant association between obesity and the severity of ambulatory hypertension in children and adolescents. The daytime SBP seems to be directly related to the degree of obesity, whereas the nighttime BP remains elevated throughout the wide range of BMI Z-scores.

Abstract# P-SUN312
ABPM IN CHILDREN WITH CAKUT

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Objective: It is recently been advanced the hypotesis that congenital anomalies of the kidney and urinary tract (CAKUT) in children represent an independent risk factor for progression to end-stage renal disease. Hypertension (HYT) is a frequent condition in this group of patients. Aim of our study was to measure the blood pressure (BP) profile [investigating BP variability and dipping (DIP)] in children with CAKUT.
Methods: In the last six months we performed ambulatory blood pressure monitoring (ABPM) using SpaceLabs 90217, in 58 children with CAKUT, mean age of 10.4±4.1 years (5-18). We excluded children with renal insufficiency or in treatment with antihypertensive drugs. We divided patients (group A) in four groups, according to renal ultrasound and DMSA scan: unilateral renal agenesis (URA) (18), unilateral renal hypoplasia (URI) (12), vesicoureteral reflux nephropathy (RVU) (22) and multicystic dysplastic Kidney (MDK) (6). We also performed ABPM in 30 healthy children, comparable for age and sex, as control group (B). Informed consent was obtained by all participants.
Results: We registered weight, height, BMI, systolic (PAS) and diastolic (PAD) office BP. PAS and PAD office values, obtained with sfigmomanometer device, were respectively 115.4±14.9 and 69.5±10.5 and 110.6±12.5 and 68.2±8.5 in group A and B. No significant difference was registered regarding mean 24h, daytime and night-time PAS and PAD, BP-load and BP variability (ABPM), between group A and B but a significative difference of dipping (DIP) 6.5±5.9 vs 12.7±3.6 % (p<0.001) among the two groups, with a percentage of non DIP of 62% and of reversal DIP of 15,5%.
Conclusion: We found masked HYT in 8,6% of patients. In conclusion 80% of children with CAKUT are non dippers and could be predisposed a vascular damage. For this reasons we raccomend ABPM in this children.

Abstract# P-SUN313
BLOOD PRESSURE MEASUREMENTS IN SCHOOL CHILDREN

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Objective: In the last years the detection of hypertension (HYT) in children has increased considerably. Blood pressure (BP) is not easy to measure in children and automatic devices would be preferable The recommended method for BP measurement in children isauscultatory. Purpose of our study was to evaluate BP in school-children, using an oscillometric device already validated in children.
Methods: In 647 students (320 M/327 F), mean age 12.6 +-1,09 years, we recorded BP values using a sphygmomanometer device (A) and an oscillometric one OMRON 705 IT (B). Two measurements of BP were done for each device at a distance of 2 minutes. We defined hypertension children according to the values of NHANES. In all children were measuread: weight, height, bmi, waist circumference, waist-to-height ratio. The BP with A were PAS/PAD: 106±11.5/61.9±8.4 mmHg and with B PAS/PAD:112.1±14.2/64.6±12.4 mmHg, being significantly lower using auscultatory compared to oscillometric ($p<0.001$).
Results: The percentage of children with hypertension was 4,7% (M:4,6%,F4,8%). BP values were significantly correlated with age, BMI, waist circumference; no correlation was found with birth weight. We divided our population in two groups in relation to weight: we found significantly higher PAS (112.1 vs 105.2 mmHg) and PAD (67.6 vs 61.3 mmHg) values in overweight patients. Dividing our population in two groups in relation to family history of hypertension (FHYT) we found significantly higher ($p <0.001$) PAS (110 vs 105.6 mmHg) and PAD (64.1 vs 61.7 mmHg) values in patients with FHYT while BMI was significantly lower (20.8 vs 25.9).
Conclusion: Blood pressure values are higher when using a validated oscillometric device: PAS (+5.2 mmHg) and PAD (+ 3 mmHg). PAS and PAD values are higher in children overweight and with FHYT independently of their weight.

Abstract# P-SUN314
Incidental discovery of a renal cell carcinoma after nephrectomy for refractory hypertension in an adolescent on haemodialysis

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Objective: Renal cell carcinoma (RCC) is rare in the paediatric population. The tumour is mostly operable at diagnosis, resulting in good prognosis. The management of RCC in children with chronic kidney disease (CKD) remains a challenge because of the perspective of immunosuppressive therapy for transplantation.
Methods: We report the case of a 15 year-old girl, on stage 5 CKD, who underwent unilateral nephrectomy for refractory hypertension and the histological analysis found incidentally a clear cell-type RCC.
Results: The girl was on haemodialysis for CKD related to bilateral renal hypoplasia dysplasia. She also presented deafness and myopia, but none of the genetic mutations for branchio-oto-renal syndrome was found in her. She was treated with recombinant growth hormone for growth failure (stopped 18 months before the nephrectomy). We decided to remove the left kidney because of refractory hypertension. The ultrasonography performed before the nephrectomy did not show any suspect lesion of the kidneys. The surgeon detected no macroscopic lesion during the nephrectomy. The histological analysis found a tumoral nodule of 5 mm with an aspect of clear cell-type RCC. Neither extension to the renal capsule nor vascular tumoral embolism was found. The immunohistochemical analysis of the tumour showed expression of the TFE3 (transcription factor for immunoglobulin heavy-chain enhancer 3) protein. No secondary malignant localisation was found (bone scintigraphy, chest CT scan, abdominal ultrasonography, abdominal magnetic resonance imaging), particularly in the right kidney. After multidisciplinary discussion (paediatric oncologists and nephrologists), we decided to remove the other kidney preventively before transplantation, despite the poor risk of contralateral recurrence. The histological analysis of the right kidney did not find any tumoral lesion. The girl is now on daily haemodialysis, still waiting for kidney transplant, 3 months after the second nephrectomy.
Conclusion: The incidental discovery of a RCC in a patient waiting for transplantation led us to preventive contralateral nephrectomy. The risk of post-transplantation recurrence of RCC seems infinitesimal.

Abstract# P-SUN315
Renovascular hypertension in Chinese children - experience from a regional hospital in Hong Kong

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Objective: Renovascular hypertension is an important cause of paediatric hypertension. Non-invasive investigations including plasma renin activity and various imaging modalities are used as screening tools in diagnosing this condition. The gold standard of diagnosis is by digital subtraction angiography, which is an invasive diagnostic radiological study. Renovascular hypertension is amendable by endovascular or surgical treatment. We aim to describe the clinical characteristics and outcome of childhood renovascular hypertension in a regional hospital in Hong Kong and to identify any clinical parameters and investigations that can help to select the high risk patients for digital subtraction angiography.
Methods, Results and Conclusions: 22 patients were included in this study. 7 had renovascular hypertension and 15 had essential hypertension. Fibromuscular dysplasia, neurofibromatosis type 1 and Takasayu's arteritis account for all the diagnosis in renovascular hypertension group. Compared to those with essential hypertension, these patients were non-obese and presented at a younger age ($p < 0.05$). Peripheral supine renin was significantly higher in this group of patient (p 0.032). A high or intermediate probability result in MAG3 scan with captopril challenge is suggestive of renovascularhypetension(p 0.001) and it could be regarded as reasonable screening imaging modality in diagnosing renovascularhypertesion. Ambulatory blood pressure monitoring is able to confirm hypertension but its parameters are not useful in differentiating renovascular hypertension from essential hypertension. Definitive treatment is individualized according to etiology and site of involvement. 6 patients underwent angioplasty, of which 2 (33%) could wean off and 2 (33%) could wean down anti-hypertensive drugs. One patient with failed angioplasty and resistant hypertension benefited from partial nephrectomy.

Abstract# P-SUN316
OBESITY RELATED HYPERTENSION IN PEDIATRIC PATIENTS

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Objestive: The prevalence of obesity and obesity related hypertension (HT) have increased in the pediatric population.The aim of this study was to evaluate the demographic, clinical and blood pressure parameters of the newly diagnosed, untreated pediatric patients with obesity related HT; and to assess the effects of therapy on blood pressure abnormalities and end-organ damage.

Methods: Overweight or obese pediatric patients who were diagnosed as hypertensive and referred to the pediatric nephrology for further evaluation of HT were included. Patients were evaluated at the first admission and after a follow up period of non-pharmacological and/or pharmacological therapy.
Results: A total of 65 (44 male, 21 female) children with a mean age of 12.5 years (Range 7-18) were recruited. Half (52%) of the patients had complaints due to HT and 70% had family history of hypertension. Hyperlipidemia was found in 30%, hyperuricemia in 16% of the patients. Left ventricular hypertrophy was observed in 42% and HT retinopathy was seen in 30% of the patients. Mean duration of follow-up was 18 months. Half of the (52%) patients were treated with one, 26% with two anti-hypertensive drugs and the rest with non-pharmacological therapy only. Overall, mean body mass index (BMI) did not change, BMI percentile decrease was seen in only 8 patients during the follow-up. Casual blood pressure was found normal in 44% of the patients in the last visit. According to ambulatory blood pressure monitoring results, mean 24 hour blood pressure, daytime blood pressure and nighttime blood pressure at admission were 131/74, 135/77 and 119/65 mmHg; and in the last visit 125/69, 128/72 and 119/63 mmHg, respectively. Elevated daytime and nighttime systolic blood pressure loads were detected in 80% and 84% of the patients at admission and 83% and 78% of the patients in the last visit, respectively. At admission 32% and in the last visit 40% of the patients had attenuated dipping. 5 patients' left ventricular hypertrophy and 7 patients' retinopathy disappeared during follow-up.
Conclusion: According to our findings, control of obesity and related HT seems to be difficult in pediatric patients.

Abstract# P-SUN317
Comparison of Eight Oscillometric Blood Pressure Measurement Devices to a Mercury Sphygmomanometer in Children aged 1-15 years

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Objective: The prevalence of hypertension in children is low, but some evidence suggests that it is increasing. International guidelines recommend that children are screened yearly for hypertension with blood pressure measurements. The golden standard for measuring blood pressure is the mercury sphygmomanometer, but devices containing mercury is no longer allowed for daily use in EU countries.The purpose of this study was to compare the automated oscillometric blood pressure measurement devices (Osc) routinely used in Pediatric Departments in Denmark to the mercury sphygmomanometer (Msp).
Methods: Eight different Osc in eight Pediatric Departments were used. In each Pediatric Department 195 children were recruited, approximately 65 in each age group: 1-5 years, 6-10 years and 11-15 years. All children had six blood pressures measured. They were within the age groups randomized into three arms: 1) Osc first (three measurements) followed by Msp (three measurements), 2) Msp first followed by Osc, and 3) six measurements with Msp by two different nurses. Blood pressure measurements were performed by skilled nurses in a standardized setting. Mean differences between devices and standard deviation were calculated (American criteria) and the percentage of differences less than 5, 10, and 15 mmHg were calculated (European criteria) for each device, randomization group, and age group. Data were compared according to modified European Society of Hypertension guidelines.
Results: We included 1522 children (50% males). 477 aged 1-5 years, 533 aged 6-10 years and 512 aged 11-15 years. Right arm range 13-40 cm. Blood pressure range 55-162 mmHg systolic and 20-127 mmHg diastolic. The most accurate device was DinamapV300 which passed systolic blood pressure measurement according to both American and European standards. None of the tested devices met all the American and European criteria for validation.
Conclusion: The tested oscillometric blood pressure measurement devices measured the blood pressure significantly different from the mercury sphygmomanometer in this clinical setting.

Abstract# P-SUN318
Impact of revascularization on hypertension in children with Takayasu's arteritis induced renal artery stenosis

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Objective: To determine the effect of revascularization on renovascular hypertension in children with Takayasu arteritis induced renal artery stenosis.
Methods: A 22 year retrospective review. Renal artery stenosis (RAS), confirmed by angiography was considered significant if >50% of the lumen was occluded. Reno-vascular hypertension was defined as systolic and/or diastolic blood pressure 95th percentile for age, sex and height on 3 occasions. Mean of 5 pre-surgery blood pressure measurements and blood pressure at 3 and 6 months post-surgery were recorded. Hypertension was considered cured if normotensive off anti-hypertensives, improved if on the same or reduced number of medications, and persistent otherwise(failure). Benefit was taken as improvement or cure. Association between outcome and some variables were determined.
Results: Fifty-nine children were reviewed. Male: female ratio 0.7:1. Age range 1.10-14.65years (median= 9.98). All were hypertensive with mean systolic and diastolic blood pressures of 161.5mmHg (36) and 106.5mmHg (31) respectively. Number of anti-hypertensives ranged from 1-10. RAS was present in 45(76.3%) children. Bilateral in 30, right-sided in 8 and left-sided in 7. Twenty three procedures were performed in 21 children: Percutaneous transluminal angioplasty (9); auto-transplantation (10); graft insertions (4). Three had contralateral nephrectomy while 16 had nephrectomies only. Outcome data was available for 17 children at 3 months and 14 at 6 months. Cure, improvement and failure rates at 3 months were 2/17(11.8%), 7/17(41.2%) and 8/19(47%). This was similar at 6 months. Association between outcome and age (p=0.51), sex (p=0.32), number of pre-surgery anti-hypertensives (p=0.18) and stenosis sites (p=0.22) were not statistically significant.
Conclusion: Revascularization is beneficial to blood pressure control in about half of children with TA. Factors that may predict outcome are not apparent from this study.

Abstract# P-SUN319
Prospective analysis of utility and feasibility of Ambulatory Blood Pressure Monitoring (ABPM) service in a paediatric nephrology set up in India

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Objective: ABPM is becoming standard of care in pediatric hypertension (HTN) but there are very few reports on its utility and feasibility from an emerging economy and none from India. We hereby present an initial report of a prospective analysis of ABPM service initiated at our pediatric nephrology division in India.
Methods: ABPM service was initiated in May 2012 with WellchAllyn 6100. It was offered to all children above 5 yrs of age with incidental clinic BP persistently ≥ 95th percentile (p) but ≤ 99th p +5 mm Hg or as a standard of care to the following group of children: Chronic kidney Disease (CKD) (≥ Stage 3), post renal transplant (RTx), solitary kidney, renal scar, and post op for coarctation of aorta. The American Heart Association recommendation (Hypertension 2008;52;433-451) was taken as standard and interpretation was done as per their suggestions. ABPM limits were identified using height but if height was less than 120cm then age was used.
Results: Till 31st March 2013; 53 children have undertaken ABPM (26% female) with median age of 9.2 years (range 5 to 18). Incidental HTN was 42% (n=22), CKD 23% (n=12), single kidney 13% (n=7), renal scar 11% (n=6), RTx 3.3% (n=2), post op coarctation 3.3% (n=2) and miscellaneous 3.3% (n=2). The median number of reading was 52.5 (range 34 to 72). Only 2 cases had total number of reading less than 40 and all had at least 1 BP reading every hour. White Coat HTN (WCH) was detected in 32% (n=17) [12 were incidental], masked hypertension (MH) in 8% (n=4) [3 was CKD and 1 was RTx], pre HTN in 11% (n=6) [all incidental hypertension], ambulatory HTN in 6% (n=3) and severe ambulatory HTN in 15% (n=8) [5 of them had office BP ≥ 95th p but ≤ 99th p]. On analysis of feasibility only 2 cases had to be repeated as the machine did not record any readings and overall it was well tolerated. On analysis of utility ABPM resulted in definite change in management in 39.6 % (n=21; cases of WCH and MH).
Conclusion: In this first such report from India ABPM proved to be feasible as well as clinically useful particularly in identifying WCH (avoiding extra costs) and MH.

Abstract# P-SUN320
Impact of revascularization hypertension in children with Takayasu's arteritis induced renal artery stenosis

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Objective: To determine the effect of revascularization on reno-vascular hypertension in children with Takayasu's arteritis induced renal artery stenosis.
Methods: A 22 year retrospective review. Renal artery stenosis (RAS), confirmed by angiography was considered significant if ≥50% of the lumen was occluded. Reno-vascular hypertension was defined as systolic and/or diastolic blood pressure ≥95th percentile for age, sex and height on ≥3 occasions in the presence of haemodynamically significant RAS. Mean of 5 pre-surgery blood pressure(BP) measurements and BP at 3 and 6 months post-surgery were obtained. Hypertension was : cured if normotensive off anti-hypertensives, improved if so on the same or reduced number of medications, and persistent (failure) otherwise. Benefit was taken as improvement or cure.
Results: Fifty-nine children were reviewed. Male:female ratio 0.7:1, age range 1.10-14.65years (median= 9.98). All were hypertensive with mean systolic and diastolic BP of 161.5mmHg(±36) and 106.5mmHg(±31) respectively with number of anti-hypertensives ranging 1-10. All received standard medical therapy for TA. RAS, present in 45(76.3%) children was bilateral in 30, right-sided in 8 and left-sided in 7. Twenty three procedures were performed in 21 children: Percutaneous transluminalangioplasty(9); auto-transplantation(10); graft insertions(4). Three had contralateral nephrectomy while 16 had nephrectomies only. Outcome data was available for 17 children at 3 months and 14 at 6 months. Cure, improvement and failure rates at 3 months were 2/17(11.8%), 7/17(41.2%) and 8/19(47%). This was similar at 6 months except in 1 patient with failure who later demonstrated improvement. Association between outcome and age (p=0.51), sex (p=0.32), number of pre-surgery anti-hypertensives (p=0.18) and number of stenosis sites (p=0.22) were not statistically significant. Three children with failure proceeded to nephrectomy with cure.
Conclusion: Revascularization is beneficial to BP control in about half of children with TA. Factors that may predict outcome are not apparent from this study. Review of pre and post-operative angiograms may yield additional useful information.

Abstract# P-SUN321
Facilitating Identification of Hypertensive Children: An Electronic Medical Record Approach

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Objective: The prevalence of children and adolescents with elevated blood pressures (BP) has been increasing over the past decade. Unfortunately, children with elevated BPs often go unrecognized due to the complexity of interpreting BP readings, as it requires clinicians to reference cumbersome tables to calculate the corresponding BP percentile. Recently there has been some effort to simplify this process with the development of online clinical BP calculators and simplified tables. However, they still require clinicians to take additional steps to identify high BPs. As more clinics and institutions transition to electronic medical records (EMR), there is a great opportunity to incorporate these calculators within the EMR so abnormal BP values can be identified without additional clinician effort. Here we describe the process for calculating and displaying BP percentiles within our institution's EMR.
Methods: With the introduction of clinical electronic documentation at our institution, we had all of the necessary data (sex, age, height, and BP readings) captured within the EMR to calculate BP percentiles. To do this we utilized the formulas and coefficients published within *The Fourth Report* and incorporated them into custom scripts and rules within our EMR. The documentation of all non-invasive BP readings in patients aged 1 – 17 leads to the execution of these scripts, and the corresponding percentiles get recorded into the EMR as distinct results. Percentiles ≥95th are flagged as abnormal.
Results: The system generated BP percentiles, for both systolic BP and diastolic BP are displayed within the EMR adjacent to the original BP reading. This allows the results be viewed and tracked over time simultaneously in both tabular (fig. 1) and graphical formats without any additional work on the behalf of the clinician.

Provider Overview	2/15/2013 11:11	2/15/2013 11:10	2/15/2013 11:08
Vital Signs			
Systolic Blood Pressure	105	124	122
Diastolic Blood Pressure	64	78	75
Systolic Blood Pressure Percentile	* 47	* H 96	* 94
Diastolic Blood Pressure Percentile	* 55	* 92	* 87

Figure 1 – BP readings of an 11-year female and the corresponding percentiles below

Conclusion: BP percentiles calculated and documented automatically within the EMR have the potential to remove an enormous barrier to the recognition and treatment of hypertension in children and adolescents. We plan to examine if this improves the identification of hypertensive children at our institution.

Cardiovascular morbidity

Abstract# P-SUN322

High Levels Of N-terminal Pro-B Type Natriuretic Peptide (NT-proBNP) And High-sensitive Troponin T (hsTNT) Are Associated With Early Cardiac Abnormalities In Children Undergoing Dialysis

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Objective: Children with end-stage renal disease (ESRD) have an increased risk of cardiovascular disease. This study aimed at exploring traditional and novel biomarkers for early identification of cardiac abnormalities in asymptomatic dialysis children.
Methods: Fractional shortening (FS), left ventricular mass index (LVMi) and indices of LV relaxation (Em/Am) and compliance (E/Em) were measured by 2D-Echo and tissue Doppler imaging. 3-monthly ambulatory blood pressure (ABP) was monitored. Diastolic and systolic BP scores were calculated by adding individual scores for 24h, wake/sleep BP index and load, and BP dipping. Traditional (time-averaged uric acid, calcium, intact parathyroid hormone, phosphate, urea, hemoglobin) and novel serum biomarkers (NT-proBNP, hsTNT, ST2, GDF15, homocysteine, ADMA, hsCRP, cystatin-C) were measured. Principal Component Analysis was used to create 9 independent traditional (including ABP scores, ESRD duration, BMI) and 8 novel predictors. Multivariate linear regression analyses were done, and biomarker cut-off values calculated by ROC curves.
Results: Of the 25 pediatric patients (mean age 16.0±6.3 years and dialysis duration 4.5±3.9 years) studied, 92% had hypertension, 24% left ventricular hypertrophy (LVH), 16% diastolic dysfunction (DD) and 8% systolic dysfunction (SD). NT-proBNP levels were significantly higher in patients with LVH and SD (p=0.001) while hsTNT levels were significantly higher in those with DD (p=0.002). Of the traditional markers, time-averaged phosphate was the only independent predictor of LVMi (B=9.9; p<0.001) while total BP score was predictive of Em/Am (B=-0.15; p=0.03). Of the novel biomarkers, NT-proBNP and hsTNT were independent predictors of LVMi (B=14.3; p<0.001), Em/Am (B=-0.2; p=0.01) and FS (B=-3.2; p<0.001). NT-proBNP cut-off value of 3600 pg/mL (AUC 0.93±0.05; p=0.002) had a sensitivity and specificity of 100.0% and 84.2%, positive and negative predictive values of 66.7% and 100.0% respectively for LVH.
Conclusion: NT-proBNP and hsTNT were the most useful novel biomarkers for detecting early cardiac abnormalities, with NT-proBNP having the highest diagnostic value in excluding LVH.

Abstract# P-SUN323

RENAL AND PATIENTS' SURVIVAL IN HYPERTENSIVE CHRONIC KIDNEY DISEASE CHILDREN

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Objective: Hypertension prevalence and impact on renal and patients' survival were retrospectively determined in chronic kidney disease (CKD) children.
Methods and Results: The median age was 10.0 (0.2-15.5) years. 77of 154 (50.0%) were hypertensive with 23 (30%) and 54 (70.0%) having stages I (123.0 +/- 12.5/ 82.4 +/- 10.6 mmHg) and II hypertension (161.0 +/- 32.3/111.0 +/- 23.0 mmHg), respectively. 70.0% of the patients received two or more anti-hypertensives for satisfactory blood pressure (BP) control. BP control was good, fair and poor in 43 (56.0%), 18 (23.4%), and 16 (20.6%) patients, respectively. Post-treatment BP in hypertensives with good control was similar to normotensives', p=0.541. One/5 years renal survivals in normotensives (97.0/80.0%) were similar to hypertensives with good BP control (96.2/63.0%, p=0.362). Normotensives, however, demonstrated significantly better one/five years renal survival (97.0/80.0%) than patients with fair (75.0/25.0%, p= 0.014) and poor BP control (50.0/0.00%, p=0.003). By Kaplan-Meier pairwise comparisons and the log-rank test, patients with good BP control survived (66.7%) better than patients with either fair (24.1%; p=0.002) or poor (0.0%; p=0.000) control. Hypertensives with good BP control (66.7%) and normotensives (90.4%) survived similarly, p= 0.198. Normotensives survived (90.4%) better than patients with either stage I (46.8%, p=0.014) or II (49.3%, p=0.000) hypertension. Stages I and II hypertension survived similarly (p=0.353). Cumulative mortality was significantly higher in hypertensive (62.4%) than non-hypertensive (9.5%) CKDs [Hazard ratio: 0.54, 95% CI: 0.35-0.83, p= 0.005].
Conclusion: In childhood CKD, hypertension is a highly prevalent comorbidity and a significant risk factor for renal disease progression and mortality.

Abstract# P-SUN324

When does hypertension appear in pediatric patients with chronic kidney disease?

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Objective: Due to the hypertension (HTN) risk factor has rarely been systematically assessed in childhood-onset CKD (CKiD) population in Asian kids, we aimed to examine the incidence rate, time to onset, and additional risk of childhood-onset CKD for HTN in Taiwan pediatric population.
Methods: A nested case-control study using the population-based Longitudinal Health Insurance Database 2010 from Taiwan was conducted to assess the risk of CKiD for hypertension. CKiD was defined in children and adolescents with at least one ICD9 codes for CKD (585-588) and congenital adbnormalities of kidney and urinary tract (CAKUT, 589, 591, 5937x, 596, 5997, 753xx, 7885, 7910, etc.) at age lessthan 20 years old. Presence of HTN was defined by at least one ICD9 codes for hypertension (401-404, 99791, etc.) or with ATC codes for anti-hypertensive medication uses for at least 14 dyas during 1998-2010. Multivariate logistic regression was employed to assess the association between the presence of CKiD, types of CKiD and occurence of HTN.
Results: In the pediatric cohort, 6106 of them were with CKiD (mean incidence, 80cases/per 106 person-years with SD=18), 47.4% were female, median age at CKD onet was 7.1 years old, and 36% were CAKUT. Of CKiD kids, incidence rate of HTN was 28.4% (n=1736) and 60.8% of them with onset of HTN between 20-34 years of age. The overall HTN risk was 1.2 times higher in pediatric CKD than in the general pediatric population, and 2 times higher in CAKUT type of CKiD than those who with non-CAKUT CKD.
Conclusion: Children and adolescents at schoolhood ages are optimal time to both identify modifiable risk factors and intervene in efforts to

avert future end stage kidney disease and cardiovascular diseases. Although we cannot rule out the propensity that HTN was underestimated and/or undertreated in the sudy population, study findings highlighted the needs to further identify and effectively treat HTN in Taiwan kids to reduce the future burden of adult cardiovascular diseases.

Abstract# P-SUN325

HAVE THE PATIENTS WITH STEROID RESISTENT NEPHROTIC SYNDROME (SRNS) ELEVETED RISK OF LEFT VENTRICULAR HYPERTROPHY?

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Objective: The cardiovascular morbidity is the leader cause of mortality in pts with ESRF independently of kind of renal replacement therapy. Left ventricular hypertrophy (LVH) is important marker of cardiovascular risk in adults with chronic kidney disease.
Methods: For assessing the prevalence and factors associated with LVH in children with SRNS echocardiograms, blood pressure monitoring, biochemical profiles were obtained in 53 children (12.69+/-4.037 years, f/m=0.51/0.49) and compared with dates of 83 children (age 12.52+/-3.8 years, f/m=0.57/0.43) with non immune chronic renal diseases (non-SRNS pts). LV mass established by Devereux methods and indexed to height^{2,7} according to Simone formula was compared with age-specific percentile curves (P.R.Khoury, al., 2009).
Results: LVH was revealed in 11 pts with SRNS (q=0.21) and in 5 (q=0.06) non-SRNS pts (p=0.002). The children with LVH in SRNS group were younger than the pts with LVH in non-SRNS group (12.62+/-4.01 and 14.75+/-3.3 years, p>0.05). There was statistically significant difference in incidence of blood hypertension and the level of proteinuria between two groups (tab.1). There were no significant associations between LVH and levels of casual and ambulatory blood pressure and eGFR. The RR for LVH was 3,58 (1.36;9.42) in pts with high proteinuria (> 50 mg/kg/die). It raised to 5.47 (2.26;13.21) in the pts with blood hypertension and high proteinuria and it was 6.25 (3.3;11.79) - in children with blood hypertension, high proteinuria and eGFR<60 ml/min/1.73m^2 .
Tabl.1

	SRNS pts (n=53)	non-SRNS pts(n=83)	p
BMI, kg/m^2	20.73+/-4.87	18,98+/-3,45	>0,05
blood hypertension, q	0.77	0,57	**<0,05**
hemoglobin, g/l	128+/-21.6	135,1+/-17,9	>0,05
ESR, mm/h	32+/-5.8	18+/-7,4	>0,05
total serum protein, g/l	63.51+/-13.58	82,54+/-7,14	>0,05
total serum cholesterol, mmol/l	8.66+/-4.14	5,1+/-1,49	>0,05
urine protein >50mg/kg/day, q	0.19	0,012	**0,01**
eGFR, ml/min/1.73m^2	126+/-50.28	111,91+/-33,14	>0,05

Conclusion: Our results demonstrated that pts with SRNS have high risk for LVH. Both traditional cardiovascular risk factors and renal disease-related factors have contributed to development of LVH in these pts.

Abstract# P-SUN326

The Effect Of Fibroblast Growth Factor 23 On Left Ventricular Function In Peritoneal Dialysis Children

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Objective: Elevated Fibroblast Growth Factor 23 (FGF23) levels were shown to be associated for cardiovascular events in chronic kidney disease (CKD) Our purpose was to assess the relationship FGF23 with left ventricular function and carotid intima-media thickness (CIMT) in children on peritoneal dialysis (PD).
Methods: The study population consisted of 17 pediatric patient undergoing PD. Median age was 7.83 (range 0.66-17.75) years. FGF23, serum phosphorus, calcium, intact parathyroid hormone (iPTH), 25 (OH) vitamin D, 1,25 $(OH)_2$ vitamin D and Kt/V urea was measured, left ventricular mass (LVM) and LV myocardial index (LVMI) assessed by echocardiography, CIMT assessed by ultrasonography.
Result: Median FGF23 level was 29.92 pg/ml (22.7-74.76), phosphorus was 5.14 mg/dl (3.05-9.94), iPTH was 438 pg/ml (16-1446), 25 (OH) vitamin D was 11 ng/ml (5-35), 1,25 $(OH)_2$ vitamin D was 11 pg/ml (2-106), Kt/V urea was 2.33 (1.01-3.84). In correlation analyses FGF23 levels were negative associated significantly with Kt/V urea and LVEDD. Patients with <=4 year-old had significantly higher serum FGF23 concentration and LVMI, but lower Kt/V urea.
Conclusions: The worse dialysis vintage found to be associated with higher FGF23. This higher FGF23 seems to contribute the cardiac geometry changes such as LVMI, LVEDD that may be progress to left ventricular hypertrophy independently phosphor, calcium, vitamin D and PTH.

Abstract# P-SUN327

VASCULAR CHANGES IN PEDIATRIC RENAL TRANSPLANT RECIPIENTS

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Objective: Cardiovascular disease is a major cause of morbidity and mortality following kidney transplantation. Endothelial dysfunction was shown to constitute an independent predictor of cardiovascular events. To detect early vascular changes in pediatric renal transplant recipients.
Methods: 36 pediatric renal transplant recipients, at the end of their 1st post - transplantation year, 30 patients with ESRD on regular hemodialysis and 30 normal subjects, were assessed using Doppler ultrasound for assessment of carotid artery intima media thickness (IMT, in mm), renal resistivity indices (RRIs, defined as the ratio of peak systolic velocity - end diastolic velocity/peak systolic velocity) and brachial artery flow mediated dilatation % (FMD %) calculated by the formula (D2-D1/D1) x 100 where D1 is the brachial artery diameter at rest, D2 is the vessel diameter in reactive hyperemia.
Results: Carotid artery IMT measurements in the transplantation group were significantly lower than the dialysis group (0.43 +/- 0.08 mm vs. 0.5 +/- 0.1 mm, *p = 0.001)*, and insignificantly higher than the control group (0.43 +/- 0.08 mm versus 0.41 +/- 0.07 mm, *p = 0.31)*. RRIs in the transplantation group were significantly higher than the control group (0.64 +/- 0.06 vs. 0.61 +/- 0.06, *p=0.026)*. FMD % of the transplantation group was significantly higher than that of the dialysis group (12.01 +/- 9.52 vs. 7.58 +/- 6.78, *p = 0.04*) and insignificantly lower than that of normal controls (12.01 +/- 9.52 vs. 16.13 +/- 8.39, *p = 0.08*).

Conclusion: IMT, RRIs and FMD % in pediatric renal transplant recipients tend to show evidence of vascular dysfunction, despite being significantly lower than those of patients on regular hemodialysis.

Abstract# P-SUN328

Relation between Arterial Stiffness and Components of Ambulatory Blood Pressure in Children with Hypertension and Chronic Kidney Disease

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Objective: Arterial stiffening may be both the cause and consequence of an increase in blood pressure but the blood pressure components implicated in the inter-relationship may differ. The blood pressure component caused by stiffening is pulse pressure (PP). By contrast, passive stiffening resulting from distension of the arterial wall would be expected to relate most closely to mean arterial blood pressure (MAP) at the time of measurement, and stiffening secondary to structural change to relate to longer term MAP and/or PP.The objective of the study was to examine the relation between arterial stiffness as measured by carotid-femoral pulse wave velocity (PWVcf) and components of blood pressure (MAP and PP) at the time of the measurement of PWV (clinic BP), and over a 24 hour period (ambulatory BP) in children with hypertension and chronic kidney disease (CKD).
Methods: Fifty three patients (17 female) aged 7-18 years were recruited from paediatric renal and hypertension clinics at the Evelina Children's Hospital, London. Office brachial blood pressure was measured using a calibrated aneroid instrument. Ambulatory blood pressure measurements were performed using paediatric validated Spacelabs oscillometric ambulatory BP monitors. PWV was measured using the Vicorder volumetric system (Skidmore Medical, UK). Measurements were recorded in triplicate. Univariate analysis and multiple linear regression were used to assess the relationship between PWVcf and components of blood pressure (MAP and PP). Models included adjustment for age, sex and clinical category.
Results: Patients (34 with CKD, 16 with hypertension) had a mean+/-SD office blood pressure 116 +/- 17/63+/-14 mmHg and PWVcf of 5.5+/-1.0m/s. On univariate analysis PWV was most closely correlated with 24 hour MAP (R=0.465, P<0.001 and R=0.288) and was more closely correlated with MAP than PP (irrespective of time point). Multiple linear regression analysis showed the only variables independently associated with PWV were 24 hour MAP (β=0.331, P=0.006) and age (β=0.451, P=0.000).
Conclusion: In children with CKD and hypertension, PWVcf is most closely associated with mean 24 hour MAP and likely to be secondary to increased MAP.

Abstract# P-SUN329

Influence of blood pressure on left ventricular mass (LVM) in children with autosomal dominant polycystic kidney disease (ADPKD)

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Objective: Hypertension and left ventricular hypertrophy have important roles in cardiovascular complications in patients with ADPKD. To identify the left ventricular mass index (LVMI) in relation to systolic and diastolic blood pressure (BP) adjusted for sex, age, and height.
Methods: 36 children (20M/16F) with ADPKD were examined. The median age was 14.0 (IQR: 9.0;15.0) years. We checked blood pressure with OBPM (4 children aged 1 to 5 years) and ABPM (32 patients aged 5 to 17 years). Patients were divided into 3 groups according to three levels of BP: hypertension (HBP; greater than the 95th percentile for sex, age, and height), borderline hypertension (BBP; 75-95th percentile), and normotension (NBP; less than the 75th percentile). Standard two-dimensional echocardiogram was performed and determined LVM. LVM was corrected for body surface area in $g/m^{2,7}$.
Results: Hypertension was found in 30.5% (11 of 36 children) of cases, the median age was 15 (IQR: 14;15) years. Left ventricular (LV) remodeling was found in 5 of 36 children (13,7%) -3 with HBP (2 children - concentric LV hypertrophy; 1 child - concentric remodeling) and 2 with BBP (eccentric hypertrophy). Mean BP during the day was higher in children with LV remodeling: 108.5 (97.8; 110.6) vs. 85 (81.7; 97) (p=0,013). A moderate correlation between LVMI and mean systolic BP (r=0.36, p=0.029) was observed. The BBP children had significantly higher LVMI than the NBP group: 32.5 (27.9; 35.7) vs. 25.47 (22.76; 26.82) (p=0.01). The LVMI in the HBP group was slightly more than in the NBP children: 28.53 (26.25; 32.6) vs. 25.47 (22.76; 26.82) (p=0.15) There was no significant difference in LVMI between the BBP and HBP groups. Low LVMI in children with HBP compared to BBP is probably due to the all children with HBP were treated with ACE inhibitors (over 1 year).
Conclusion: The observation that ADPKD children with borderline hypertension had significantly greater LVMI than the normotensive subjects would suggest that any cardiac intervention in ADPKD children should not wait until hypertension is established.

Abstract# P-SUN330

CARDIOVASCULAR RISK FACTORS IN PEDIATRIC RENAL TRANSPLANT RECIPIENTS

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Objective: To evaluate cardiovascular risk (CVR) before and after renal transplantation (RTx) and to document its potential alleviation in the postRTx period.
Methods: 32 patients (16.8+/-3.4 years) who received renal allografts (72% living-related, 28% cadaveric) before the age of 18 and more than 6 months ago (48+/-31, 7-109 months) and 32 age, sex and body mass index matched control subjects were enrolled. In addition to biochemical testing, in the preRTx period, left ventricular hypertrophy (LVH) in ECHO and carotid intima-media thickness (CIMT) were evaluated; in postRTx period, tissue Doppler ECHO data (TDI) and brain natriuretic peptide (BNP) levels were also evaluated.
Results: 9-16% of patients were hypertensive. Compared to pre- and post-RTx levels, Hb increased; Ca*P and PTH decreased (p<0.001 for all). CRP, CIMT and left ventricular mass index (LVMI) were also decreased after RTx (12.2+/-9.5 vs 4.3+/-3.5 mg/L, p<0,001 and 0.74+/-0.87 vs 0.56+/-0.98 mm, p<0.001 and 62+/-36 vs 46+/-14 gr/m2.7, p<0.001 respectively). However they all remained significantly higher when compared with controls (p<0.01 for all). LVH prevalence was decresed after RTx (78% vs 66%) but there was no statistical significance. LVMI, myocardial performance index and BNP levels in RTx patients were higher than the controls (p<0.05-0.001). PreRTx LVMI was correlated with low Hb levels (r=-0.40) and long dialysis duration (r=0.41). In postRTx period, there were positive correlations between BNP and LVM as well as E/E Ratio in TDI (r=0.26 and r=0.33), between CIMT and LVM as well as Ca*P product (r=0.37 and r =0.82).
Conclusion: To reduce CV risk in RTx patients, targeting optimum Hb level, well maintained Ca*P product levels due to its negative effect on vascular structure at high levels and avoiding long dialysis period could be helpful in following structurel and functional abnormalities of CV system.

Abstract# P-SUN331

Cardiovascular risk profile in children on renal replacement therapy (RRT)

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Objective: Cardiovascular complications remain a major cause of morbidity and mortality of pediatric end stage renal disease. Although many studies reported a high prevalence of single cardiovascular risk factors, data on the coexistence of cardiovascular risk factors is scarce. We aimed to provide an overview of the coexistence of four cardiovascular risk factors (hypertension, obesity, dyslipidemia, and anemia) in European children on RRT.
Methods: From the year 2000 onwards, data were collected on 589 patients aged 0-16 years contributing to the ESPN/ERA-EDTA registry, providing 1746 measurements. Risk factors were categorized as: obesity (BMI SDS >2 according to World Health Organization cut-offs (0-1 years) or BMI for height age above International Obesity Task Force cut-offs (2-16 years)), hypertension (systolic or diastolic blood pressure SDS ≥ 1.65 or using antihypertensive medication), dyslipidemia (HDL cholesterol <40 mg/dl, or non-HDL cholesterol >145 mg/dl), anemia (hemoglobin levels <10.5 g/dl (0-1 years) or <11.0 g/dl (2-17 years)).
Results: Hypertension was found in 43% of dialysis and 40% of transplant patients, obesity in 17% of dialysis and 31% of transplant patients, dyslipidemia in 62% of dialysis and 30% of transplant patients, whereas 41% of dialysis and 27% of transplant patients were anemic. Thirty-Three percent of dialysis patients had one risk factor, whereas 55% had multiple cardiovascular risk factors (37%, 16%, and 2% had two, three, and four risk factors, respectively). Among transplant patients, 37%, 27%, 10%, and 1% had one, two, three, or four cardiovascular risk factors, respectively.
Longer dialysis vintage was associated with a greater number of risk factors among dialysis patients, whereas in graft recipients younger age and shorter time since transplantation were associated with a greater number of risk factors.
Conclusion: Coexistence of cardiovascular risk factors is common in European pediatric RRT, with only a small number of patients showing no risk factor at all. Future analyses will include other cardiovascular risk factors, and relate these factors to outcome (e.g. patient and graft survival).

Abstract# P-SUN332
Cardiovascular study in children with end-stage renal disease. Monitoring for twelve months

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Objective: Cardiovascular disease causes major morbidity and it is an important determinant of premature death in the paediatric chronic kidney disease population. The objective of this study is to detect cardiovascular changes in the patient on dialysis and their evolution during one year.
Methods: Longitudinal, descriptive study of 26 children who start dialysis replacement therapy, aged 1 to 18 years. It makes them echocardiogram, hemoglobin (normal value ≥ 11g/dl), total cholesterol and triglycerides before starting dialysis, 6 months later and again a year later.
Results: The average age of patients was 10.11 years, 16 were female and 10 were male. The 88.5% (23 patients) had anemia before starting dialysis none received erythropoietin, improving at 12 months. Left ventricular hypertrophy (LVH) is present in 20 of the 26 patients, which keeps at the 6 months, increasing in the year with 22 patients (84.6%).
Conclusion: LVH increases with time of dialysis in our patients; however the anemia decreases, this may be related to the use of erythropoietin when they start dialysis.

Abstract# P-SUN333
Serum Klotho is Associated with Left Ventricular Hypertrophy in Pediatric Dialysis Patients

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Objective: To determine whether serum klotho is a marker for left ventricular hypertrophy (LVH) in pediatric dialysis patients.
Methods: Cross-sectional analysis of serum klotho levels measured in 16 pediatric dialysis patients and 10 healthy controls. Echocardiograms were done within 2 months of klotho measurements.
Results: Serum klotho levels were significantly lower in dialysis patients compared to healthy controls (mean±SD, 1312±1411 vs 2017±901 pg/ml, p=0.019). In dialysis patients, univariate analysis showed that serum klotho levels negatively correlated with age (r^2=0.434, p=0.027), height (r^2=0.476, p=0.019), and left ventricular mass (LVM) (r^2=0.555, p=0.009), but not left ventricular mass index (LVMI) (r^2=0.035, p=0.581). Multivariate analysis did not reveal any significant independent predictor of LVM or LVMI. At a serum klotho level cutoff of 850 pg/ml, dialysis patients with lower klotho levels had a significantly higher risk of LVH compared to those with klotho levels above the cutoff (p=0.029, OR=30). There were no significant differences in age or height between the two groups, and all but 1 patient were hypertensive at the time of study.
Conclusion: Serum klotho levels are lower in pediatric dialysis patients compared to healthy controls. Serum klotho levels are negatively correlated with age, height, and LVM in pediatric dialysis patients, and low serum klotho is associated with an increased risk for left ventricular hypertrophy. Further study is needed to determine the role of klotho in cardiovascular disease in pediatric dialysis patients.

Abstract# P-SUN334
Hyperhomocysteinemia in chronic kidney diseases stage V: Is there any predicting factor?

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Objective: hyperhomocysteinemia is proposed as an important risk factor for athero sclerosis in the general population and an independent risk factor for access thrombosis and cardiovascular mortality in patients undergoing dialysis therapy. This collected evidence aimed to define the frequency of hyperhomocysteinemia in pediatric dialysis patients and determine whether there are any predicting factors to define patients who are at greater risk for having high serum homocysteine levels?

Methods: 45 patients in hemodialysis and peritoneal dialysis centers of an academic children hospital were enrolled study. The study was funded by a research grant from Mashhad University of Medical Sciences and approved by local ethic committee and written consent was obtained from patients or their parents. Serum homocysteine levels were checked and amounts >15μmol/L was defined as hyperhomocysteinemia. Age, gender, modality of dialysis, duration that patients were placed on dialysis and dosage of folate consumption (< 5mg/day versus 5mg/day) were compared in groups with normal and those who had high serum homocysteine levels .For univariables analysis chi square and T tests and for multivariate analysis binary logistic regression test were used and p-value =<0.05 was considered as statistically significant.
Results: 45 patients 19 girls (42.2%) and 26 boys (57.8%) aged 19-300(mean 166+/-76) months were enrolled study. They were placed on dialysis from 1-128(44.2+/-31.2) months ago .Modalities of dialysis were continuous peritoneal dialysis (CAPD) and hemodialysis in 12(26.6%) and 27(60%) patients respectively .Six cases (13.3 %) in the course of renal replacement therapy had been placed on hemodialysis and then CAPD or vice versa. High serum homocystein levels were reported in 13 patients (28.8%), 12 hemodialysis patients and one who had received hemodialysis and then were placed on CAPD. Any of patients who were placed just on CAPD had hyperhomo cysteinemia.Comparing modality of dialysis hyperhomocysteinemia were more common in hemodialysis cases with statistically significant differences (p=0.009).Nine of 19(47.3%) girls and 4 of 22(15.4%) boys had high serum homocysteine levels. hyperhomocysteinemia was found significantly more common in girls than boys (p=0.043), but after entering the all variables on Logistic regression test multivariable analysis showed that these two variables are not as significant independent risk factor in predicting hyperhomocysteinemia in dialysis patients (P=0.187 and 0.999 for gender and modality of dialysis respectively). Mean age, mean length of time from beginning of dialysis and comparing the dosage of folate consumption in cases (<5 mg/day with 5 mg per day) didn't show any significant differences (p values 0.055, 0.467 and 0.235 respectively).
Conclusion: this study showed that unfortunately hyperhomocysteinemia is a common complication on pediatric dialysis patients. Although in our series hyperhomocysteinemia was significantly more common in patients who were placed on hemodialysis and female gender, but we couldn't find any independent risk factor which predict the occurrences of hyperhomocysteinemia in dialysis patients.

Abstract# P-SUN335
Looking into the hearts of children with CKD

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Objective: To screen for presence, type, severity and risk factors for CVD in CKD.
Methods: Observational prospective study of children attending the CKD OPD. Parameters assessed (2D Echo & Colour Doppler): left ventricular dilatation (LVD), left ventricular mass index (LVMI) & left ventricular hypertrophy (LVH){ structure};fractional shortening (FS), ejection fraction (EF), systolic function, diastolic function and myocardial performance index (MPI) {function}; carotid intimal media thickness (CIMT) {large vessel involvement}; Cardiac symptoms & results of the 6 minute walk test; demographic, growth, nutrition, BP, eGFR and biochemical parameters evaluated for significant correlation.
Results:43 children, mean age 8 years had reflux nephropathy or hypodysplasia as the leading cause of CKD. 80% belonged to CKD 4 and 5. The mean GFR: 23.22 ml/1.73m^2/min. 86% wasted & 70% stunted. Abnormalities: LVH (95%),LVD (65%).The LVMI increased progressively with the CKD stage. systolic dysfunction(23.2%),diastolic dysfunction(21%), abnormal MPI(23.2%), increased CIMT (>0.08cm)(90%). Patients with ESRD had highest mean CIMT values (0.14cm, P v < 0.03). Uncontrolled systolic (57%) and diastolic BP (43%) despite control, resulted in residual LV dysfunction (P 0.04) & higher CIMT (0.15 cm). Higher mean CIMT (0.124 cm ±0.006) was seen in cases with LVH (P <0.0001). 9/41 with LVH and 8/39 with high CIMT were symptomatic. The mean EF: CKD(stage II and III) 54.3% ± 4.46; CKD (stage IV and V) 63.7%± 1.9 (P < 0.03). Despite optimal control, diastolic hypertension resulted in persistent diastolic dysfunction (P<0.05)
Conclusion: Structural abnormalities & functional abnormalities seen in 95% & 25% respectively. Large vessel disease seen in 90%, worsened as ESRD developed. Compensatory LVH in advanced CKD preserved systolic function better than the early stages. Hypertension was the single most important risk factor contributing to global LV dysfunction and worse large vessel disease which did not revert to normal even with good hypertension control. Cardiovascular morbidity is universal in Indian children with CKD.

Abstract# P-SUN336
Arterial Stiffness in Children Relates to Age and Blood Pressure but not the presence or absence of chronic kidney disease

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Objective: The aim of this study was to investigate the relationship of arterial stiffness {by measuring carotid-femoral pulse wave velocity (PWVcf)} with blood pressure and renal function in children with predialysis chronic kidney disease (CKD).
Methods: 150 children (94 boys), aged 3–18 years, were recruited from paediatric nephrology and hypertension clinics. CKD was present in 112 (75%) with mean (SD) eGFR 59 (34) ml/min/1.73m^2; hypertension but with no CKD in 21 (14%); and 17 (11%) healthy 'controls'. PWVcf was measured using the Vicorder system.
Results: Overall the mean (SD) of clinic blood pressure was 108 (16)/58 (12) mm Hg and PWVcf was 5.2 (0.9) m/s with no significant gender difference (p=0.81); 25 (16.7%), 24 (16%), 37 (24.7%), 21 (14%) and 5 (3.3%) with stages 1-5 of CKD respectively. In those with CKD the eGFR, BP and PWVcf was 59 (34) ml/min/1.73m^2, 106 (16)/59 (13) mmHg and 5.2 (0.9) m/s respectively. Subjects with hypertension were significantly older, taller, and of higher body mass index (BMI) and had higher blood pressure components (SBP and PP) than those with CKD and 'controls' [all p<0.05]. Except for normal GFR, 'control' subjects were similar to those with CKD. In all patients there was significant correlation between PWVcf and age, height, weight, BMI, SBP and MAP [r=0.48, 0.48, 0.28, 0.41, 0.34; p<0.0001]; PWVcf and DBP and PP [r=0.23, 0.23; p=0.004] but no significant correlation of PWVcf with heart rate and eGFR [r=-0.11 and 0.06; p=0.20 and 0.42]. Across CKD stages 1-5 there was a significant difference in height (p=0.02) and antihypertensive use (p=0.006) but no difference in age, BMI, SBP, DBP, MAP, PP or PWVcf. On multivariate analysis, incorporating age, gender, GFR, use of antihypertensives, and BP variables (SBP, DBP, PP and MAP individually), PWVcf was independently correlated only with age (β=0.37, p <0.001), SBP (β=0.23, p=0.009) and MAP (β=0.17, p =0.04). Addition of anthropometric measures including height, weight or BMI confirmed similar findings.
Conclusion: Our results suggest that arterial stiffness in children in our cohort is predominantly determined by age and blood pressure and not by the presence or absence of CKD or level of renal dysfunction.

Abstract# P-SUN337

The Importance of Ambulatory Blood Pressure Monitoring in Children after Renal Transplantation

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Objective: Hypertension (HT) is a common and serious complication in adults as well as in pediatric patients after renal transplantation (RTx). It has been shown in several studies that ambulatory blood pressure monitoring (ABPM) is a better method for evaluating blood pressure (BP) in children after RTx. In this study, we wanted to determine the relationship between ABPM recordings and HT-related risk factors in children after RTx.
Methods: The ABPM recordings of 24 children who underwent RTx between January 2005 and December 2012 in our unit were evaluated, retrospectively. Pre- and post-transplant parameters regarding echocardiographic features, hypertension, anemia, anti-hypertensive drugs, hyperlipidemia and cumulative steroid dose were also recorded. After RTx, mean follow-up time was 32.24±19.42 years. Statistical analysis was made using *chi-square* and *t-tests* as well as *Pearson correlation analysis* in SPSS 20.0 software.
Results: HT was demonstrated in 7 (29.1 %) patients by casual BP measurement and 10 (40 %) by ABPM. The mean percentage night-time decline in BP (dipping) was 7.38±6.54 % for systolic and 12.75 ±10.91% for diastolic BP. Abnormal dipping (<10%) was seen in 54.1 % of patients. BP load (percentage of BP recordings above 95th percentile) was >30% in 70.8 % of patients. The prevalence of left ventricular hypertrophy was 29.1 % before transplantation and 20.8 % after transplantation. There was no significant relationship between abnormal ABPM recordings and left ventricular mass (LVM) indexed to height *(P>0.05)*. Abnormal ABPM recordings were significantly correlated with triglyceride levels, urine volume, left atrial end diastolic diameter and hypertensive retinopathy *(P<0.05)*.
Conclusion: ABPM is a useful tool for evaluating HT in children after RTx. Our results suggested that HT could not always associated with cardiac hypertrophy following pediatric RTx. Using serial ABPM could lead to clarify the relationship persistent abnormal recordings and other risk factors associated with HT and cardiovascular mortality.

Abstract# P-SUN338

Pulmonary hypertension in an adolescent with renal failure: a diagnostic challenge

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Objective: Prevalence of pulmonary hypertension (PH) in patients with end-stage-renal disease (ESRD) is higher than in controls but the pathophysiology remains poorly understood. We report the case of a 16-year-old boy with ESRD who was diagnosed with PH on echocardiography, discussed the possible etiology for PH and the interest of cardiac catheterization for diagnosis and treatment management.
Methods and Results: The patient's primary renal disease was a congenital nephrotic syndrome. The first renal transplant was complicated by a systemic thrombotic microangiopathy (TMA), a pulmonary embolism and transplant loss. He underwent a second transplantation but presented fifteen months later an acute humoral rejection with deterioration of the graft function. During follow-up, he presented pulmonary edema. The echocardiography showed a dilated left ventricle with normal systolic function, but elevated systolic pulmonary pressure of 60 mmHg and an increased of right atrial pressure above 10 mmHg. Right heart catheterization confirmed PH with a mean PAP of 50 mmHg. This was associated with a massive left-to-right shunt due to a femoral AV fistula. Cardiac index was at 10 L/min/m^2. Pulmonary vascular resistance (PVRi) was 2.8 WoodU*m^2 and acute vasoreactivity testing showed a drop in PVRi to 1.6 WoodU/m^2. PH was then related to a pulmonary overflow due to a massive arterio-venous left-to-right shunt at the femoral level. The normalization of the pulmonary pressure (32/10 mean 20 mmHg) and of the cardiac index (4 L/min/m^2) after closure of the fistula confirmed our findings.
Conclusion: The present case report illustrates the multifactorial aspects of PH in ESRD and discusses the pathophysiology of PH in our patient since the elevation of pulmonary pressure could have been related to 1/previous pulmonary embolism in relation to his nephrotic syndrome, 2/to left-heart diastolic dysfunction related to chronic renal failure and TMA, 3/to ESRD itself as endothelial dysfunction has been found in this condition and 4/to pulmonary overflow. Cardiac catheterization can give valuable information on PH etiology and on PVRi and their reversibility that may help nephrologists, especially in AV access management.

Abstract# P-SUN339

Ambulatory blood pressure monitoring (ABPM) in children with frequently relapsing nephrotic syndrome (FRNS)

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Objective: Multiple risk factors might predispose to cardiovascular morbidity in patients with FRNS. We screened consecutive patients with FRNS for presence of ambulatory hypertension (AH) and left ventricular hypertrophy.
Methods: Following Ethics & parental approval, 97 consecutive patients with FRNS (≥2 relapses in 6-mo) with duration of illness ≥2-yr, were prospectively screened for systemic hypertension. Clinic blood pressure (BP) was measured by oscillometry (Mindray vs-800) as mean of 3 measurements in right arm supine position, using appropriate cuff. We also performed 24-hr ABPM (Spacelab 90207) and 2-D echocardiography for left ventricular mass index (LVMI) on all patients. AH was diagnosed in patients with clinic BP >95th centile for age, sex & height, & systolic BP (SBP) load >25%.
Results: Of 97 patients, 72 were boys; mean age was 10.2±3.5 (range 5-16) yr. Clinic BP was >95th percentile in 63 (64.9%) patients. AH was diagnosed in 33 (34.0%) patients, 16 (16.4%) had masked hypertension & 30 (14.4%) had white coat hypertension. Non-dipping was seen in 69 (71.1%) patients & 54 (55.7%) had high nocturnal SBP load. Severe AH (SBP load >50%) was seen in 14 (14.4%) patients. High LVMI (mean±SD) was seen in 5 patients; 4 of these had severe AH. Mean LVMI in patients with and without AH was 71.9±26.3. and 66±16.1 mg/ respectively (P=0.25). There was no significant relation of AH to steroid intake, use of alternative medications or duration of illness **(Table)**.
Conclusion: Majority of patients with FRNS show evidence of clinic and/or AH. Since patients with AH showed a trend towards higher left ventricular mass and high prevalence of non-dipping, its cardiovascular consequences needs to be evaluated.
Prevalence of clinic & ambulatory hypertension in patients with frequent relapses

Therapy (n)	Clinic hypertension	Ambulatory hypertension	Masked hypertension	Non dipping	High nocturnal SBP
Levamisole alone (13)	6	3	2	9	4
MMF alone (15)	9	7	4	11	10
Prednisolone alone, with levamisole or MMF (29)	21	10	5	23	17
Calcineurin inhibitors (6)	5	2	0	4	2
No therapy(n= 34)	22	11	5	22	21

MMF mycophenolate mofetil; SBP systolic blood pressure

Abstract# P-SUN340

Do Pre-Transplant Stable Systolic Cardiac Functions Play A Role On Short-Term Systolic Cardiac Functions After Kidney Transplantation in Children?

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Objective: Cardiovascular disease is by far the most important and an independent risk factor for morbidity and mortality in every stage of chronic kidney disease (CKD),even after kidney transplantation.Left ventricular hypertrophy (LVH) is one of the most significant risk factors for the development of cardiovascular morbidity.However,studies evaluating systolic cardiac function and associated risk factors in pediatric kidney transplantation are still limited. We,therefore,wanted to assess the systolic cardiac parameters and related risk factors in children within 6 months after kidney transplantation.
Methods: Twenty four children who underwent kidney transplantation between 2005 and 2012 in our unit were evaluated,retrospectively. Pre- and post-transplant parameters regarding echocardiographic features, hypertension,anemia,anti-hypertensive drugs,hyperlipidemia, cumulative steroid dose and growth were recorded. A statistical analysis was made using chi-square and t-tests as well as multivariate regression in SPSS 20.0 software.
Results: After transplantation,ejection fraction (63.35±5.38vs66.95 ±5.52;$p<0.005$), increased, left ventricular mass index (32.63 ±17.21vs30.9±15.42;$p<0.005$) decreased whereas fractional shortening (52.16±15.32vs50.44±13.04;$p=0.43$) did not change.Pre-and post-transplant systolic blood pressure (114±23vs109.7±13.1), systolic blood pressure index (0.98±0.2 vs 0.91±0.1), diastolic blood pressure (73.4±21.1vs69.7±11.4) and diastolic blood pressure index (0.98±0.3vs0.92±0.2) values were not statistically different (p>0.05).In patients, although insignificant, the number of anti-hypertensives used decreased after transplantation (p>0.05). After transplantation, growth and nutritional parameters showed insignificant improvement over 6-month period (p>0.05). Post-transplant serum creatinine and creatinin clearance values were 0.97±037 mg/dl and 86.4±27.3 ml/min/1.73m^2, respectively.Five patients (%20.83) had biopsy-proven acute allograft rejection,managed by pulse-steroid therapy or plasmapheresis.
Conclusion: Our patients who had stable cardiac function in pre-transplant period showed further improvement in cardiac function even within 6 months after transplantation. Therefore,strictly controlled blood pressure,volume,anemia and nutrition in children before transplantation seems to play an important role in achieving better cardiac systolic function after kidney transplantation.

Abstract# P-SUN341

MONITORING OF CARDIO-VASCULAR COMPLICATIONS IN KIDNEY TUMOR SURVIVORS

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Objective: The aim of the study was to monitor for cardio-vascular complications in children after nephrectomy due to kidney tumor.
Methods: 42 children (25f, 17m, aged 11+/-3.37, 5-17.5 years) nephrectomized and treated due to kidney tumor were examined for cardio-vascular complications after minimum 5 years follow-up(mean 7.7+/- 2.6 years). The control group consisted of 30 age-matched children with kidney agenesis (16f, 14m, aged 10,81+/- 3,91, 4-17 years). 24 hours ABPM, carotid intima-media thickness (cIMT) and stiffness, abdominal vessels Doppler ultrasound and left venticle mass index, microalbuminuria, plasma renin activity (PRA) and aldosterone (Ald) were measured. Iohexol test was used to find the glomerular filtration rate (GFR).
Results: The study and control groups did not differ in hight, weigth, biochemical parameters, blood pressure, PRA, Ald, cIMT, Left ventricle parameters. However patients in the control group showed significant higher GFR (117.9 vs. 106.7 ml/min/sBSA, p=0.021) than nephrectomised patients treated in the early childhood with chemiotherapy. The blood velocity in Doppler ultrasound of abdominal aorta was significantly higher in patients with kidney agenesis (160.6 vs. 134.8 cm/s, p=0.003). The resistive index (RI) in kidney artery was comparable in both groups. cIMT correlated well with MAP (R=0.45, p<0.05). 2 patients with agenesis of the right kidney presented with orthostatic proteinuria and “nutcracker syndrome” with dilatation of retroperitonel and scrotal veins. One patient after heminephrectomy presented with acute hypertention with high PRA a. Ald. probably due to additional kidney artery. In result 15 pts. were treated with ACEI as nephroprotection for albuminuria, hyperfiltration and hypertention.
Conclusion: Monitoring of cardio-vascular system is required not only in patients after nephrectomy, but also in patients with kidney agenesis. Regular follow-up allows for diagnosing coexisting malformations and early treatment of common complications.

Abstract# P-SUN342

Left ventricular hypertrophy in children with CKD stages 3-5 is determined by blood pressure and calcium loading but not principally by FGF23

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Objective: To evaluate the relationship of FGF23 with indexed LV mass and LVH following adjustment for relevant confounders in children with pre-dialysis CKD.
Methods: Single centre study, 83 children (51 boys), age 12.1 (3.2) years, mean eGFR 32.3 (14.6) ml/min/1.73m^2, underwent clinic and ambulatory BP measurement, echocardiography and evaluation of biochemical markers of CKD-MBD. LVH was defined using age-specific reference intervals for LV mass index (LVMI) expressed in g/m$^{2.7}$.
Results: The mean (SD) LVMI was 35.9 (8.5) g/m$^{2.7}$ with 30 (36.1%) showing LVH. For all subjects median (IQR) FGF23 concentrations were 75.7 [54.8-131.5] ng/L and following log transformation was 1.94 ± 0.39. Those with LVH (versus those without) had significantly lower eGFR (p=0.008) and higher clinic systolic BP z-score (p=0.009) and higher dose of elemental Calcium intake in g/day [from prescribed Ca-based phosphate binders] (p=0.003). Amongst markers of CKD-MBD, children with LVH had significantly higher concentrations of log iPTH (p=0.04), lower log Calcitriol (p=0.002) and higher log FGF23 (p=0.04) concentrations but no difference in plasma phosphate (p=0.79) concentrations. Log FGF23 concentrations had a negative reciprocal relationship with GFR (r= -0.50, p<0.0001) and log Calcitriol (r= -0.24, p=0.04) and a positive relationship with phosphate (r=0.24, p=0.03) and percent fractional excretion of phosphate [n=33] (r=0.44, p=0.01). On univariate correlation there was significant association of LVMI with GFR (r= -0.32, p=0.004), clinic SBP z-score (r=0.34, p=0.001), with BMI z-score (r=0.28, p=0.01); with elemental Ca intake (r=0.36, p=0.001) but not with log iPTH (r=0.22, p=0.053) nor log FGF23 (r=0.16, p=0.15). Multivariate linear regression demonstrated a strong relationship of LVMI with clinic SBP z-score (β= 0.26, p=0.01) and elemental calcium intake (β=0.28, p=0.01) only.
Conclusion: In this first study in children with carefully managed CKD we have observed, systolic BP and calcium loading as the major determinants of LVH and LV mass while FGF23 had only a minor influence. Larger studies in children are needed to clarify the role of FGF23 on adverse CV outcomes.

Abstract# P-SUN343
Left ventricular hypertrophy: incidence, prevalence and its relationship with blood pressure control in non hypertensive children with pre-dialysis CKD

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Objective: Left ventricular hypertrophy (LVH) in adult patients with chronic kidney disease (CKD) is associated with high morbidity and mortality. In children with pre-dialysis CKD, LVH has been associated with male gender, elevated blood pressure (BP), lower glomerular filtration rate (GFR) and anaemia. There is though scarce data in children with CKD regarding the incidence and prevalence of LVH and factors that influence its change over time. In non hypertensive children with pre-dialysis CKD (i)to establish the incidence and prevalence of LVH and (ii) to determine the relationship of LVH with BP over time.
Methods: Single centre prospective observational study. In children with pre-dialysis stages 3-5 of CKD, echocardiographic evaluation, clinic and ambulatory BP at two time points >6-months apart were performed.
Results: Fifty eight children (35 boys) at baseline (tp1) with mean (SD) age of 11.9 (3.2) and estimated GFR of 31.8 (13.1) ml/min/1.73m^2 had a second assessment (tp2) 1.01 (0.5) years subsequently. Forty-eight (82.7%) had structural renal disease with 24 (41.3%) having their CKD managed since birth with follow-up duration of all subjects at 7.3 (4.8) years at baseline. The prevalence of LVH n (%) was 21 (36.2%) at tp1 and 12 (20.7%) at tp2, all with eccentric hypertrophy. Among 37 children with initial normal left ventricular mass index (LVMI), 3 (8.1%) developed incident LVH; and of 21 with initial LVH, 9 (42.9%) had persistent LVH at tp2. In all subjects, mean (SD) delta LVMI was -2.2 (7.1) g/m$^{2.7}$, delta clinic SBP z-score -0.40 (1.0) and delta GFR -0.79 (5.1) ml/min/1.73m^2. In comparison to other children those with persistent LVH (n=9) had significantly worse delta LVMI, delta clinic SBP z-score and delta GFR [–3.0(6.4) vs 2.2(9.3), p=0.04; –0.52(1.0) vs 0.24(0.6), p=0.04; and –0.10(4.9) vs -4.4(4.6), p=0.02] respectively.
Conclusion: In this single centre study we have observed significant regression of prevalent LVH and lower than previously reported incidence of LVH in children with moderate-severe stages of pre-dialysis CKD. Worsening renal function and poor systolic BP control adversely impact improvement of LVH in this cohort.

Abstract# P-SUN344
High-density lipoprotein (HDL) in children with CKD promotes endothelial damage and early atherosclerosis

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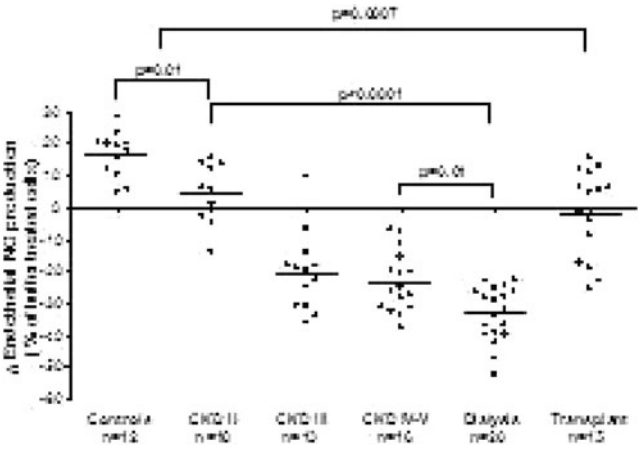
Objective: Endothelial injury and dysfunction begin in early chronic kidney disease (CKD) and may contribute to cardiovascular mortality. High-density lipoprotein (HDL) is considered anti-atherogenic but little is known about HDL function in CKD.
Methods: We studied the endothelial effects of HDL in 74 children with CKD II - V, dialysis and transplant (HDL^{CKD}) and compared these with 12 age-matched healthy controls (HDL^{Healthy}). Patients with underlying inflammatory diseases or diabetes were excluded. HDL was isolated by electron spin resonance (ESR) spectroscopy and incubated with human aortic endothelial cells. Endothelial nitric oxide (eNO) and superoxide production were analyzed by electron spin resonance spectroscopy.
Results: HDL^{Healthy} stimulated eNO production, but HDL^{CKD} strongly inhibited eNO production in endothelial cells. HDL-induced eNO production was reduced in a significant and graded manner with eGFR decline (p<0.0001; Figure 1). HDL effect was not associated with dialysis vintage. HDL^{CKD} promoted endothelial superoxide production, with increasing superoxide production by HDL from patients with more severe renal impairment (p=0.003). HDLfrom dialysis patients reduced endothelial cell migration and increased vascular cell adhesion molecule-1 (VCAM-1) production compared with HDL^{Healthy}. Importantly, HDL^{CKD} function was abnormal as early as CKD II (with reduced eNO, increased superoxide and reduced endothelial cell migration), with the most profound changes in dialysis and only partial recovery after transplantation. Endothelial dysfunction was associated with increased inflammation (IL6 levels; p=0.03), an anti-angiogenic milieu with increased angiopoietin-2 (p=0.009) and increased vessel stiffness as measured

by aortic pulse wave velocity (p=0.02). HDL^{CKD} had reduced ability to promote cholesterol efflux from macrophages compared with $HDL^{Healthy}$.

Conclusion: We have shown that in a population of children with CKD and no underlying inflammatory disease, HDL fails to induce endothelial NO production and is associated with increased inflammation and oxidative stress promoting endothelial dysfunction and increased vascular stiffness.



Abstract# P-SUN345

Blood Pressure Control and Left Ventricular Hypertrophy in Children with Chronic Kidney Disease

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Objective: Patients with chronic kidney disease (CKD) are at high risk of cardiovascular morbidity and mortality. Left ventricular hypertrophy (LVH), as a common risk factor to cardiovascular disease, was frequently observed in CKD patients with hypertension. The aim of this study, thus, is to evaluate whether there is a relationship between LVH and blood pressure (BP) in children with CKD.

Methods: In this cross-sectional study, 85 children with stages 2 to 5 CKD have underwent echocardiography, casual BP assessment and 24h ambulatory BP monitoring. LVH was defined as left ventricular mass index (LVMI) greater than 38 $g/m^{2.7}$. Biochemical data were also analyzed in this study to see whether there are other factors could be linked to LVH.

Results: The median (interquartile range) LVMI for the 85 children was 35.12 (28.85 to 45.92) $g/m^{2.7}$, with 39 (45.9%) of them exhibiting LVH. By examining these two groups (with/without LVH) , we have found that children with LVH had shown consistently higher 24h ambulatory BP values (wake/sleep SBP and DBP) than those had no LVH. However, casual BP measured from those 85 children was not found the same linkage to LVH ($p > 0.05$).

Conclusion: In conclusion, we have found a clear relationship between 24h ambulatory BP and LVH in CKD children. The association of LVH with ambulatory BP indicates that ABPM should be performed routinely in CKD children as an assessment factor.

	All	No LVH	LVH	P
Casual BP				
SBP	110±18.5	107±17.3	113±19.5	0.094
DBP	71±14.9	70±15.7	71±14.3	0.730
24h ABPM				
SBP	107±14.2	102±12.9	112±13.7	0.001
DBP	65±13.6	62±11.6	71±14.4	0.003
Wake SBP	108±13.9	104±12.6	113±13.8	0.002
Wake DBP	67±14.1	64±12.2	72±15.0	0.010
Sleep SBP	103±14.6	97±11.5	108±15.7	0.001
Sleep DBP	61±14.4	57±10.7	66.7±16.2	0.002

CKD: Epidemiology

Abstract# P-SUN346

Retrospective short cohort longitudinal study in Taiwan Pediatric Chronic Kidney Disease

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Objective: Chronic kidney disease (CKD) is a life-long condition associated with substantial morbidity and premature death due to complications from a progressive decrease in kidney function. The incidence and prevalence of all stages of CKD in children continues to increase worldwide. We'll illustrate the spectrum of CKD-associated epidemiologic characters in Taiwan children and emphasizing areas requiring further investigation.

Methods: Since 2008-12, data on etiology, incidence, prevalence, presentation, family history, treatment modalities and outcome of children aged 0-20 years, with CKD Stages 1-4 and CKD Stage 5, were collected by reporting index cases from paediatric centres.

Results: A total of 366 subjects were included in the statistical analysis, which consisted of 189 males (51.6%) and 177 females (48.4%), with a median baseline age of 10.6 years (IQR: 6.0 to 14.7 years). The median (IQR) of age of CKD onset was 5.6 (0.7, 10.6) years. Regarding type of renal diseases, most of subjects with CKD were due to kindly malformations (233 subjects, 60.9%) and more than one third subjects were due to nephritis (143 subjects, 39.1%). Regarding CKD stage at baseline, 152 (41.5%) subjects were identified as Stage I, 132 (36.1%) as Stage II, 54 (14.8%) as Stage III, and 14 (3.8%) for both of Stage IV and V, respectively. In regard to the first diagnosis symptom, renal echo abnormality was found most frequently (63.0%), followed by urinary protein (34.0%) and hematuria (23.4%). With regard to systematic disease, more than one-in-ten of subjects had autoimmune disease (11.0%) and anemia (12.2%). Two leading family history of diseases were hypertension (35.0%) and diabetes (23.5%). In terms of risk factors for CKD, the most frequent factors among these subjects were urinary protein (26.3%) and urinary tract infection (21.4%), respectively.

Conclusion: Epidemiology of pediatric CKD in Taiwan is similar to that reported from developed European countries. Additional efforts to define the epidemiology of pediatric CKD worldwide are necessary if a better understanding of the full extent of the problem, areas for study, and the potential impact of intervention is desired.

Abstract# P-SUN347

The Applicability of Assessment Equation of Glomerular Filtration Rate in children with Chronic Kidney Disease

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Objective: Accurate assessment of renal function is important in the management of children with chronic kidney disease (CKD). Glomerular filtration rate (GFR) is the best index of assessing kidney function. The equations including Schwartz formula, MDRD formula, Cockroft-Gault formula and Counahan-Barratt formula based on serum creatinine (SCr) and the formula based on serum cystatineC(CysC) are used in pediatric and adult clinical practice. However, there are few studies on the applicability of these formulas for estimating GFR in Chinese children with CKD. The aim of this study was to evaluate the applicability of those equations in North-Eastern Chinese children with CKD.
Methods: Children aged 1-14 years who underwent isotope ^{99m}Tc-diethylenetriaminepentaacetic acid (^{99m}Tc-DTPA) GFR testing from January 2011 to December 2011 were enrolled in the study. GFR was calculated using: (1)Schwartz formula (2)Cockroft-Gault formula (3)MDRD formula (4)Counahan-Barratt formula (5)The formula based. SCr was detected by alkaline kinetic method. **Results:** One hundred patients (67 males and 33 females) were enrolled in this study. 66 subjects were in CKD1, 23 in CKD2, 8 in CKD3, 2 in CKD4 and 1 in CKD5. The results showed that these five formulas overestimated or underestimate GFR in different CKD stage. Counahan-Barratt formula was more accurate than those 4 formulas in CKD, and Schwartz formula was more accurate than other 4 formulas in CKD 1 and Schwartz formula was accurate than other 4 formuals in CKD in all patients. For female, Counahan-Barratt formula was the most accurate from 1-16 age, Schwartz formula was poor for female from 10-16 years and Cockroft-Gault formula was poor for female before 10 years. For male, Counahan-Barratt formula was the best from 1-16 years and MDRD was poor for them.
Conclusion: Counahan-Barratt formula maybe used to predict GFR in patients with CKD1 and Schwartz formula in patients with CKD 2 in North-Eastern China. More suitable GFR predictive equations to assess GFR for Chinese children with CKD should be developed.

Abstract# P-SUN348

End stage kidney disease in children: a nationwide survey in 2006-2011 from Japan by the Japanese Society of Pediatric Nephrology

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Objective: The marked variations in the incidence of end stage kidney disease (ESKD) in the pediatric population across countries have been indicated. To improve the understanding of the difference in incidence between countries, more epidemiological study is needed. Therefore, we conducted a nationwide survey to indicate the incidence and the state of Japanese new ESKD patients less than 20 years.
Methods: We performed a cross-sectional, nationwide survey of Japanese children aged less than 20 years who were newly diagnosed for ESKD between 1 January 2006 and 31 December 2011. This survey was conducted by Japanese Society of Pediatric Nephrology (JSPN) in conjunction with Japanese Society for Dialysis Therapy (JSTD) and Japanese Society for Clinical Renal Transplantation (JSCRT). ESKD was defined as irreversible kidney function disorder when treatment with renal replacement therapy [dialysis or kidney transplantation (KTx)] becomes necessary to sustain life. Surveys were sent to a total of 773 institutions in Japan, including all institutions that are members of JSPN, or JSDT or JSCRT, and all university and children hospitals.
Results: A total of 770 institutions (96.6%) responded. The information was collected on 540 children during a target period. The estimated incidence of new ESKD children in 2007, 2009 and 2011 were 3.9, 4.7 and 4.1 per million of the age-related population, respectively. 422 (78.1%) children were diagnosed at less than 15 years. 327 children (60.5%) received peritoneal dialysis, 85 (15.7%) received hemodialysis, 118 (21.9%) received a preemptive KTx, 6 (1.1%) received no treatment and 4 (0.8%) had no data during this period. The most cause of ERSD was congenital kidney urinary tract abnormality (n=215, 39.8%).
Conclusion: This nationwide survey indicated that the incidence of new ESKD children in Japan was much lower than in other high-income countries. Further analysis is required to explain the reasons why the incidence of ESKD is comparatively lower in Japanese children.
Acknowlegements: We thank the members of JSPN, JSTD, JSCRT and all of you who had this study cooperate.

Abstract# P-SUN349

Epidemiology and clinicopathologic outcome of childhood and adolescents' chronic kidney disease

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Objective: Due to dearth of data, understanding of chronic kidney disease (CKD) aetiology, manifestations and management has been poor and outcome dismal in African children.
Methods:A retrospective analysis of hospital data of 154 CKD children and adolescents was conducted to determine the epidemiology and clinicopathologic outcome of paediatric CKD.
Results: Overall mean incidence was 11 (6-20) per million children population (pmcp)/year while prevalence averaged 48 (8-101) pmcp. There were 86 males (55.8%). Median age was 10.0 (0.2-15.5) years with 83.8% =/> 5 years old. Aetiologies were glomerular disease (GMD, 90.26%), congenital and acquired urinary tract (7.79%) and hereditary (1.95%) disorder. CKD stages at diagnosis were 45.5% CKD-1, 22.7% CKD-2, 10.4% CKD-3, 2.6% CKD-4 and 18.8% CKD-5. Median progression time through the CKD stages was 24.0 (3-108) months. Mean dialysis incidence and prevalence were 1 (0-4) pmcp/year and 4 (1-12) pmcp, respectively. Hypertension, heart failure (HF), malnutrition, anaemia, acute-on-CKD, and need for dialysis, azotaemia, hypercreatinaemia, and high calcium-phosphorous product (=/> 4.44 $mmol^2/L^2$) were mortality risk factors. CKD-1 survived significantly better than CKD stages 3-5 ($p < 0.05$) but not CKD-2 (p=0.098). Hypertensive CKDs without HF survived better (73.0%) than hypertensive CKDs with HF (16.0%) [Hazard ratio (HR): 0.34, 95% CI: 0.14-0.83]. GMD survived better (68.5%) than non-GMD patients (33.0%) [HR: 2.87, 95% CI: 1.16-7.06].
Conclusion: CKD was commoner among school than pre-school age children. GMD was the predominant aetiology with better outcome than non-GMD. Comorbidity prevalence increased significantly with increasing severity of CKD stage.

Abstract# P-SUN350

Taiwan Pediatric chronic kidney disease prevention: Strategies, Actions and Outcome

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Objective: To reduce incidence and prevalence of pediatric CKD and ESRD
Methods: In collaboration with the Bureau of Health Promotion (BHP), Bureau of National Health Insurance (BHI) and Department of Health, We design a three-stage prevention scheme for children at risk for CKD and ESRD outcome, Since 2008 till now and cooperation with school urine screening and sonoscreening programs. More than 1000 patients recruited were under 18 years of age.
Results: Etiology: CAKUT51% primary glomerulonepluritis (GN) 20%, secondary GN 16%. Most crucial GN progress to CKD and ESRD is focal segmental glomerular sclerosis and lupus nephritis (LN). Observational data across 13 years show annual incidence of heavy proteinuria falling from 9.91 to 3.36 per 100,000 children, with decreasing ESRD. Hypertension and anemia showed higher prevalence in our cohort. Regarding growth, decreased body length and BMI after Stage IIIb showed positive correlation with CKD progression. Through student health checks, teachers and school nurses responsible for each class should inform parents with outcomes, giving them notice and referral sheet. Pediatric nephrologist should reply to health personnel with current case status; health personnel at school should continue to monitor cases and prevent delay of treatment. Those CKD Stage IIIb-V patients receiving integrated renal care had better quality of care, slower rate of ΔGFR and lower medical expenses during this period. The program was reimbursed by NHI for patient education and management, CKD Stage I-IIIa patients covered by BHI.
Conclusion: Incidence of CKD and treated dialysis declined, an encouraging sign of pediatric CKD prevention in collaboration with government and academic societies.

Abstract# P-SUN351
Hepatitis B vaccination: Seroconversion in chronic kidney disease

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Objective: Impaired immunity leading to lower seroconversion rates in CKD results in lower peak of antibody titres and a quicker decline of antibody levels following Hepatitis B vaccination. The usual vaccination schedule may be ineffective and antibody titres need to be checked periodically. To assess the seroconversion following hepatitis B vaccination (10 μg at 0,1 and 2 months) in children with CKD stage II to V including those on dialysis and following transplantation and to assess the persistence of antibody titres at one year following vaccination.
Methods: It was a prospective interventional study. Children aged 3 months to 18 years with chronic kidney disease stage II to V, were screened for inclusion into the study. Children who were negative for hepatitis B surface antigen and had antibody titres <10 mIU/ml were included in the study. The CDC guidelines recommend 3 doses of 10μg of hepatitis B vaccine at 0, 1 and 6 months in children. However, to achieve rapid seroconversion we administered 3 doses of 10μg of recombinant hepatitis B vaccine of the same brand at 0, 1 and 2 months. Antibody titres were checked at 4 months from the first dose; if positive (>10mIU/ml), they were re- checked at 12 months. If negative, the entire schedule was repeated.
Results: Ninety three patients were screened. Antibodies to hepatitis B surface antigen were positive in 36 patients. About 49 out of 55 seronegative patients were recruited into the study. At 4 months, the antibody titres were done in 36 patients. Among these, antibody titres were positive in 26 patients (72%). There was no significant difference in seroconversion between CKD and dialysis patients. All the ten patients who were seronegative were re-vaccinated and repeat titres after 4 months were positive in 6. Among the 26 patients who were positive at 4 months, antibody titres were positive in 16 (61.5%), negative in 4 and 6 were lost to follow up. Among those who remained positive, the mean antibody titres reduced significantly from 649 to 373mIU/ml.
Conclusion: Optimal seroconversion following hepatitis B vaccination was seen in 72% of children with CKD. Amongst them protective antibody titres were evident only in 61% children with a significant reduction in the antibody titres after one year following vaccination.

Abstract# P-SUN352
Medication Adherence and Growth in the Chronic Kidney Disease in Children (CKiD) study

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Objective: The extent of medication non-adherence (NA) and its relationship to growth in children with CKD is unknown. To describe the prevalence of medication NA and its relationship to growth during the first year of follow-up in the CKiD study.
Methods: CKiD is a prospective cohort study of children 1-16 years old with an estimated GFR of 30-90 mL/min/1.73 m2. We analyzed data from 284 participants who were prescribed at least one of eight classes of medications at both of their first two annual study visits. Patients were categorized as adherent if they reported not missing any medication(s) within the past 7 days at both of their first two visits, and as NA otherwise.
Results: Adherence varied by class of medication: ESAs (98%), immunosuppressants (87%), calcitriol (82%), iron (81%), alkali (72%), growth hormone (71%) ergocalciferol (65%), and phosphate binders (63%). Patients prescribed fewer medications were more likely to be adherent with all of their medications (p=0.027, trend test). 188 (64%) participants were adherent with all of their prescribed medications. Those who were NA to at least one medication were more likely to have a non-glomerular CKD etiology (p=0.011) and to have slightly less height impairment at the baseline visit (height z-score -0.76 [-1.54 to 0.08] in adherent vs -0.67 [-1.37 to 0.10] in NA group). Age and gender were not significantly different between adherent and NA groups. After adjusting for baseline height z-score, GFR, CKD etiology, sex, and age, there was no difference in the one year change in height z-scores between adherent and NA patients.
Conclusion: We report the prevalence of self-reported NA in the CKiD cohort, which varies by class of medication. Although overall adherence was not associated with change in height z-score in the first year of follow-up, longitudinal analyses examining the relationship between adherence with each individual medication class and growth will be conducted by CKiD.

Abstract# P-SUN353
Medication uses between pediatric patients with chronic kidney disease and the general pediatric population

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Objective: Previous study showed the use of drugs to treat pediatric health condition is increasing. In order to identify, prevent and manage potential medication-related problems in Asian kids with chronic kidney disease (CKD), this study aims to explore the frequencies, variations in long-term effects of commonly used drugs between childhood-onset CKD (CKiD) persons and those without CKiD.
Methods: A cross-sectional study using the population-based Longitudinal Health Insurance Database 2010 from Taiwan was conducted to explore the patterns of medication utilization and their outcomes in CKiD versus non-CKD pediatric patients. Childhood-onset CKD was defined in children and adolescents with at least one ICD9 codes for CKD (580-588) and congenital abnomalities (589, 591, 5937x, 596, 5997, etc.) at age< 20 years old. ATC (Anatomical Therapeutic Chemical) Classification System was used to present the medication usages during 1998-2010 among pediatric patients with CKD and the general pediatric population.
Results: 6106 childhood-onset CKD kids were identified in 417,411 pediatric cohort, median age at CKD onset was 13 years old, 36% with congenital abnormalities. Overall, 1129 different drugs were prescribed during 1998-2010 for pediatric paitents in Taiwan. The most commonly used drugs were in respiratory system, following by alimentary tract and metabolism, and antiinfectives for systemic use. Commonly used medications in hospitalization have similar patterns with ambulatory care. The long term effects of corticosteroids for systemic use, antineoplastic and immunomodulating agents, and respiratory agents were substantially prescribed more in CKD kids than the general pediatric population.
Conclusion: Despite the perception of potential risk, there is little information about long term effects of many commonly used drugs for pediatirc population. Our sudy findings highlights the needs to further investigate medication-related safety and effectiveness in CKD kids and proposes initiatives for addressing these problems through a further structured reviews.

Abstract# P-SUN354
Analysis of underlying factors of chronic renal failure with uncertain cause based on 254 cases

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Objective: Our aim is to reveal the underlying factors of CRF patients with uncertain cause so that we may provide some clue for the prevention and intervention of CRF.
Methods: 1. 700 cases in hospital were investigated by questionnaire:(1) Hemodialysis center of West China Hospital:493 cases.(2) Sichuan People's Hospital:175; (3) Great Wall of Kidney Disease Hospital:32. 2. Patient's demographic data, past history, family history, living habits, health condition during childhood etc. were all included in the questionaire. 3.All data was statistically analyzed by logistic regression.
Results: There were 254 cases with uncertain cause in the total 700 CRF (36.3%). Cases aged between 18 and 60 made the top proportion (198/254, 77.95%), and 3 cases(3/254,1.6%) under age 18. Male appears to be a risk factor to develop CRF, as male patients (159/254,62.6%) were much more than female(95/254,37.4%). Patients with positive family history account for 4.7%(12 cases) including pyelonephritis, renal cyst, renal tuberculosis etc. Frequent respiratory tract infection occurs in 22 cases during childhood(22/254,8.66%), and 3 patient had the abnormality of urine routine before 18 years. Besides, CRF patient seemed to be more vulnerable to allergies from childhood(38/254,14.96%) such as allergic to pollen,seafood,and some drugs(sulfanilamide etc). Toxic exposure(34/254,15.5%) is discussed in this article.Smoking (43/254,16.93%) and drinking(10.24%) is also obvious. Logistic regression revealed that: age, drinking, toxic exposure, allergy, family history were proved to be the independent risk factors of chronic renal failure with uncertain cause.
Conclusion: male, positive family history,toxic exposure, vulnerable to allergies, abnormal urine routine during childhood,smoking and drinking may be the possible underlying factors of chronic renal failure with uncertain cause.

Abstract# P-SUN355
The relationship between children kidney diseases and adult chronic renal failure - an epidemiological investigation of 700 cases

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Objective: We planed an epidemic investigation of 700 cases who suffered from chronic renal failure (CRF) to search for the evidence, demonstrating that the relationship between children kidney diseases and adult CRF.
Methods: 700 patients from West China 1st and 2nd University Hospitals of Sichuan University, Sichuan Province Hospital and Chengdu Great Wall Nephrology Hospital, were investigated face to face to complete a questionnaire referring to the information of diagnoses, treatment, history and so on. There enumeration count data were analyzed by statistical description.
Results: There were 402 male and 298 female in the 700 CRF patients, including 21 children and 679 adults. The cause of CRF was unknown in 36.3% (254/700) of our patients. In the known causes, diabetes mellitus (107/700, 15.3%) and chronic glomerulonephritis (101/700, 14.4%) were the most common causes of CRF, followed by hypertension (71/700, 10.1%) and gout (42/700, 6.0%). However, the proportions of nephrotic syndrome, purpura, HBV associated nephritis and systemic lupus erythematosus in CRF causes were low. Analysis of 21 children cases: chronic glomerulonephritis had the highest proportion of 52.4% (11/21), followed by nephrotic syndrome (4/21, 19%), Henoch-Schonlein purpura (2/21, 9.5%), urinary tract obstruction (one/21, 4.8%). 38 (38/700, 5.4%) cases developed kidney diseases during children, in which 17 cases appeared CRF in adult stage, other 21 ones appeared it just in childhood. The primary renal diseases are chronic glomerulonephritis (23/38, 60.5%), purpura nephritis (7/38, 18.4%), nephrotic syndrome (4/38, 10.5%), urinary tract obstruction (1/38, 2.6%) and the unclear (3/38, 7.9%).
Conclusion: The survey showed that chronic glomerulonephritis remained the main cause of CRF no matter what in children or in adults. Part of purpura during childhood might eventually developed CRF in adult, which used to be thought as a kind of self-limited disease. We must focus on kidney diseases in children to prevent them from developing as CRF in adulthood.

Abstract# P-SUN356
GLOMERULAR FILTRATION RATE (GFR) MEASURED BY IOHEXOL CLEARANCE IN CHILDREN; A COMPARISON BETWEEN VENOUS SAMPLES AND DRIED BLOOD SPOTS

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Objective: Glomerular filtration rate (GFR) measured by iohexol clearance using venous samples at different time points is widely used in children and adults. We validated iohexol based GFR using dried

capillary blood spots. Capillary sampling on filter paper is easier to perform and may be less painful for the young children. The blood volume needed is less compared to standard venous methodology; 0.1 mL versus 1-4 mL. This is the first study on the correlation between GFR based on dried blood spots and venous samples in children.
Methods: We examined 31 children with median age 3.0 years (range 1.1-6.2). In total 7-8 venous samples were collected and gold standard GFR based on all samples was calculated for reference. Dried blood spots were collected at 2, 3, 3.5 and 4 hours after injection of iohexol and compared to the venous samples at corresponding time points by Bland-Altman plots and regression analyses of the calculated GFRs.
Results: Median gold-standard GFR using venous samples at 7 or 8 time points was 65.3 (95 % CI, 9.9-117.1) ml/min/1.73m^2. The 2h plus 4 h blood spot samples were the two point combination with the strongest correlation (R^2 = 0.972) to GFR based on the corresponding venous samples. In 28 patients the relative difference between GFR based on two blood spots vs. corresponding venous samples was <+/-15 % while 3 differences were +/-15-21 % (total error), and in these 3 samples GFR was >100 ml/min/1.73m^2. The mean relative bias was +3.5, +2.1,-0.6, -3.4 and -8.8 % at GFRs = 10, 20, 40, 60 and 100 ml/min/1.73m^2 respectively. The individual points had a standard deviation of 6.3 % around this bias trend.
Conclusion: GFR calculation based on blood spot iohexol measurement is an alternative method to traditional venous iohexol measurement in children, with acceptable total error in cases where GFR<100 ml/min/1.73m^2.

Abstract# P-SUN357
PREVALENCE OF EARLY MARKERS FOR CHRONIC KIDNEY AND CARDIOVASCULAR DISEASE IN ABORIGINAL AND NON-ABORIGINAL CHILDREN: RESULTS OF 6 YEAR POPULATION BASED COHORT STUDY

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Objective: Although end stage kidney disease is 8-10 times more common in Aboriginal Australians compared with non-Aboriginal Australians, the natural history remains unclear due to a lack of longitudinal population-based studies. The aim of this study is to determine whether the increased prevalence of chronic kidney disease (CKD) and cardiovascular disease (CVD) seen among Aboriginal adults becomes evident in adolescence through examining early markers of chronic disease.
Methods: A prospective cohort study of Aboriginal and non-Aboriginal school children commenced in 2002 with data on haematuria, albuminuria, blood pressure and BMI collected every 2 years. Data on socio-economic status, remoteness area and birth weight was also obtained.
Results: 2266 children (55% Aboriginal; 51% male; mean age 8.9 years) were enrolled at baseline, with 1106 (49%) reviewed at six years follow up (mean age 14.5 years). At six years follow up there was no significant difference in the point prevalence of albuminuria (19.7% vs 17.5%), haematuria (9.1% vs 8.8%), obesity (11.6% vs 9.0%) and systolic hypertension (4.4% vs 5.0%). The prevalence of persistent early markers of CKD and CVD were considerably lower with: haematuria 2.0%; albuminuria 4.2%; obesity 6.3% and systolic hypertension 1.7%. There was no significant difference in persistent markers of chronic disease between Aboriginal and non-Aboriginal adolescents using multivariate logistic regression. Persistent albuminuria was associated with female gender (AOR 2.01 95% CI 1.23 to 3.28), increasing age (2 year increase in age: AOR 1.35 95% CI 1.06 to 1.71) and a BMI SDS at enrollment of less than -1.0 (AOR 1.81 95% CI 1.04 to 3.15) but not with geographic isolation or socio-economic disadvantage.
Conclusion: Since there are no significant differences in the prevalence of markers for CKD and CVD between Aboriginal and non-Aboriginal adolescents, the increased prevalence in Aboriginal adults must become evident in older people and therefore potentially be amenable to intervention strategies targeting young people.

Abstract# P-SUN358
Prevalence and structure of Chronic Kidney Disease (CKD) III - V stages in children of Voronezh region

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Objective: The end of CKD progression - Chronic Kidney Failure (CKF) - the most tragic pathologic condition which may be found in children. There are only few studies about epidimiology of CKD in different regions of Russia. The purpose of our study was the analisis of prevalence and ethyology of CKD III - V stages in children of Voronezh region (VR).
Methods: The number of all children with CKD, who were admited in 2012 year in Voronezh Regional Children Hospital 1, was 21 children (the age -8 months - 17 years old; mean age – 11.0±4.8 years), 13 boys and 8 girls. The age of the children at the begining of CKD was from 6 months to 15 years. Diagnosis of CKD was established accoding to the glomerular filtration rate (GFR) (<60 ml/min/1.73 m^2), serum creatine (>2.0 mg%) and/or urea (> 10.0 mM/l) minimum in 3 months. The children's population in VR at 01.01.2012 was 370572, in Voronezh city (VC) - 141750 children and in region without city - 228822.
Results: It was found, that the prevalence of CKD in children was 56.7per 1 million, this parameter in children of VC was more higher than in VR without city (76.6 and 43.7 per 1 million ($p \leq 0.05$) respectively). The results were different from the data which were published in 1995 year. Accoding to the study which was done 17 years ago the prevalence of CKF in VR was 23.5 per 1 million and there were more children with CKF in VR than in the city – 30.0 and 14.9 per 1 million respectively. The main reason of CKD in children of VR was hereditary pathology of urinary tract (n=12, 57.2%); such as obstractive uropathies (n=6, 50%), then polycystic kidneys (n=4, 33.3%) - in 2 children -ARPK and 2 children had cystic displasia. There was 1 case of hypoplastic displasia of kidneys and 1 case of Alport syndrome (8.3%). Other ethyology of CKD were: Gemolitic Uremic Syndrome (n=3, 14.3%), tubulointerstitial nephritis (n=2, 9.5%), reflux nephropathy (n=2, 9.5%), glomerular sclerosis (n=1,4,8%), rabdomiosarcoma (n=1, 4.8%).
Conclusion: There was significant increasing of prevalence of CKD in 2012 than in 1995 in children of VR. The prevalence of CKD was more higher in VC than in children from region. The main reason of CKD of children was obstructive uropathies. In our opinion the increasing of CKD in children of VR depends on improving the diagnosis, especially in fetus.

Abstract# P-SUN359
Comparison of Estimated Glomerular Filtration Rate Using Cystatin C versus Creatinine in Pediatric Renal Transplant Patients

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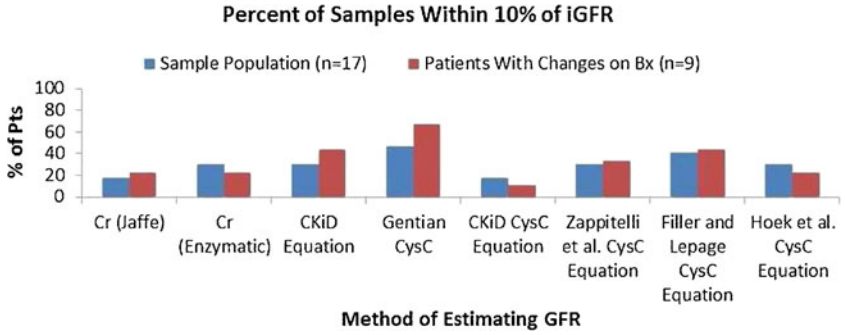
Objective: Analyze the accuracy of estimated glomerular filtration rate (eGFR) in pediatric renal transplant (Tx) patients (pts) using cystatin C, serum creatinine (SCr), and the combined cystatin C and SCr CKiD equation in comparison to iohexol clearance (iGFR), the gold standard.
Methods: Cystatin C (standardized Gentian), SCr (Jaffe and enzymatic) and iGFR were obtained from 17 renal Tx pts, 1-18 years old, with stable Tx function who presented for protocol biopsies (Bx). eGFR data were analyzed in terms of bias (difference between eGFR and iGFR), precision (variability of predictions around iGFR), and accuracy (proportion of estimates falling within 10 percent of iGFR). Secondary analyses evaluated the accuracy of cystatin C and SCr in pts with Bx-proven histological changes by Banff criteria (9 of 17 subjects); the effect of steroid use on cystatin C; comparing the Gentian cystatin C equation to other published cystatin C equations.
Results: The mean iGFR in our population was 95.9 +/- 24.6 ml/min/1.73m^2. The Gentian cystatin C and eGFR equation was most accurate compared to SCr, CKiD equation, and other cystatin C eGFR equations. For example, using SCr (Jaffe), only 18% of the sample population and 22% of pts with changes on Bx yielded results within 10% of the iGFR. With cystatin C, 47% of the sample population and 67% of pts with changes on Bx had eGFR within 10% of iGFR. Similar trends were observed in a subgroup of patients on steroid-based immunosuppression (14 of 17 subjects).



Conclusion: The standardized Gentian cystatin C assay and equation appears to be the most accurate in predicting GFR in pediatric renal Tx pts, especially in those with perceived stable renal Tx function exhibiting changes on Bx. It also seems to outperform several other cystatin C equations and worked well despite the fact that the majority of our patients were taking steroids, which are known to affect serum cystatin C concentrations.

Abstract# P-SUN360
Renal function following tandem high-dose chemotherapy and autologous stem cell transplantation in pediatric patients with high-risk solid tumors

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Objective: High-dose chemotherapy and autologous stem cell transplantation (HDCT/autoSCT) has improved the survival of children with high-risk solid tumors. However, long-term organ damage such as renal insufficiency has emerged as a major cause of treatment-related mortality and morbidity in patients who have undergone HDCT/autoSCT. Little is known about the incidence of chronic kidney disease (CKD) in pediatric patients with HDCT/autoSCT.
Methods: We undertook as retrospective study in order to assess the incidence, risk factors and outcome of HDCT/autoSCT-associated CKD in 58 pediatric patients who were transplanted at Samsung Medical Center from 2008 to 2010. Various renal function parameters reflecting renal function were evaluated before each HDCT/autoSCT, and 1 year after the second HDCT/autoSCT.
Results: Thirty-nine patients were male, and 19 were female and the median age at first HDCT/autoSCT was 4.2 years. Primary disease included neuroblastoma (42%), retinoblastoma (6%), and brain tumor (52%). Twelve months after second HDCT/autoSCT, CKD [e.g. glomerular filtration rate (GFR) estimated using Schwartz formula < 90 ml/min/1.73m^2] was noted in 27 patients (46.5%) and the mean GFR was 59.1 ± 27.6 ml/min/1.73m^2. CKD with GFR < 60 ml/min/1.73m^2 was noted in 11 patients (18%). Four of these patients had severe CKD stage 4 and 5, with a GFR < 30 ml/min/1.73m^2 and 2 patients needed dialysis. Three patients received renal replacement therapy during early posttransplant period and progressed to CKD. There was no significant difference in the sex, primary disease, or the baseline GFR between the patients with or without CKD. The age at 1st HDCT/autoSCT was younger in the patients with CKD compared to those without CKD (3.9 ± 3.2 vs. 6.1 ± 4.9 years, P=0.053). Subclinical tubular dysfunctions during early posttransplant period were associated with the development of CKD (P=0.037).
Conclusion: CKD is a relatively common late complication of HDCT/autoSCT. Because renal function may decline with time, there is a risk to progress to end-stage renal disease in pediatric patients. The current findings suggest the necessity for long-term follow-up of vulnerable patients with CKD.

Abstract# P-SUN361
Clinical And Pathological Features Of 230 Cases with Isolated Hematuria in Children

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Objective: To analyze the epidemiological and clinicopathological features in children manifested as isolated hematuria.
Methods: The epidemiological and clinicopathological features of children manifested as isolated hematuria were analyzed retrospectively from Jan. 1984 to Aug. 2011. All of these children were performed renal biopsy and under 14 years old.

Results: 30 children with isolated hematuria (135 males and 95 females) accounting for 17.5% (230/1313) of children performed renal biopsy in 28 years. Mean onset age was 8 years and mean age at the diagnosis was 9.1 years. The peak age of disease onset was 6 to 10 years and the peak age of diagnosis were 6 to 10 years and 10 to 14 years. Along with the age growth, the rate of diagnosis increased gradually(r=0.99 P <0.01). There were 133 (57.8%) cases with microscopic hematuria and 97 (42.2%) cases with macroscopic hematuria. The pathological types included minimal change disease (MCD)(34.3%),IgA nephropathy (IgAN)(29.1%), mesangioproliferative glomerulonephritis (MsPGN)(18.7%), IgM nephropathy (IgMN)(8.3%),Alport syndrome(4.3%),thin basement membrane disease(3.9%),endocapillary proliferative glomerulonephtitis(0.4%), proliferative sclerosing glomerulonephritis(0.4%)and membranous glomerulopathy(0.4%).The predominant pathological type was MCD in children with microscopic hematuria (45.1%, 60/133) and IgAN in children with macroscopic hematuria (57.7%, 56/97). The difference of pathological type between children with macroscopic hematuria and with microscopic hematuria was statistically significant (P<0.01).
Conclusion: Chidren with isolated hematuria occupied the second largest proportion of children performed renal biopsy, and mainly manifested as microscopic hematuria. The most common pathological type is MCD in children with microscopic hematuria and IgAN in children with macroscopic hematuria. There is a correlation between hematuria features and renal pathological type on some degree, not fully parallel. It is better for children with isolated hematuria, even with simple microscopic hematuria, to perform renal biopsy early in order to clarify diagnosis, direct therapy and estimate prognosis.

Abstract# P-SUN362

Determination of GFR by iohexol plasma disappearance by finger-prick versus phlebotomy

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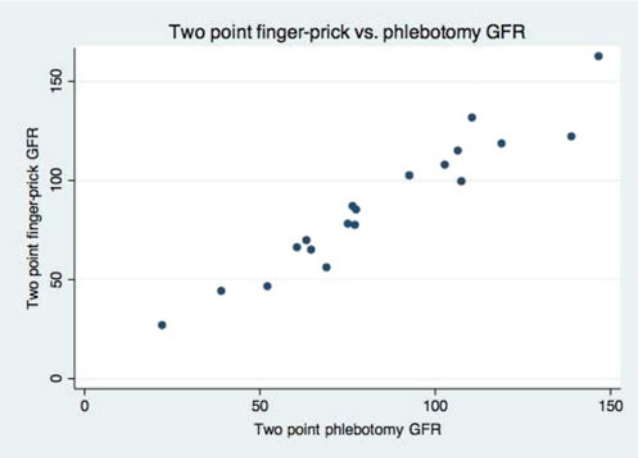
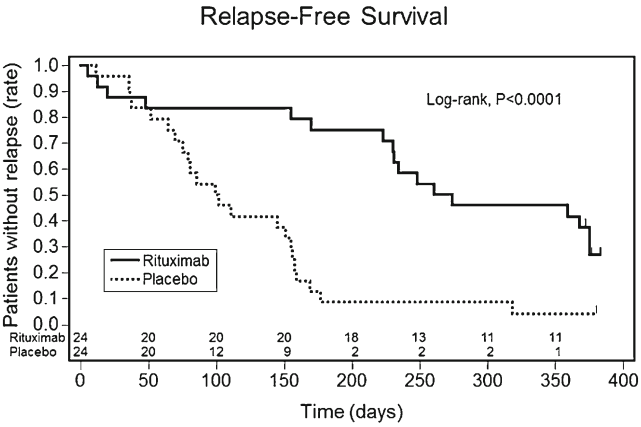
Objective: Measurement of glomerular filtration rate by iohexol disappearance (iGFR) has become a gold standard in the pediatric CKD population. Yet the need for serial phlebotomy can be difficult and minimizing lab draws from the standard required 4 down to 2 would be beneficial. Furthermore, finger prick blood collection may be more tolerable in the pediatric population, and equivalence between these two methods may further simplify the measurement process.
Methods: This was a cross-sectional study in children 1 to 21 years with Stage I-IV CKD by KDOQI classification. Exclusion criteria: Subjects with nephrotic syndrome and pregnant females were not eligible. Single injection iohexol clearance to measure GFR: After a zero time blood sample, 5 ml of iohexol was infused. Blood was drawn through an IV catheter at 10, 30, 120, and 300 minutes. Blood spots on filter paper (Schleicher and Schuell Grade 903) were collected by finger-prick at 120 and 300 minutes. Iohexol concentrations were determined by high-pressure liquid chromatography (HPLC). The rate of iohexol plasma disappearance was used to calculate the GFR. Statistics: Means and standard deviations were calculated for the various GFRs; Pearson's correlation coefficient and bias were used to compare the 2-point and 4-point GFR; as well as the finger-prick versus phlebotomy methods.
Results: A total of 25 patients were recruited and complete data was available on 17 patients. The mean creatinine was 1.18 mg/dL (SD 0.53) and the mean 4-point iGFR was 74.9 ml/min/1.73m2 (SD 35.1). Correlation between 2-point and 4-point phlebotomy GFR was r=0.964; p<0.0001; bias was 2.7 (95% CI -15.2 - 20.54). The correlation between the 2 point finger-prick and the 2 point phlebotomy GFR was r=0.963; p<0.000.1; bias was -2.2 (95% CI -20.6 - 16.2).
Conclusion: The 2-point iGFR is highly correlated with the 4-point iGFR. Additionally, the finger-prick method was highly correlated with the phlebotomy method. It appears that both venous and finger prick sampling at 2 time points after iohexol infusion gives an accurate measurement of GFR.





Abstract# P-SUN363

Clinical and pathological analysis of 977 children with renal disease

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Objective: To investigate the relationship between clinical characteristics and renal pathological classification of childhood renal diseases in single center.
Methods: A retrospective analysis of 977 renal biopsies performed from July 1989 to December 2011 was done. All the cases were recruited from Department of Pediatric Nephrology Xinhua hospital affiliated to Shanghai Jiaotong University School of Medicine.
Results: Of the 977 patients, 971 renal biopsies were success. Among these patients, 755 (77.7%) cases of primary glomerular disease, 183 (18.8%) cases of secondary glomerular disease and only 18 (1.9%) cases of heritage glomerular were found. In primary glomerular disease, the most three common clinical diagnosis were isolated hematuria (40.9%), followed by nephritic syndrome (31.8%) and persistent glomerulonephritis (18.7%). The most five common pathological category in primary glomerulary disease were minor lesion type (43.8%), followed by focal segmental glomerulosclerosis(FSGS)(13.0%), focal

glomerulonephritis(FGN) (12.5%), mesangial proliferative glomerulonephritis (MPG)(11.5%) and IgA nephropathy(IgAN) (11.0%). Minimal change disease was only 5.2% in primary glomerular disease. Purura nephritis (140 cases, 76.5%), hepatitis B virus associated nephritis (26 cases, 14.2%) and lupus nephritis(LN) (13 cases, 7.1%) were the most common clinical diagnosis in secondary glomerular disease. MPG were the most common pathological category followed by minor lesion type, membranous nephropathy, FSGS, FGN, LN, endocapillary proliferative glomerulonephristis and IgAN. In heritage glomerular, thin basement membrane nephropathy(TBMN), Alport syndrome and Batter syndrome were the most common clinical diagnosis.

Conclusion: Primary glomerulary disease is still common glomerulary disease in children. The higher incidence of Minor lesion is possibly due to the higher incidence of isolated hematuria in study. In secondary glomerulary disease, HSPN is the most clinical diagnosis and MPG is the most common pathological category.

Abstract# P-SUN364

Korean Pediatric Patients with Chronic Kidney Disease; Pediatric subcohort of KNOW-CKD

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4 Pediatrics, Kyungpook National University Hospital, DaeGu, Korea
5 Pediatrics, Asan Medical Center University of Ulsan College of Medicine, Seoul, Korea
6 Pediatrics, Health Promotion Center Seoul National University Bundang Hospital, SeongNam, Korea

Objetive: KNOW-CKD (KoreaN cohort study for Outcome in patients With Chronic Kidney Disease) is a nation-wide, ten-year longitudinal cohort study collecting clinical informations of Korean chonic kidney disease (CKD) patients, launched in 2011. The aim of the study is to assess the characteristics and risk factors of progression and complications of CKD of Korea, to provide adequate guidelines for management of CKD. Pediatric sub-cohort of KNOW-CKD is planned to enroll 500 children with CKD, stage I to V (pre-dialysis), and collect their clinical information for more than five years. Here we report the baseline characteristics of peditric sub-cohort of KNOW-CKD.

Methods: Five major pediatric nephrology centers of Korea enrolled children younger than 20 years who had CKD. After informed concent, medical history taking, questionaire assessment of socio-economic status, anthropometric measurement, and clinical assessment using laboratory and imaging tests were done and recorded using web-based case report form.

Results: Total 245 patients (M: F 165:80) were enrolled in 2011 and 2012. Average age was 10.1 years (yrs). Etiologies of CKD were congenital renal dysplasia (49%), reflux nephropathy/chronic pyelonephritis (22%), primary glomerular diseases (16%), secondary glomerular diseases (4%), and others. Stages of CKD were I for 13%, II 17%, III 34%, IV 18%, and V 17%. Age groups were less than 2 yrs for 11%, 2 to 5 yrs for 13%, 6 to 11 yrs 27%, and 12 to 19 yrs 49%. One third had histories of UTI and 9% had developmental delay. Growth delay was observed even in early stage of CKD stage, with mean height and weight z score of -0.92 and 0.98; younger patients (< 6yrs) with advanced CKD (IV and V) had more profound growth delay. Deficiency of of 25-hydroxyvitamin D3 and anemia were common (53% and 43%, respectively). Left ventricular hypertrophy was observed in 12% of the patients.

Conclusion: This prospective, multicenter cohort study aiming to improve CKD outcome revealed that our current management of pediatric CKD in Korea had room for improvement. We expect to obtain more information on pediatric CKD with this ten-year project of KNOW-CKD, which can be translated to better management for Korean pediatric CKD.

Abstract# P-SUN365

Epidemiological investigation of the first-degree relatives of children with CKD

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Objective: To explore the incidence of chronic kidney diseases(CKD) and risk factors of children with CKD.

Methods: We investigated the first-degree relatives of children (less than 14years) with CKD(CKD group, 86cases) from Sep.2011 to Feb. 2012, hospitalized in the Pediatrics department, First Affiliated Hospital of Sun Yat-sen University. The first-degree relatives of non-CKD patients were enrolled in the control group(non-CKD group,29cases). Datas including a histotory od kidney diseases, diabetes, hypertension, hepatitis B infection and smoking, as well as body mass index(BMI) and urinary analysis.

Results: There were 8 diagnosed CKD patients in CKD group. Including kidney stones(4 cases), chronic nephritis(2 cases), acute pyelonephritis(1 case) and renal pelvis effusion(1 case). Ten cases with proteinuria, four cases with microscopic hematuria and two cases with both proteinuria and hematuria were found by urinary analysis. Three cases with hypertesion were found in CKD group.But only one case with diagnosed kidney stones and one with hypertesion was found in non-CKD group,and the results of urinary analysis were all normal.There were no diabetes and obesity cases in both group.More cases with abnormality of urinary analysis were found in CKD group than non-CKD group(P less than 0.05).But the history of kidney diseases, diabetes, hypertension, hepatitis B infection, smoking and BMI were no significant difference between the two group.

Conclusion: The first-degree relatives of children with CKD had a higher risk to be CKD patients, and it seemed that the screeening of urinary analysis in these high risk population could make an early diagnosis of CKD.

Abstract# P-SUN366

Analysis of the Incidence of Childhood Henoch-sch(o)nlein Purpura Nephritis from 2009 to 2012 in Jiangxi Province

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Objective: To analyze the prevalence of childhood Henoch-sch(o)nlein purpura nephritis(HSPN) in Jiangxi province.

Methods: Inpatients of Jiangxi children's hospital who had the onset of Henoch-sch(o)nlein purpura(HSP) or Henoch-sch(o)nlein purpura nephritis(HSPN) were recruited during Jan. 1st, 2009 to Dec.31st, 2012. The basic messages in the home page of medical records,such as the year, sex, age, district were collected.

Results: During 2009 to 2012, the incidence of HSP increased year by year. The onset of HSP were 412 cases in 2009, 568 cases in 2010, 750 cases in 2011, 786 cases in 2012. Among them, presented symptoms of renal damage were 110 cases in 2009, 148 cases in 2010, 198 cases in 2011, 196 cases in 2012. The avarage incidence of HSPN was 25.91%, which was lower than the data of Tianjin(47.3%) and Hunan(55.51%). The morbidity of HSPN were similar in diffferent years(X^2=0.62, P>0.05). In HSP patients, the ratio between the male and female was 1.69:1; the peak age was 4-8 year-old(66.3%). The morbidity of HSPN

were similar in diffferent sex group(X^2=0.14, P>0.05). The morbidity of HSPN was 18.24% in <6 years group, lower than 26.27% in ≥6 ~<11 years group and 40.69% in ≥11years group, the difference was significance(X^2=63.86, P<0.05). The morbidity of HSP in all month groups were different, the peak month was Oct. to Dec(40.74%). The morbidity of HSPN were diverse in diffferent month grorps(X^2=19.79, P<0.05). In the last four years, the hospitalized patients of HSP were 824 cases(32.75%) in Nanchang district, 382 cases(15.18%) in Fuzhou district,333 cases(13.24%) in Shangrao district, 250 cases(9.94%) in Yichun district, 212 cases(8.43%)in Jiujiang district,196 cases(7.79%) in Jian district, 111 cases(4.41%) in Yingtan district, 71 cases(2.82%) in Ganzhou district, 137 cases(5.45%)in other provinces and cities. The morbidity of HSPN in Nanchang district was 16.63%, compared with the average lever 25.91%, the difference was significance (X^2=29.68, P<0.01).

Conclusion: The morbidity of HSPN was stabilized in the last four years in Jiangxi. The morbidity of HSPN in Nanchang district was lower than the average lever of the province. The morbidity of HSPN was increased with age.

Abstract# P-SUN367

Practicability and performance of an adapted height-independent GFR predicting equation in children

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Objective: According to KDOQI recommendations, determination of plasma creatinine (Pcr) should be associated to an estimation of GFR (eGFR). However, in the pediatric population, the Schwartz formula requires height information, which is normally not available in clinical laboratory databases. Pottel et al. (1) developed a height-independent equation based on the determination of median of Pcr for each age class. The aim of the study was to estimate the practicability of determination of eGFR in children with this equation as a screening tool for a possible underlying kidney problem and its performance compared to reference determination of GFR.

Methods: 1) all Pcr determination performed in children (1 to 18 years old) in the pediatric hospital from January 2010 to December 2011were collected. Median of Pcr was determined for each one-year-age-interval and the upper limit of normal Pcr was determined as the 97.5 percentile for age (P97.5). Based on the Pottel equation, we determined eGFR as 107.3/(Scr/Q) where Q is the median Pcr calculated for age. 2) Among the whole population, a true measurement of GFR was performed (inuline or iohexol clearance, mGFR) in 320 children (364 measures) and was compared to eGFR calculated by the adapted Pottel equation and by the Schwartz equation. Pcr was determined by an IDMS-standardized enzymatic assay.

Results and Conclusions: 39981 measurements of Pcr were performed in 14749 children (53 % males, mean age ± SD = 8.6± 5.3 yrs). Mean Pcr was 60±108 µmol/L, mean eGFR was 110±45 ml/min/1.73m2 and 26 % of eGFR were < 90. P97.5 corresponds to a mean eGFR of 76±3 ml/min/1.73m2 [70-83]. Children with a mGFR were aged of 9.6±3.2 yrs and mean GFR was 94±33 ml/min/1.73m2. The adapted Pottel has a significant lower bias compared to the Schwartz equation (1.4, 95%CI (-0.8 ;3.5%) and 10.7; 95%CI (8.4 ; 13.1%), respectively).

Abstract# P-SUN368

Epidemiology of Chronic Kidney Disease in children in the east of Iran

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Objective: Chronic kidney disease (CKD) in children is a worldwide public health problem, with increasing incidence and prevalence, high costs, and poor outcomes. The causes of CKD vary from one geographical area to another due to genetic and environmental factors. The aim of recent study was to determine causes, first clinical presentation, and deterioration rate in children with CKD.

Methods: A retrospective analysis of 180 children (76 girls, 104 boys) with CKD was performed over a 10-year period (2001-2011). The following patients were excluded from the study: age less than 3 months and more than 18 years, glomerular filtration rate >60 ml/min/1.73 m2 , unilateral nephrectomy with normal contralateral renal function, single solitary kidney, multicystic dysplastic kidney with normal function in contralateral kidney, cancer/leukemia diagnosis.

Results: The mean age of diagnosis was 8.9 ± 4.6 years, and the male to female ratio was 1.3: 1 which had no significant changes during the period of study. The most common causes of CRF were congenital anomalies of the kidney and urinary tract (CAKUT, 54.7%), Glomerulonephritis (17.9 %), hereditary nephropathy (13.4%), and multisystem disease (2.3%), Age at clinical onset of CRF was significantly lower in patients with CAKUT (2.3 years) in compare with glomerulopathies (10.9 years). Pallor (45.3%), growth failure (42.6%) and hypertension ± neurologic symptoms (38.3 %) were the most common clinical presentation. Deterioration rate correlated with cause of CRF; it was more rapid in primary glomerulopathies (2.3 years) than in CAKUT (6.2 years). At the end of the study period 23.2% patients were on conservative treatment, 32.6% on maintenance hemodialysis, 20.3% on peritoneal dialysis and 23.9% patients had functioning allografts.

Conclusion: Congenital anomalies of the kidney and urinary tract was the main underlying cause of CKD and ESRD. These findings suggest that major efforts should be directed toward identification of the etiopathogenesis of congenital nephropathies to prevent occurrence of chronic renal failure.

Abstract# P-SUN369

Multicenter investigation of therapy status of children with IgA nephropathy in China

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Objective: Data on general status of clinical presentation and therapy of IgA nephropathy in children in Chinais lacking. This study aimed to investigate the clinical presentations and treatment status of children with IgA nephropathy inChina.

Methods: Thirty four centers from 23 provinces/cities of china participated in the study. Children less than 18 years old who were diagnosed by renal biopsy as IgA nephropathy from July 1, 2008 to Jun 20, 2011 were included. The data on clinical presentations and treatment methods were collected. Descriptive method was used for data analysis.

Results: Totally 1409 children aged from 1 to 18 years old were included. Children more than 6 years old account for 89.6%. Most of the children presented with hematuria and proteinuria (36.3%), among them, 277/512 children received steroid or immunosuppressive treatment, 256/512 received therapy of ACEI or ARB. Thirty percent of them presented with nephrotic syndrome, among them, 259/427 children received therapy of steroid combined with immunosuppressant such as CTX and MMF. Other clinical presentations included isolated hematuria (15.7%), acute glomerulonephritis (12.8%), chronic glomerulonephritis (1.8) and rapidly progressive glomerulonephritis (1.3%).

Conclusion: Most of IgA nephropathy occurred in school age children more than 6 years old. Hematuria and proteinuria is the most common clinical type. Steroid, immunosuppressant and ACEI or ARBS were common therapy in children with IgA nephropathy inChina.

Abstract# P-SUN370

Chronic Kidney Disease in Children: Awareness is increasing over the years in our country ?

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Objective: Chronic kidney disease (CKD) is an important problem in children worldwide, especially in terms of lack of information about its epidemiological data.In this study, we wanted to determine the etiology,clinical and laboratory patt1erns of pediatric CKD in different periods in our center.
Methods: The medical data of pediatric patients who had estimated glomerular filtration rates (GFRs) of ≤60ml/min/1.73m2 treated in our hospital from January 1995 to December 2011 were retrospectively collected. Patients and their medical records were evaluated in three separate observational periods;period 1:January 1995 to November 2000,period 2:January 2001 to December 2005,period 3:January 2006 to December 2011.We received an approval from our Institutional Review Board for data collection.Statistical analysis was made using chi-square and t-tests as well as Pearson correlation analysis in SPSS 20.0 software.
Results: We retrospectively analyzed the data of 245 patients (109 females/136 males;mean age 8.56±0.31years).The leading causes of CKD were vesicoureteral reflux (VUR), urological abnormalities (UA) and UTI (56 patients,22.8%).The predominance of VUR,UA and UTI significantly decreased over the years (P=0.005). Recognizing the CKD children in early stages raised over time.The number of children diagnosed and treated by conservatively in predialysis program significantly increased in period 3(56 out of 91 patients,61.5%) (P<0.000);period 1 (3/53,5.6%),period 2(20/101,20%).The GFR,hemoglobin and albumin levels were found to be greater in period 3 than in periods 1 and 2 (P<0.000).The rate of patients who required urgent dialysis and the incidence of death were greater in period 1(73.5%and32%) than in period 2(40.5%and6.9%) and period 3(19.7and2.1%),respectively(P<0.000).
Conclusion: Based on our results,the awareness of CKD in children and early referral have increased over time in our region of our country.Also,the predominance of VUR,UA and UTI decreased over time.Hence,appropriate treatment due to early referral will lead to decrease the need for urgent dialysis and CKD-releated complications including death in children in our country.

Abstract# P-SUN371

Renal Replacement Therapy (RRT) for Henoch Schonlein Purpura nephritis (HSPN) and primary IgA nephropathy (IgAN) : data from the ERA-EDTA and ESPN/ERA-EDTA registries

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Objective: IgAN and HSPN, two glomerulonephrites sharing some similar pathophysiological processes related to the glomerular deposition of IgA, can both lead to ESRD in adults and in children as well. IgAN is the most frequent glomerulonephritis world wide in adults whereas HSP ,the most frequent vasculitis in children, is complicated by a glomerulonephritis in 30 to 50 % of cases. Overall IgAN is a much more frequent cause of RRT than HSPN.
Methods: Within the framework of the ERA-EDTA registry, reliable information on incidence and survival was available from 9 countries. Survival analysis was performed using Kaplan Meyer analyses and cox regression analyses. The ESPN/ERA-EDTA registry was used for comparing blood pressure and growht retardation.
Results: Between 1990 and 2011, for the whole cohort of adults and children, the incidence of RRT due to IgAN strongly increased but remained stable for HSPN. For patients < 20 years old it remained stable for the 2 diseases. Considering the whole cohort of RRT patients, the percentage of RRT due to IgAN doubled from the eighties to the nineties whereas the latter decreased by half for HSPN. The mean age at start of RRT in the whole group of HSPN and IgAN patients increased from 45 years to 51 years. Predictors of poor graft survival were either a young age (<20 years) or aged above 60. At entry, the mean blood pressure in children with RRT due to IgAN and HSPN was higher than in children with RRT due to CAKUT but growth retardation was less pronounced.
Conclusion: An increasing age at start of RRT was observed for the whole cohort including IgAN and HSPN patients. This might result partly from an increased age for accessing to RRT but also from therapy improvement of both diseases. There was a strong increase in the incidence of RRT due to IgAN over the past decades. Increased incidence of IgAN, improvement of diagnosis, and increased aged for accessing to RRT should be considered as possible cause. Graft and patient survival strongly improved. The less good results of kidney transplantation in patients less than 20 years old result probably from non compliance associated with puberty since RRT is mostly observed in late infancy and adolescence for both diseases.

Abstract# P-SUN372

Overview of pediatric dialysis in China: Brief data report from IPPN CHINA

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Objective: To give a brief overview of pediatric dialysis in Chinese children in some area of China.
Methods: Data from IPPN CHINA (International Pediatric Peritoneal Dialysis Network Registry CHINA) were collected and analyzed.
Results: IPtN CHINA provides Chinese translation for IPPN. The website was open on December 2012. From December 2012 to March 2013, 17 pediatric centers from 15 cities in 13 provinces had participated in IPPN CHINA. According to the registered data, various kinds of renal replacement services were offered by these centers, including acute and chronic dialysis. CAPD (continuous ambulatory peritoneal dialysis) was offered by 13 (76.5%) centers, APD (automated peritoneal dialysis) by 10 (58.8%) centers, HD (hemodialysis) by 14 (82.4%) centers, HF (hemofiltration) /HDF (hemodiafiltration) by 15 (88.2%) centers, PE (plasmapheresis) /IA (immunoadsorption) by 14 (82.4%) centers, and CET (continuous extracorporeal circulation technology) by 12 (70.6%) centers. Among these centers, 858 CKD (chronic kidney disease) patients were under pre-dialysis care, 83 under chronic PD, 94 under chronic HD, and 40 patients from 6 centers received renal transplantation. Eleven centers took care of both chronic PD and chronic HD patients. Among patients under chronic PD, 70% were mainly taken care in 2 centers. As to patients under chronic HD, 70% were taken care in 5 centers.
Conclusion: According to our data which represent some of the pediatric dialysis centers in China, many centers distributed in different cities in China can offer renal replacement services for children with end stage renal disease. Various kinds of renal replacement services are available in these centers. Although more than half centers take care of both chronic PD and chronic HD patients, patients under chronic PD or chronic HD distribute quite differently in various centers.

Abstract# P-SUN373
Clinical characteristics and outcomes of children with stage 2-5 chronic kidney disease: an eight-year experience

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Objective: The aim of this study was to analyze the clinical characteristics and outcomes of children with stage 2-5 chronic kidney disease (CKD) in our center.
Methods: CKD and stages of CKD were defined according to the K/DOQI classification system. The eGFR was calculated by the Schwartz formula.
Results: 1. Between 2005 to 2012, 162 new cases below the age of 16 years (male/female ratio 1.4) with stage 2-5 CKD were diagnosed in our center. There were 24 cases (14.8%) in CKD stage 2, 33 cases (20.4%) in stage 3, 28 cases (17.3%) in stage 4 and the other 77 cases (47.5%) in stage 5. 2. Primary diseases: CAKUTs were the main causes of stage 2-5 CKD and accounted for 75/162 cases (46.3%). Glomerular diseases were found in 34/162 (21.0%) and hereditary nephropathy accounted for 12/162 (7.4%) of the cases. 3. Age at diagnosis of primary diseases: Patients with CAKUTs and glomerular diseases were diagnosed at a median age of 4.5 years and 9.5 years, respectively. Compared with the developed countries, the diagnosis of CAKUTs was delayed (1 year *VS* 4.5 years). Some kinds of CAKUTs such as VUR, neurogenic bladder and PUV that could be detected early and treated properly were diagnosed in 30 cases. The median age at diagnosis of these primary diseases was 4 years in CKD stage 2-3 cases and 8.8 years in CKD stage 4-5 cases ($P<0.05$). 4. CKD evolution: During the follow-up, 3 cases with CKD stage 2 developed to stage 3, 7 cases with stage 3 developed to stage 4 and another 2 cases with stage 4 developed to stage 5. 5. Renal replacement therapy (RRT): At latest follow-up, there were totally 79 cases with CKD stage 5. 51/79 children (65%) received RRT. PD was performed in 31 cases, renal transplantation in 10 cases, HD in 7 cases, and PD combined with HD in another 3 cases. Although the abandonment rate was no significant difference in various years, more young children didn't receive the RRT.
Conclusion: CAKUTs were the leading causes of CKD. Early diagnosis and treatment are important to prevent or delay the progression of CKD in children. At the same time, we hope more patients with ESRD even small children and infants have the chance to receive the RRT in the near future.

Abstract# P-SUN374
The long-term renal function monitoring receiving multicenter-protocols chemotherapy in childhood ALL and NHL

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Objective: To investigate the renal damage on 52 children, acute lymphoblastic leukemia 33 cases, non-Hodgkin's lymphoma 19 cases, which were received the intensive multicenter-protocols (MCP).
Methods: 52 cases of consecutively diagnosed ALL (33 cases) and NHL (19 cases) were inspected by multi-parameter assay including serum urea nitrogen (BUN), creatinine (Cr), endogenous creatinine clearance (Ccr), Serum β2-microglobulin (β2 - MG) and urinary β2-MG, microalbumin (Alb), transferrin (TRF), IgG and retinol-binding protein (RBP).
Results: Corresponding to the pre-chemotherapy the levels of BUN, Cr, Ccr were normal in most children, microscopic hematuria or mild proteinuria were presented in 9 cases of children , blood and urinary β2- MG, Alb, RBP were increased significantly ($P<0.05$), the levels of RBP remains high with CCR more than 1 years and complement the scheme .
Conclusion: Different degrees of subclinical renal damage with a predominance of tubular dysfunction, marked by alleviated urinary RBP, were occurred in some patients received MCP, most of them were irreversible.

Abstract# P-SUN375
Transition of patients with chronic kidney disease from paediatric to adult care, living the challenge

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Objectives: The transition of patients with chronic kidney disease from paediatric to adult care constitutes a challenge with which pediatric an adult nephrologists face in their practice.Our group met to make this study, in which patients in transition ages and a group of professionals were evaluated in order to identify strengths and weaknesses of this process in a Nephrology Center.
Methods: 12 patients in transition ages were included in this work, evaluated in a private center, Rennius SA. within the last 5 years. Retrospective, qualitative and quantitative study.
Results: Evaluating by participant observation this group of patients and professionals we detected the following strengths 1) Children and

parents with previous contact with adult nephrologists, so they were not unknown to them 2) Dialysis nurses with practice in adult and paediatric care. 3) Weekly meetings with all the staff, who were aware of the problems of all the patients. Weaknesses: 1)Lack of self care knowledge in transiton patients 2) No acceptance of the substitutive therapy indicated 3)Difficult management of the patient living a critical adolescent age with a weak social environment 4)Fatigue in patients and parents , because of the long survival of patients with chronic renal disease 5) Different management of the interaction between child-parents-doctors versus adolescent-parents-doctors, till they can arrive to a doctors-patients relationships itself.
Conclusion: Although the strengths are important in the transition process, we found that some weaknesses generated the best moment to start the way. We consider necessary to establish multidisciplinary standards and guidelines to apply in the transition process adapted to each group. It becomes essential to have a fluid communication between adult and paediatric nephrologists, who are nothing but the partners of their patients on the road of their chronic renal disease.

Abstract# P-SUN376
Risk for death in children with end-stage kidney disease-data from the Polish Registry of Renal Replacement Therapy

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Objective: Mortality rates among children with end-stage kidney disease remain higher comparing to general population. Known risk factors for death are age at start of renal replacement therapy (RRT) and the treatment modality.
To assess the risk of death associated with treatment modality in children who commenced RRT in Poland.
Methods: A National RRT Registry set up in 2000 accumulated individual patient data of all children receiving dialysis or kidney transplantation at 13 pediatric dialysis centers. Data from 779 children aged 0-18 years was analyzed. Mean age at start of RRT was 10.3 ± 5.3 yrs. Mean time of observation was 13.1 yrs. The most frequent causes of end-stage kidney disease were congenital and genetic related diseases of the kidneys and urinary tract. Cox proportional hazard model was used to calculate risk of death associated with treatment modality. Modality of RRT was included into the model as time-dependent variable.
Results: During 8 years of follow-up among 779 children 73.5% received renal transplant, 54.3% underwent peritoneal dialysis (PD), 44% were hemodialysed (HD) and 7.7% died. The preferred initial mode of therapy was PD (62%), followed by HD (32%) and pre-emptive transplantation (6%). There were 60 deaths reported (32 girls/28 boys). Risk of death was 2-times as high in patients receiving PD as for children on HD in univariate analysis. There was no difference in survival regarding dialysis modalities in age and sex adjusted analysis. Kidney transplantation was independently associated with reduced risk of death (Hazard Ratio 0.09 95% Confidence lnterval: 0.04-0.18). Younger age was independent predictor of worse survival.
Conclusions: 1. There were no differences in risk of death in children commenced RRT regarding dialysis modality. 2. The finding showing 11-times better survival in kidney transplantation confirms that this treatment is method of choice in children with end-stage kidney disease.

Abstract# P-SUN377
Implementing Transition: Ready Steady Go

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Questions	Responses
The RSG leaflet "Transition: Moving to adults" helps patients and families understand why they are starting RSG	All agree
The RSG questionnaires are easy to understand	All agree
The RSG questionnaires help focus the clinic appointment and address difficult issues	62/63 Agree
	1/63 disagreed
RSG will help ease the process of transition	All agree
Are there any other questions that you would like to see in the RSG questionnaires that might help.	No - all

Objective: Studies show that effective transition between paediatric and adult care improves long-term outcomes. Many of the issues faced by young people with a chronic medical condition are generic across all sub-specialities during transition. We have developed and implemented a Trust-wide transition programme called Ready Steady Go (RSG). RSG ensures the medical, psychosocial and vocational needs of the young person are being addressed by following a structured, but where necessary adaptable, transition plan. A key principle is 'empowering' the young person to take control of their lives and equipping them with the necessary skills to be able to function independently and confidently in adult services, shifting the emphasis from preparing the adult service for the patient to preparing the patient for the adult service. Objectives. To assess the effectiveness of a generic transition programme, Ready Steady Go, across paediatric sub-specialities.
Methods: We conducted a prospective study between October 2012 to March 2013. Patients, carers and healthcare providers, across sub-specialities, who were using the RSG programme were asked to fill in a questionnaire to assess if the generic programme is simple to understand, easy to use, useful in addressing the key issues and easing the overall transition process.
Results: 63 completed questionnaires were returned. The responses are summarised in the table below.
Conclusion: The results show that the Ready Steady Go transition programme is simple to understand, easy to use and helps address the key issues for successful transition for young people and that a generic programme can be used across sub-specialities.

Abstract# P-SUN378
The proportion and clinical characteristics of low birth weight children with stage II-V CKD

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Objective: The aim of the present study was to analyze the proportion and clinical characteristics of low birth weight children with stageII-VCKD.
Methods: Data from patients with CKD in treated in our center from January 2008 to December 2012 were retrospectively analyzed.

patients were classified into one of five stages using the Kidney Disease Outcomes Quality Initiative (KDOQI) CKD staging system. Estimated GFR (eGFR) was determined using the Schwartz equation. All patients' information including gender, low birth weight(BW<2.5kg),CKD diagnosis age,CKD stage,primary disease,proteinuria,hypertension(systolic or diastolic BP>95 percentile for age, gender, and height)and anemia(hemoglobin<120 g/L or hematocrit<37%)were collected. Patients excluded from this study were those who were <2 years of age, because the KDOQI staging system is not applicable to children<2 years old.
Results: A total of 134 patients were enrolled in this study, 15 patients(11.2%)wtih low birth weight(LBW)and 119 patients(89.8%)wtih normal birth weight(NBW). The male/female ratios were 0.8 in LBW group and 2.8 in NBW group. In LBW group,there were 3 cases(20%)in CKD stageII, 4 cases(26.7%)in stage III, 0 cases (0%)in stage IV and the other 8 cases(53.3%)in stageV. In NBW group,there were 22 cases(18.5%)in CKD stageII, 23 cases(19.3%)in stage III, 18 cases(15.1%)in stage IV and the other 37 cases(31%)in stageV. Patients with LBW and NBW were diagnosed at a median age of 8.9±4.3 years and 8.3±3.8 years, respectively. Hypertension presented in 42.1% LBW patients while 30.2% in NBW patients. 66.7% LBW and 51.3% NBW patients have proteinuria. Anemia is present in 66.7% LBW patients and 59% NBW patients.
Conclusion: The proportion of low birth weight in CKD (stageII-V) children was higher than normal population in China. Higher ratio of CKD Vstage was shown in LBW group compared with NBW group . Hypertension and anemia were more often in LBW patients.

CKD: Experimental research

Abstract# P-SUN379
Beyond gap junctions:Aldosterone-induced mesangial cell proliferation is mediated by down-regulating Connexin43 expression via Erk MAPK and PKC pathways but not PI3K pathway

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Objective: Connexin43 (Cx43) play a central role in cell growth, however, little is kown about its exact role and underlying mechanisms involved in Aldo-induced mesangial cell (MC) proliferation.
Methods and Results: In this studies, we found that there seemed to be an inverse relationship between cell proliferation and Cx43 expression after stimulating by 100nM Aldo for 24h in a dose-dependent manner. In contrast, then, exposure of the rat MCs to the proteasome inhibitor MG132 elevated Cx43 protein levels and decreased cell proliferation. However, SLDT studies revealed little change in GJIC fuction, despite stimulation with different concentrations of Aldo, indicating that Aldo might directly decrease DNA and protein synthesis of Cx43, other than its celebrated channel-dependent mechanisms, and then stimulated MC proliferation. Besides MAPK and PI3K pathways, our data showed for the first time that PKC pathway also is responsible for Aldo-induced MC proliferation by the observations that: i) the PKC blocker GF109203X (10uM) could block MC proliferation response to 100nM Aldo treatment, though not as significant as MAPK or PI3K pathway did; ii) Aldo promotes MC proliferation, in parallel with increasing [Ca2+]i both in a dose-dependent manner. Further studies demonstrated that MR antagonist spironolactone (Spi,10nM), the ERK1/blocker PD98059 (10uM), the PKC blocker GF109203X (10uM) could reverse down-regulation of Cx43 expression both in gene and protein levels as well as decrease MC proliferation, which was similar to MG132. However, the PI3K blocker LY294002 (10uM) blocked Aldo-induced cell proliferation but alter Cx43 expression neither mRNA nor protein.
Conclusion: Taken together, these results suggest that Aldo promotes MC proliferation by directly regulating Cx43 expression at the transcriptional and translational levels, instead of the influence on GJIC function,through MR-mediated, the ERK1/2- and PKC-dependent but not PI3K-dependent pathways.

Abstract# P-SUN380
Interleukin-13 may increase podocyte permeability via modulation of zonula occludens-1

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Objective: The aim of this study was to investigate whether there is any pathologic changes in zonula occludens-1 (ZO-1) in minimal-change nephrotic syndrome (MCNS) induced by interleukin 13 (IL-13) and to determine whether leukotriene receptor antagonist has an effect on ZO-1 expression in cultured human podocytes.
Methods: The human podocytes on bovine serum albumin-coated plates with different doses of IL-13 were cultured and examined for the permeability, distribution, and amount of ZO-1 using monolayered semi-permeable membranes, confocal microscopy, and western blotting.
Results: IL-13 gradually increased the overall permeability of podocytes for 24 hours. In the immunofluorescence study, the redistribution and rearrangement of ZO-1 by IL-13 was observed as the concentration of IL-13 increased. ZO-1 was internalized into the cytoplasm of human podocytes with accumulations in a dose-dependent manner. High doses (50 and 100 ng/mL) of IL-13 decreased the levels of ZO-1 protein at 12 and 24 hours (both $P < 0.01$; n=3), which was significantly reversed by high dose (0.5μM) of leukotriene receptor antagonist (monteleukast) ($P < 0.01$).
Conclusion: Our results suggest that IL-13 may increase podocyte permeability through modulation of ZO-1, and alterations in the content and localization of ZO-1 may be relevant to the pathogenesis of proteinuria in MCNS. High dose of leukotriene receptor antagonists can be a potential therapeutic option for the treatment of IL-13-induced MCNS.

Abstract# P-SUN381
The role of ubiquitin-proteasome pathway in regulating TGF-β signaling in rat mesangial cells

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Objective: This study was designed to investigate the effect of TGF-β and proteasome inhibitor MG132 on the expression of TGF-β, Smad7, SnoN, FN, Ub and Smurf2 mRNA in rat mesangial cells (RMCs) as well as the expression of FN protein in the culture supernatant of RMCs in vitro, to explore the potential role of ubiquitin-proteasome pathway in regulating TGF-β signaling.
Methods: The rat mesangial cell line (HBZY-1) was obtained from theChinaCenterfor Type Culture Collection (Wuhan,China). RMCs were divided into six groups rμgandomly: normal control group, DMSO control group (1.0 μM DMSO), TGF-β group (stimulated with 5.0 μg/L TGF-β), normal control+MG132 group (only pretreated with 1.0 μM MG132), MG132 therapy group 1 (pretreated with 1.0 μM MG132 and followed by 5.0 μg /L TGF-β) and MG132 therapy group

2 (pretreated with 2.5 μM MG132 and followed by 5.0 μg/L TGF-β). The expression of TGF-β, FN, Smad7, SnoN, Ub, and Smurf2 mRNA was assayed by RT-PCR. The expression of FN protein in the culture supernatant of RMCs was analyzed by ELISA.
Results:1.It suggested that only the expression of TGF-β mRNA and FN protein in the normal control RMCs pretreated with 1.0μM MG132 was slightly downregulated (p less than 0.01).2.When RMCs were treated with 5.0 μg/L TGF-β for 24h, the expression of TGF-β, FN, Smad7, SnoN, Ub and Smurf2 mRNA as well as the FN protein in the culture supernatant were significantly increased compared with the normal control group (p less than 0.01). 3.When RMCs were pretreated with MG132 for 30min and followed by 5.0 μg/L TGF-β stimulation for 24h, the expression levels of TGF-β, FN, Ub and Smurf2 mRNA as well as FN protein were significantly decreased but the expression of Smad7 and SnoN mRNA was further increased, versus TGF-β group (p less than 0.01). It showed that the changes were more significant at a concentration of 1.0 μM MG132 than 2.5 μM(p less than 0.01).
Conclusion: It appears that the UPP could contribute to the regulation of TGF-β/Smads signaling pathway in the pathogenesis of kidney fibrosis.

Abstract# P-SUN382
The Effect of TGF-β on the expression of Ub and Smurf2 mRNA in rat mesangial cell

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Objective: This study was designed to investigate the effect of TGF-β on the expression of TGF-β, Smad7, SnoN, FN, Ub and Smurf2 mRNA in rat mesangial cell (RMCs) as well as the expression of FN protein in the culture supernatant of RMCs in vitro, to explore the potential role of ubiquitin-proteasome pathway in regulating TGF-β signaling.
Methods: The rat mesangial cell line (HBZY-1) was obtained from the China Center for Type Culture Collection (Wuhan, China) . RMCs were cultured in RPMI-1640.RMCs were treated with different TGF-β concentrations (0, 1.25, 2.5, 5.0 and 10.0 μg/L) for 24h.RMCs were treated with 5.0 μg/L TGF-β for various periods of times (0, 0.5, 1, 3, 6, 12, 24 and 48h). The expression of TGF-β, FN, Smad7, SnoN, Ub, and Smurf2 mRNA was assayed by RT-PCR.The expression of FN protein in the culture supernatant of RMCs was analyzed by ELISA.
Results: 1. When RMCs were treated with different TGF-β concentrations (0, 1.25, 2.5, 5.0 and 10.0 μg/L, respectively) for 24h, the expression of TGF-β, FN, Smad7, SnoN, Ub and Smurf2 mRNA as well as the FN protein in the culture supernatant were gradually upregulated, and peaked at the stimulative concentration of 5.0 μg/L TGF-β (increased by 2.1-fold, 4.4-fold, 4.9-fold, 3.0-fold, 11.5-fold, 15.6-fold and 1.4-fold respectively, *p* less than 0.01), then decreased.2.When RMCs were treated with 5.0 μg/L TGF-β, the expression of TGF-β, FN, Smad7, SnoN, Ub and Smurf2 mRNA as well as the FN protein in the culture supernatant were gradually upregulated, and respectively peaked at 24h, 48h, 0.5h, 1h, 6h, 6h and 48h (*p* less than 0.01).
Conclusion: The expression of TGF-β, FN, Smad7, SnoN, Ub and Smurf2 mRNA as well as the FN protein in the culture supernatant were induced most significantly in RMCs treated with 5.0 μg/L TGF-β, and peaked at 24h, 48h, 0.5h, 1h, 6h, 6h and 48h, respectively. It indicates that TGF-β could increase the expression of FN mRNA and protein in RMCs in vitro, which may contribute to the overaccumulation of ECM; the increased transcription of the Smad7 and SnoN genes was considered to be a feedback response. So it seems that UPP and TGF-β/Smads signaling pathway are both activated in the TGF-β induced RMCs.

Abstract# P-SUN383
Morphometric, histological and biochemical changes in rats with doxorubicin-induced nephropathy

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Objective: Experimental models have contributed to our understanding of the pathophysiology of chronic kidney disease (CKD). In this regard, the injection of doxorubicin induced proteinuria and renal lesions, which mimic human nephrotic syndrome. The aim of this study was to describe the morphometric, biochemical and histological changes at different stages of disease progression in rats with doxorubicin-induced nephropathy as a contribution to the characterization of this experimental model.
Methods: Male Wistar rats (250-300g) were divided into two groups: animals injected with intravenous Doxorubicin (7.5 mg/kg) (DOX, n=25) and animals injected with vehicle (control, CON n=20). Twenty-four hour urine samples were collected at days 7, 14, 21 and 28 after injections. At the same time points, animals were sacrificed and blood samples collected for analysis. After perfusion with phosphate buffered saline (PBS), the organs were removed, weighed and kidneys prepared for histology. DOX group was compared to vehicle-injected animals and the level of significance was set at $p<0.05$.
Results: Animals of DOX group developed proteinuria, dyslipidemia, biometric and histological changes, consistent with chronic tubulointerstitial inflammatory infiltrate and renal fibrogenic process. In this animal model, some biochemical changes such as proteinuria and dyslipidemia appear early and serve as nonspecific biomarkers for NS, while histological lesions become quite intense from day 21 after the doxorubicin injection.
Conclusion: The detailed characterization of this animal model through morphometric, biochemical and histological studies may contribute to better understanding the progression to CKD.

Abstract# P-SUN384
Effects of Angiotensin II on Smad3 in Human Mesangial Cells

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Objective: To investigate the effects of Angiotensin II on Smad3 in human mesangial cells.
Methods: Human mesangial cells were cultured in vitro, and treated with 10^{-7} mol/L angiotensin II. Control group and experiment group were set up in the study. Detected the staining position and changing tendency of phosphorylated Smad3 by immunocytochemistry at 0 hr, 1 hr, 3 hr, 6 hr, 12 hr, 24 hr after the stimulation of angiotensin II in human mesangial cells. Extracted the total RNA, detected Smad3 RNA by RT-PCR and detected protein of phosphorylated Smad3 by western blotting at the different time.
Results: (1) At the resting state or under stimulated conditions, the positive staining of phosphorylated Smad3 were mainly in the nucleus. Compared with control group, phosphorylated Smad3 was stronger at 12 hr(0.255+/- 0.038 vs 0.904+/-0.035; P<0.05). (2)The expression of Smad3 mRNA was stronger than control group at 6 hr, 12 hr, 24 hr by

RT-PCR after stimulation (0.616+/- 0.012, 0.684+/- 0.013, 0.609+/- 0.012 vs 0.455+/- 0.019; P<0.05). Smad3/β-actin reached the peak value at 6 hr after stimulation, then began to decline. (3) The expression of phosphorylated Smad3 was stronger than control group at 12 hr, 24 hr after stimulation(0.645+/- 0.027, 0.538+/- 0.026 vs 0.192+/- 0.022; P<0.05). Phosphorylated Smad3/GAPDH reached the peak value at 12 hr, and then began to decline.
Conclusion: Angiotensin II could upgrade the transcription and expression of Smad3 in human mesangial cells.

Abstract# P-SUN385
Effect of the chinese herbal recipe on heparanase and nephrin on rats with adriamycin-induced nephropathy

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Objective and Methods: 30 SD rats were randomized into 5 groups: control(C), model (M), glucocorticoid(G), Chinese herbs(Z), and Chinese herbs plus glucocorticoid (ZJ)groups. 28 days after ADR injection (modelling), the levels of 24-h urinary protein, serum cholesterol, and serum triglycerides, and renal function were detected with routine biochemical methods. Kidney pathological changes were observed under light and electron microscopes. HPA mRNA expression levels were measured using real-time fluorescence-quantitative polymerase chain reaction (PCR). Urine levels of HPA in all groups were measured using enzyme-linked immunosorbent assay. The expression of nephrin were detected by immunohistochemical staining.
Results: (1) Examination under the electron microscope showed extensive fusion of foot processes in ADR rats. (2) HPA mRNA expression was higher in group M than that in group C.The HPA mRNA levels in group Z and ZJ were significantly lower than those in group M. The HPA expression levels correlated significantly with the level of proteinuria. (3) Nephrin mRNA expression levels in group M were higher than those in group C. Nephrin mRNA expression levels were significantly lower in the intervention group than in the model groups, especially in group ZJ. (4) Compared to the control group, the model group showed increased expression of nephrin in the kidney. Nephrin levels in other groups, especially in group ZJ, were significantly lower than that in the model group. (5) The nephrin levels in the kidney were negatively correlated with the level of proteinuria.
Conclusion: The Chinese herbs reduced foot process injury in rats with ADR-induced nephropathy, particularly in combination with steroid. The herbs attenuates the development of proteinuria in rats with nephropathy possibly by inhibition of HPA in kidney. In addition, it could regulate the expression of nephrin in rats with kidney disorders. The efficacy of the combined therapy was better than a singular intervention.

Abstract# P-SUN386
To Evaluate the Protective Effect of Sildenafil on Experimental induced Acute & Chronic nephrotoxicity

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Objective: Nephropathy is a leading cause of morbidity and mortality and is characterized by impaired renal function, glomerulosclerosis, persistent albuminuria, declined glomerular filteration rate (GFR), elevated arterial blood pressure and fluid retention. Gentamicin and CCl4 are well reported to induce experimental nephrotoxicity.
Methods: Wistar albino rats of either sex (180-260g), n=6 were employed in present study. Acute nephrotoxicity was induced by injecting Gentamicin (100 mg/kg, s.c.,) for 8 days. Chronic nephrotoxicity was induced by administration of carbon tetrachloride (0.5 ml/kg, s.c.,) for 28 days. Serum creatinine, BUN, urinary microprotein, TBARS, nitrite/nitrate and reduced glutathione estimations were done as hallmarks of renal functioning.
Results: Gentamicin and CCl4 treatment caused increases in serum creatinine, BUN, urinary microproteins, and renal tissue TBARS levels in comparison to normal control. It also decreased reduced glutathione and tissue nitrite/nitrate levels. Sildenafil treatment (0.4 and 0.8 mg/kg) antagonized the effect of gentamicin and CCl4 induced renal intoxication dose dependently. L-NAME treatment significantly reversed the effect of sildenafil treatment. Gentamicin and CCl4 administrations increases mitochondria free radical: OH+, H2O2 generation and causes cell membrane damage. Gentamicin and CCl4 induced nephrotoxicity is associated with decreased Nitric oxide (NO), and hence, the nitric oxide synthase inhibitors are reported to impair renal function. Sildenafil causes the release of NO through the activation of NOs cascades. Sildenafil treatment significantly attenuated all these abnormalities in renal function in a dose dependent manner. L-NAME (NO synthase inhibitor) reversed the beneficial effects of Sildenafil, confirming the increased expression of Nitric oxide.
Conclusion: Therefore, it may be concluded from above findings that Gentamicin and CCl4 administration caused marked Renal damage. Sildenafil has protective effect in prevention of renal injury by increasing the expression of nitric oxide.

Abstract# P-SUN387
Neutral endopeptidase and natriuretic peptide receptors participate in the regulation of C-type natriuretic peptide expression in renal interstitial fibrosis rats

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Objective: The initiation and progression of renal interstitial fibrosis (RIF) is a complicated process in which many factors may play an activate role. Among these factors, C-type natriuretic peptide (CNP) is an endothelium-derived hormone and acts in a local, paracrine fashion to regulate vascular smooth muscle tone and proliferation.
Methods and Results: In the present study, we established a rat model of unilateral ureteral obstruction (UUO), and found that CNP expression tends to be higher immediately after ligation and declined at later time points, occurring predominantly in tubular epithelial cells. A high-level CNP may contribute to the elevated expression of natriuretic peptide receptor (NPR) -B in the early phase of UUO. However, the sustained expression of NPR-C and neutral endopeptidase (NEP) observed throughout the study period (that is up to 3 months) helps to, at least partly, explain the subsequent decline of CNP.
Conclusion: Thus, NEP and NPRs participate in the regulation of CNP expression in RIF.

Abstract# P-SUN388
In young uremic rats with secondary hyperparathyroidism oral paricalcitol is not superior to calcitriol in terms of improving proteinuria, vascular calcification or bone structure.

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Objective: Vitamin D receptor activators (VDRA's) are used to treat and prevent secondary hyperparathyroidism in chronic kidney disease (CKD). Paricalcitol suppresses PTH and is less hypercalcemic and hyperphosphatemic than calcitriol. Anti-inflammatory activity, inhibition of the renin angiotensin system, retardation of renal failure progression and reduction of albuminuria are all potential beneficial effects of selective VDRA's in CKD. Information on the use of paricalcitol in children is insufficient. The aim of this study was to compare the effect of paricalcitol and calcitriol on renal damage, vascular calcification and osseous structure in uremic young rats. Three groups (n=5) of weaning female rats. Nx = 5/6 nephrectomy; NxP = Nx + 1 ug oral paricalcitol/48h, 7 doses; NxC = Nx + 0.25 ug oral calcitriol/48h, 7 doses. All animals received high phosphorus (0.9%) diet.
Methods: At sacrifice, serum biochemistry and proteinuria were measured. Vascular calcification and osseous structure were analyzed by micro-CT.
Results: Both, paricalcitol and calcitriol, reduced PTH levels (mg/dl) significantly and at a similar degree (Nx: 7854+/-2379 vs NxP: 4871+/-3078 and NxC: 3373+/-2095). There were no differences in proteinuria (mg/100g/day) (Nx 254+/-36, NxP 347+/-70, NxC 293+/-65). Paricalcitol and calcitriol treatment were associated with greater extension of aorta calcification (Nx 0.51+/-0.18, NxP 16.50+/-6.67, NxC 10.95+/-6.74 %). In tibiae, bone volume, bone mineral density, as well as other trabecular and cortical histomorphometric features were not significantly different between the two treated groups.
Conclusion: In comparison with calcitriol, treatment with oral paricalcitol did not show differences in proteinuria, vascular calcification or bone structure in an experimental model of marked secondary hyperparathyroidism in young uremic rats.

Abstract# P-SUN389
A case of nail-patella-like nephropathy with LMX1B mutation

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Objective: Nail-patella syndrome (NPS) is a pleiotropic autosomal-dominant disorder caused by mutations in the *LMX1B* gene. It has traditionally been characterized by dysplasia of the nails, patellar aplasia or hypoplasia, iliac horns, dysplasia of the elbows, and frequently glaucoma and progressive nephropathy. Several cases showing typical renal lesions of NPS without skeletal or nail abnormalities have also been reported as nail-patella-like nephropathy (NPLN). The association of NPLN with *LMX1B* mutation is unclear.
Methods and Results: We describe a 16-year-old girl who had proteinuria without hematuria. The proteinuria had first been noted at the age of four. The patient had normal renal function and no serological abnormalities. However, as the proteinuria had gradually increased, renal biopsy was performed at the age of ten. No remarkable pathological changes were revealed by light microscopy, but electron microscopy revealed irregular thickening of the GBM with areas of rarefaction, giving rise to a characteristic 'moth-eaten' appearance which is characteristic in NPS. Fibrillar material could also be seen clearly after tannic acid impregnation. However, neither skeletal nor nail abnormalities were evident. Therefore, we diagnosed the patient as having NPLN. We analyzed the *LMX1B* gene from the peripheral leukocyte genome DNA of the subject, but no mutation was identified.
Conclusion: From our experience with this case, it appears that NPLN patients have no mutation in *LMX1B*. Further detailed molecular studies of candidate genes will be necessary to understand the molecular mechanism underlying intra- and interfamilial variation in renal phenotypic severity and to identify the factors involved in the nephropathy associated with NPLN and NPS.

Abstract# P-SUN390
THE ROLE OF E-CHADERIN AND FIBROBLAST SPECIFICS PROTEIN 1 IN RENAL FIBROSIS

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Objective: To investigate the correlation of E-chaderin, fibroblast specific protein 1 (FSP-1) with the presences of renal fibrosis in Wistar rats.
Methods: Renal injury may cause renal tubular damage. E-chaderin is important to keep the unity basement membrane of renal tubule.Wistar rats were randomized into 2 groups, normal groups/group 1 (n = 4) and renal fibrosis group/group 2 (n = 8). Cyclosporin A was injected subcutaneously for 3 weeks to induce renal fibrosis. Group 1 were terminated after one week adaptation. Group 2 were terminated after six weeks observation. Histopathological and immunohistochemistry examinations of E-chaderin and FSP-1 were done on both groups.
Results: There were significant decreased expression of E-cadherin in group 2 than group 1 (p=0.000), and there were no significant different FSP-1 between two groups. The fibrosis area in group 2 increased significantly than group 1 (p = 0.007). Spearman correlation analysis showed that E-chaderin was correlated with increasing area of renal fibrosis (p = 0.013; r= - 0.691).
Conclusion: Decreasing E-cadherin plays a role in renal fibrosis. While FSP-1 is not specific markers of renal fibrosis induced by Cyclosporin A.

Abstract# P-SUN391
Role of mTOR/p70S6K1 signaling pathway in HK-2 cell stimulated by AngII?

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Objective: To observe the effects of Ang II and mTOR antagonist Rapamycin on the expression of AT1R, mTOR, S6K1, E-cadherin and α-SMA mRNA in HK-2 in vitro and to discuss the role of mTOR/p70S6K1 signaling pathway on renal fibrosis.
Methods: The cultured human kidney 2 cell (HK-2) were classified into the following groups: (1)the stimulating groups of different Ang IIconcentrations (AngII10^{-5}, 10^{-6}, 10^{-7}mol/L) and also different stimulating hours separately(6,24,48hr). (2) Rapamycin intervention experiment. The HK-2 were divided into six groups: normal control group, DMSO control group(10μg/L DMSO), AngIIgroup (stimulated with AngII10^{-5} mol/L), normal control+Rapamycin group(only pretreated with 10μg/L Rapamycin) and Rapamycin therapy group (AngII10^{-5} mol/L and followed by 10μg/L Rapamycin).The expressions of AngII、mTOR、S6K1、E-cadherin and α-SMA mRNA in every groups was analyzed by RT-PCR.
Results: After the stimulation of different concentrations of AngIIon HK-2 cells,the expressions of AT1R, mTOR, S6K1 and α-SMA

mRNA were significantly up-regulated whearas E-cadherin mRNA expression was markedly down-regulated(P<0.01). The suitable stimulative concentration of Ang II used was 10^{-5} mol / L. 24h after the treantment with Ang II(10^{-5} mol/L) on HK-2 cells, the expressions of AT1R, mTOR, S6K1, E-cadherin and α-SMA mRNA showed no significant differences between DMSO control group(10μg/L DMSO), normal control+ Rapamycin group and normal control group(P>0.05). 24 h after the treatment with AngII(10^{-5} mol/L) on HK-2 cells, the expressions of AT1R, mTOR, S6K1 and α-SMA mRNA were significantly up-regulated whearas E-cadherin mRNA expression was markedly down-regulated(P<0.05) respectively. mTOR antagonist Rapamycin (10μg/L) can reverse this process.
Conclusion: The expressions of AT1R, mTOR, S6K1 and α-SMA mRNA were induced significantly in HK-2 treated with 10^{-5}mol/L Ang II and the mTOR antagonist Rapamycin can reverse this process. It appears that mTOR/p70S6K1 signaling pathway may be contributed to renal fibrosis.

Abstract# P-SUN392
The Therapeutical Effect and Possible Mechanism of Human Umbilical Cord Mesenchymal Stem Cells Transplantion in Obstruction-Induced Renal Fibrosis in Rat

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Objective: To investigate the therapeutical effect and possible mechanism of human UC-MSCs transplantion in obstruction-induced renal fibrosis in rat.
Methods: UC-MSCs were recovered and enlarged after cryopreservation. 63 healthy female SD rats aged 8 weeks were divided into three groups. UUO group: 21 rats were operated by ligation of left ureter and injected PBS via the tail vein 7 days after operation; UUO+MSCs group: 21 rats were operated by ligation of left ureter and injected UC-MSCs via the tail vein 7 days after operation; Sham group: 21 rats were operated by sham surgery and injected PBS via the tail vein 7 days after operation. Seven rats of each group were killed on the 14th, 21stand 28th day. The urine, blood and renal tissue were collected. At each time point, items were detected as follows: Changes of 24-hour urine protein, serum urea nitrogen and serum creatinine; The kidney of all rats were collected to have renal pathological lesion scores; The expression of alpha-SMA, Fn, TGF-beta1 and BMP-7 in renal tissue were observed by immunohistochemical staining; The quantity analysis of alpha-SMA, Fn, TGF- beta1 and BMP-7 protein were further demonstrated with western blot.
Results: There were no significant difference in 24-hour urine protein among these three groups in each time point. On the 14th day, the serum creatinine in UUO+MSCs group were less than those in UUO group; On the 14th and 21st day, the renal pathological lesion scores, renal expression of Fn and alpha -SMA were lower in UUO+MSCs group than in UUO group, but there were no significant difference in these two groups on the 28th day; On the 14th and 28st day, the renal expression of TGF- beta1 were lower in UUO+MSCs group than in UUO group, but the renal expression of BMP-7 were higher than in UUO group; A positive correlation was found between the renal expression of alpha-SMA and TGF- beta1, while a negative correlation was found between the renal expression of alpha-SMA and BMP-7.
Conclusion: The UC-MSCs transplanting contributed to decrease the fibrosis in obstruction-induced renal fibrosis in rat. The increased renal expression of TGF- beta1 and decreased renal expression of BMP-7 appeared to be involved in these processes.

Abstract# P-SUN393
Transgenetic technology via permanent integration of genes in repopulating spermatogonial cells (PISC) for regulating the kidney gene expression in Balb/C and Kunming mice

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Objective: Through the Transgenetic technology via PISC to build an up-regulated and knockdown ANGPTL3 gene model. We intended to evaluate the feasibility and character of PISC in vivo and establish a simple and effective platform for transgenetic animal model.
Methods: (1)Construct and linearize recombinant vectors of pcDNA3.1-ANGPTL3 and pcDNA6.2- GW/EmGFP-ANGPTL3-miRNA, then inject 20ul (0.5ug/ul) linearized recombinant vectors into the right testes of 20 mature male Balb/C mice and10 KMmice respectively. Remove the left testes (F0) after electroporating reset testes.(2)Two F0 mice were sacrificed after 1, 3, 6 and 12 months to observe the expression of green fluorescent protein(GFP). (3)The electroporated male mice were mated with wild-type females after 35 days and their progenies (F1) were identified by PCR. According to the nucleotide differdnce,F1 mice were classified into 3 groups: ANGPTL3 transgenetic mice (AT), ANGPTL3 RNAi mice (AR) and wild-type mice (WT). Five mice (age: 6 weeks) from each group were selected and measured the expression of ANGPTL3 inserum, liver and kidney cortex by ELISA, Real-time PCR, western blot and IHC.
Results: (1) After 1, 3 and 6 months, testes of F0 mice still transfect spermatogonial cells, but its trend is decreased. Twelve months later, there was no GFP expression in testes. Only 11 Balb/C (55.0%) and10 KM(100%) F0 mice had their offspring. (2) 134/298(49.9%) F1 mice were positive transgenetic, including 66 AT and 68 AR. The positive rates of Balb/C and KM F1 mice identified with transgenetic by PCR were 40.0% and 60.3 %, respectively. (3) The levels of ANGPTL3 inserum: AT (32.6±2.0ug/ml) >WT (25.2±1.7ug/ml) > AR (21.0±2.2ug/ml) (P<0.05). The mRNA level and protein expression of ANGPTL3 inliver and kidney cortex were significant higher in AT than in AR (all P<0.05).
Conclusion: We succeed in making transgenetic mice model with the higher and lower expression of ANGPTL3 inglomeruli using PISC in vivo. The Up-regulation rate is 50% and knockdown rate is 30%.

Abstract# P-SUN394
The expression of RARs in renal tissues of rats with unilateral ureteral obstruction

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Objective: To investigate the expression and effect of retinoic acid receptors (RARs) in renal tissues of rats with unilateral ureteral obstruction (UUO).
Methods: Eighty Wistar male rats (6-weeks-old) were randomly assigned into 2 groups: sham-operated group (n=40) and model group (n=40). The left ureter of rats in mode group were dissociated to be obstructed. The rats in sham-operated group were dissociated left ureter only, and not to be obstructed. Twenty rats of both two groups were killed on 2, 4 weeks after surgery respectively. Histological changes of renal tubular interstitium were observed by HE and Masson staining, and the index of renal interstial fibrosis (RIF) was calculated. The expressions of protein and mRNA of RARα, RARβ, RARγ and transforming growth factor-β1 (TGF-β1) were detected by immunohistochemistry, western-blot and realtime reverse transcription polymerase chain reaction (RT-PCR). The expression of protein of collagen-IV (Col-IV) and fibronectin (FN) were detected by immunohistochemistry and western-blot.

Results: (1) Compared to sham-operated group: Histological changes showed that there was more collagen deposition, fibroblast proliferation and diffused lymphoeytein filtration in the renal interstitium, the index of RIF was increased remarkably in model group (P<0.01), and it was increased accompanying with the degree of obstruction; The expressions of protein and mRNA of RARα and RARβ were decreased significantly in model group (P <0.01), and it was decreased accompanying with the degree of obstruction; The expressions of protein and mRNA of RARγ were no significantly in model group(P> 0.05), The expressions of protein and mRNA of TGF-β1 were increased remarkably(P<0.01), and it was increased accompanying with the degree of obstruction; The expressions of protein of Col-IV and FN were increased significantly (P<0.01), and it was increased accompanying with the degree of obstruction; (2) Correlation analysis showed that: the expression of protein of RARα in model group was negative correlation with the index of RIF, TGF-β1, Col-IV and FN (r=-0.833, -0.763, -0.825, -0.918;P<0.01); the expression of protein of RARβ in model group was negative correlation with the index of RIF, TGF-β1, Col-IV and FN (r=-0.728, -0.736, -0.818, -0.784; P<0.01).The expression of protein of TGF-β1, Col-IV and FN were positive correlations with the index of RIF (r =0.995, 0.977, 0.969; P<0.01);the expression of protein of RAR γ in model group had no correlation with the index of RIF, TGF-β1, Col-IV and FN(r =0.145,0.261,0.126,0.225; P>0.05).

Conclusion: The expressions of protein and mRNA of RARα and RARβ were decreased significantly in renal tissues of rats with UUO, and they were decreased remarkably accompanying with the degree of obstruction. RARα and RARβ maybe involved in the progression of RIF.

Abstract# P-SUN395

The effect of PPARγ / RARs signaling pathway in the renal interstitial fibrosisin renal tissues of rats with unilateral ureteral obstruction

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Objective: To explore the effect of PPARγ / RARs signaling pathway in the renal interstitial fibrosisin renal tissues of rats with UUO.

Methods: 160 Wistar male rats (6-weeks-old) were randomly divided into 4 groups: model group, PPARγ receptor agonist group, PPARγ receptor blocker group, DMSO group. The left ureter of all rats were dissociated to be obstructed after anesthesia. Twenty rats of both two groups were killed on 2, 4 weeks after surgery respectively. The expressions of protein and mRNA of PPARg, RARα, RARβ, RARγ and TGF-β1 were detected by immunohistochemistry, western-blot and RT-PCR. The expression of protein of Col-IV and FN were detected by immunohistochemistry and western-blot.

Results: Compared to model group: in rosiglitazone group, the expressions of protein and mRNA of renal PPARg and RARα were increased remarkably (P<0.01); the expressions of protein and mRNA of TGF-β1 were decreased significantly than those in model group (P<0.01) ; the expressions of proteins of renal Col-IV and FN were decreased remarkly (P<0.01) ; the expressions of renal RARβ and RARγ were no significant change (P> 0.05). In GW9662 group, the expressions of protein and mRNA of renal PPARg and RARα were increased remarkably (P<0.01); the expressions of protein and mRNA of TGF-β1 were increased significantly than those in model group (P<0.01) ; the expressions of proteins of renal Col-IV and FN were increased remarkly (P<0.01) ; the expressions of renal RARβ and RARγ were no significant change (P> 0.05). In DMSO group , the expression of various indicators was no significant difference (P> 0.05). (2) Correlation analysis showed that: the expression of protein of PPARg was Significant positive correlation with the index of RARα (r= 0.883;P<0.01); the expression of protein of PPARγ was no correlation with the index of RARβ and RARγ(r= 0.132, 0.231; P> 0.05); the expression of protein of PPARg was negtive correlation with the index of RIF, TGF-β1, Col-IV and FN (r= 0.932 ,0.875, 0.917, 0.875;P<0.01).

Conclusion: The PPARγ / RARα signaling pathways maybe involved the occurred and development of pathological processes in UUO rat kidney tissue RIF.

Abstract# P-SUN396

The effect all-trans retinoic acid on Prohibitin 1 and Prohibitin 2 expressions in the renal tubular epithelial cell injury induced by hypoxia

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Objective: To explore the effect all-trans retinoic acid (ATRA) on Prohibitin 1 (PHB1) and Prohibitin 2 (PHB2) expressions in the renal tubular epithelial cell (RTEC) injury induced by hypoxia.

Metdods: RTEC was divided into 3 groups: normal group, model group, ATRA intervention group. The normal group wasn't disposed, and the model group was put into vacuum tank filled with hypoxic gas (950ml/L nitrogen and 50ml/L carbon dioxide) to construct RTEC hypoxia injury model. The cell in ATRA intervention group was added 0.1μmol/L ATRA and was conducted with hypoxia treatment as model group. After 24h and 36h, the mRNA and protein expressions of PHB1, PHB2, TGF-β1 and α-SMA were detected.

Results: 1. Compared with normal group, protein expressions and mRNA expressions of PHB1 and PHB2 in model group at two time points (24h, 36h) were markedly decreased (P<0.05). In model group, protein expressions and mRNA expressions of PHB1 and PHB2 in 36h was down-regulated when compared with those in 24h. The protein expression and mRNA expression PHB1 or PHB2 in ATRA intervention group at two time points were increased significantly when compared with those in model group (P <0.05). 2. Compared with normal group, the protein expression and mRNA expression of TGF-β1, α-SMA in NRK-52E cells of model group and ATRA intervention group at two time points (24h, 36h) were significantly increased (P<0.05), and those changes in 36h is more dramaticlly compared with in 24h. Compared with model group, the protein expression and mRNA expression of TGF-β1, α-SMA in RTEC from ATRA intervention group were decreased prominently at two time points (P<0.05). 3. Correlation analysis: The protein expression of PHB1 or PHB2 was negatively correlated with the protein expression of TGF-β1 or α-SMA in model group (P < 0.05).

Conclusion: In hypoxic RTEC injury model, ATRA can significantly enhance the protein and mRNA expressions of PHB1 and PHB2, and it may play a protective effect against the hypoxic injury for RTEC.

Abstract# P-SUN397

The association of prohibitin with oxidative damage and its molecular mechanisms in the renal interstitial fibrosis rats

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Objective: To explore the association of prohibitin (PHB) with oxidative damage and its molecular mechanisms in the renal interstitial fibrosis (RIF) rats.

Metdods: Rats were assigned into two groups randomly: sham operation group (SHO) and model group subjected to unilateral ureteral

obstruction (GU). Rats were anaesthetized by intraperitoneal injection of chloral hydrate. The left ureter of rats in GU group were dissociated to be obstructed. The rats in SHO were dissociated left ureter only, and not to be obstructed. Twenty rats of the two groups were killed on the end of 2-week and 4-week after surgery. The mRNA and protein expressions of PHB1, PHB2, TGF-β1, and the protein expression of Col-IV and FN were detect. The cell apoptosis in renal interstitium was detected using TUNEL. The contents of ROS, MDA, SOD and GSH were also detected.
Results: 1. When compared with those in SHO group, the mRNA and protein expressions of PHB1 or PHB2 in GU group were reduced (P<0.01). 2.The mRNA and protein expressions of TGF-β1, the protein expressions of Col-IV and FN, and the RIF index in GU group were up-regulated when compared with those in SHO group (P<0.01). 3.When compared with those of SHO group, the contents of ROS and MDA in GU group were increased (P<0.01), the concentrations of SOD and GSH in GU group were reduced (P<0.01), and the cell apoptosis index in GU group was up-regulated (P<0.01). 4. Correlation analysis: In GU group, the PHB1 or PHB2 protein was inverse correlated with the expression of TGF-β1, Col-IV, FN, ROS or MDA (P<0.05).
Conclusion: PHB might serve as an antioxidant agent to take part in the progression ofRIFby regulating the ROS content, and the expressions of TGF-β1, Col-IV and FN.

Abstract# P-SUN398
The association of prohibitin with oxidative damage and its molecular mechanisms in RTEC injury induced by hypoxia

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Objective: To explore the association of prohibitin with oxidative damage and its molecular mechanisms in RTEC injury induced by hypoxia in vitro.
Metdods: The cells were divided into seven groups: nomal control group (control group), hypoxic-injury group (model group), PHB1+ group, PHB2+ group, PHB1- group, PHB2- group, and negative control group. The hypoxic treatment (95% N2 and 5% CO2) was performed in PHB1+ group, PHB2+ group, PHB1- group, PHB2- group, and negative control group for 48 hours after adding the gene interference agents. All the samples were harvested for detection after 48 hour using hypoxic treatment. The mRNA and protein expressions of PHB1, PHB2 or TGF-β1, and the protein expression of Col-IV or FN were detected. The contents of ROS, MDA, SOD and GSH were also detected.
Results: 1. When compared with those in model group, the mRNA and protein expressions of PHB1 or PHB2 in PHB1- or PHB2- group were markedly reduced (P<0.01), and the mRNA and protein expressions of PHB1 or PHB2 in PHB1+ or PHB2+ group were markedly up-regulated (P<0.01). 2. When compared with those in model group, the mRNA and protein expressions of TGF-β1, and the protein expressions of Col-IV and FN in PHB1- or PHB2- group were markedly increased (P<0.01), and the mRNA and protein expressions of TGF-β1, and the protein expressions of Col-IV and FN in PHB1+ or PHB2+ group were markedly down-regulated (P<0.01). 3. When compared with those in model group, the contents of ROS and MDA in PHB1- or PHB2- group were increased (P<0.01), the concentrations of SOD and GSH in PHB1- or PHB2- group were reduced (P<0.01); and the contents of ROS and MDA in PHB1+ or PHB2+ group were reduced (P<0.01), the concentrations of SOD and GSH in PHB1+ or PHB2+ group were increased (P<0.01). 4. Correlation analysis: the PHB1 or PHB2 protein was inverse correlated with the expression of TGF-β1, Col-IV, FN, ROS, MDA (P<0.05). The PHB1 or PHB2 protein was positively correlated with the expression of SOD or GSH (P<0.05).
Conclusion: PHB might play the role against oxidative damage and anti-ECM accumulation by regulating the expression of ROS, and reducing the TGF-β1, Col-IV, or FN expression in RTEC in vitro.

Abstract# P-SUN399
The Function of PAX2 Re-expression in EMT of Rat with Renal Interstitial Fibrosis

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Objective: The purpose of the present study was to identify the relationship between the re-expression of PAX2 as an embryonic development gene in rat with renal interstitial fibrosis and the Specific marker E-cadherin and α-SMA in Epithelial Mesenchymal Transition (EMT)in renal tubular epithelium. The possible mechanism of PAX2 in renal interstitial fibrosis was discussed in this paper.
Methods: 80 male Wistar rats were randomly divided into two groups: sham-operated group (sham group) and unilateral ureteral obstruction group (UUO group), 40 in each group. After the surgery, rats were killed at 3, 5, 7, and 14 days (n = 10 each) to remove and collect kidneys. Morphological changes of the kidney were determined by histopathology with light microscope. The relationship between PAX2 and E-cadherin/α-SMA was measured by immunohistochemistry. Protein and mRNA expression of PAX2, E-cadherin and α-SMA in the kidney were determined by Western blot and real-time polymerase chain reaction (RT-PCR).
Results: (1)Hematoxylin and Eosin (HE) and Masson staining revealed obvious renal interstitial fibrosis in UUO group,(2) increased PAX2 and α-SMA expression and decreased E-cadherin expression were found in renal tubular epithelial cells in UUO group by immunohistochemistry with the time of obstruction prolonged, the overlapping region of PAX2 andα-SMA protein increased, but not in sham group; (3) As the renal interstitial fibrosis occurred,the expression of E-cadherin protein and mRNA as cell phenotype specific mark of renal tubular epithelium decreased, meanwhile,the expression of α-SMA protein and mRNA as cell phenotype specific mark of myofibroblast increased; (4) PAX2 protein level was positive correlated withα-SMA protein level ($r = 0.977$ and $p < 0.05$) and negative correlated with E-cadherin protein level($r = -0.984$ and $p < 0.05$).
Conclusion: In rats with renal interstitial fibrosis , the re-expression of embryonic development gene PAX2 in renal tubular epithelium is related with the change of cell phenotype in EMT, which may participate in the process of EMT in renal interstitial fibrosis.

Abstract# P-SUN400
Study on Mechanism of WNT4 Pathway In Paired Box 2 Induced Renal Tubular Epithelial Cells Mesenchymal Transition

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Objective: Epithelial- mesenchymal transition (EMT) is considered to be a crucial stage of renal fibrosis. Previous studies have indicated that paired box 2 (PAX2) could directly induce normal renal tubular EMT in vitro. However, the mechanism of PAX2 on EMT remains unknown.
Methods: Renal tubular epithelial cells (NRK52E) derived from normal rats were transfected with pEGFP- PAX2 and selected with G418.

pEGFP- PAX2 cells was evaluated through fluorescence detection, western blotting and real-time polymerase chain reaction (PCR). Morphological alterations were examined using phasecontrast microscopy. The expression of E-cadherin, α-smooth muscle actin (α-SMA), fibronectin , snail ,WNT4 and β-catenin were analyzed by immunofluorescence, western blotting and real-time PCR. Cell migration assay and transwell were to detect migration and invasion.
Results: PAX2 had statistically significantly altered expression levels with more than a three-fold difference compared with the pEGFP - transfected NRK52E cells were considered. Key elements of the EMT process, such as α-SMA , snail and fibronectin genes expression were transcriptionally activated in the pEGFP- PAX2 transfected sublines. In addition, E-cadherin, which is a marker of epithelial cells, decreased in the pEGFP- PAX2-transfected NRK52E cells. The cell migration assay and transwell demonstrated that the transfection of NRK52E with PAX2 promoted cell migration and invasion following EMT. Additionally, consistent with the effects of increased PAX2 expression levels, we found that WNT4 and β-catenin were highly elevated in the pEGFP- PAX2 transfected group. Blocking WNT pathway with WIF-1 we found E-cadherin was increased. In addition, α-SMA , snail and fibronectin were decreased. Blocking WNT pathway degraded cell migration and invasion of PAX2 transfected cells. Silencing WNT4 with WNT4 siRNA, E-cadherin was found to increased, α-SMA , snail and fibronectin decreased, and cell migration and invasion were degraded.
Conclusion: Our study demonstrates that PAX2 can induce renal tubular cells epithelial-mesenchymal transition in vitro. We speculated that PAX2 induced EMT perhaps by WNT pathway with WNT4 gene.

Abstract# P-SUN401
PGC-1α activation protects against aldosterone-podocytes damage via regulating mitochondrial antioxidant genes

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Objective: Podocytes are specialized visceral epithelial cells that reside on the glomerular basement membrane (GBM) outside of the glomerular capillaries. It therefore forms the final barrier to protein loss, which explains why podocyte damage is typically associated with marked proteinuria. Previous study has showed that reactive oxygen species (ROS) play a crucial role in the pathogenesis of proteinuria and podocyte damage.
Methods and Results: This study investigated whether the transcriptional coactivator, peroxisome proliferator activated receptor-g coactivator 1α (PGC-1α), a major regulator of oxidative metabolism and mitochondrial function, prevented podocyte damage by regulating mitochondrial antioxidant genes. Aldosterone (Aldo) induced mitochondrial ROS production and decreased PGC-1α expression in a dose dependent manner. Increased PGC-1α levels in podocytes by infection with PGC-1α adenoviral vector prevented Aldo-induced mitochondrial ROS production and podocyte damage. Meanwhile, PGC-1α overexpression increased the levels of mitochondrial antioxidant genes, including superoxide dismutase 2 (SOD2), peroxiredoxin 3 (Prx3) and peroxiredoxin 5 (Prx5). Finally, suppression of endogenous PGC-1α expression results in the down-regulation of the mitochondrial detoxification machinery.
Conclusions: These results unveiled that PGC-1α was important in regulating mitochondrial antioxidant genes. PGC-1α activation enhanced the expression of mitochondrial antioxidant genes, which then inhibited Aldo-induced mitochondrial ROS production and finally protected against Aldo-induced podocyte damage.

Abstract# P-SUN402
Mitochondrial Dysfunction Is an Early Event in Aldosterone-induced Podocyte Injury

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Objective: We previously showed that mitochondrial dysfunction (MtD) is involved in an aldosterone-induced podocyte injury. Here, the potential role of MtD in the initiation of podocyte damage was investigated.
Methods and Results: We detected the dynamic changes of urinary protein, urinary F_2-isoprostane and renal malondialdehyde levels, kidney ultrastructure morphology, mitochondrial DNA (mtDNA) copy number, mitochondrial membrane potential ($\Delta\Psi_m$), and nephrin and podocin expressions in Aldo-infused mice. Aldosterone-infusion first induced renal oxidative stress, as evidenced by increased levels of urinary F_2-isoprostane and renal malondialdehyde, and MtD, as demonstrated by reduced mtDNA, $\Delta\Psi_m$, and ATP production. Later, at 5 days after aldosterone-infusion, proteinuria and podocyte injury began to appear. In cultured podocytes, Aldosterone induced MtD after 2–8 h of treatment, whereas the podocyte damage, as shown by decreased nephrin and podocin expressions, occurred later after 12 h of treatment. Thus, Aldo treatment both *in vitro* and *in vivo* indicated that MtD occurred prior to podocyte damage. Additionally, MtDNA depletion by ethidium bromide or mitochondrial transcription factor A (TFAM) RNAi induced MtD, further promoting podocyte damage. TFAM expression was found to be reduced in aldosterone-infused mice and aldosterone-treated podocytes. Adenoviral vector-mediated overexpression of TFAM prevented aldosterone-induced MtD and protected against podocyte injury.
Conclusion: Together, these findings support MtD as an early event in podocyte injury, and manipulation of TFAM may be a novel strategy for treatment of glomerular diseases such as podocytopathy.

Abstract# P-SUN403
Reciprocal interaction between PPAR-γ and TGF-β modulates epithelial-mesenchymal transition in renal proximal tubular epithelial cells

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Objective: Transforming growth factor-β (TGF-β)-induced epithelial-mesenchymal transition (EMT) plays an essential role in the pathogenesis of renal fibrosis which is the common pathway results in end-stage renal disease (ESRD). However, the pathogensis involved remains unclear. The present study is to inverstigate the role of the peroxisome proliferator-activated receptor γ (PPAR-γ) in TGF-β-induced EMT.
Methods: Treatment with 10 ng/ml TGF-β1 for 3 days induced EMT, PPAR γ agonists (Refine Gundam Zeta and 15-deoxyprostaglandin J2) or inhibitor T007 were used to treat culture cells before the treatment of TGF-β1. Changes in morphology were observed, expression of E-cadherin and α-smooth muscle actin (α-SMA) were analyzed by western blot and real-time PCR. Reactive oxygen species were assessed by DCFDA and Laser scanning confocal microscope(LSCM).
Results: we found that activation of peroxisome proliferator-activated receptor γ (PPAR-γ) by RGZ and 15d-PGJ2 inhibits TGF-β1-induced EMT. Activation of PPAR-γ prevents TGF-β-induced loss of E-cadherin expression and inhibits the induction of α-SMA and snail1 . two marks invoved in EMT. Moreover, PPAR-γ agonists blocked TGF-β1-induced ROS production. In addition to above, TGF-β1 dose and time dependently inhibited PPAR-γ expression and activity, three different ROS inhibitors attenuated TGF-β1-induced decrease of PPAR-γ.
Conclusion: Based on these findings, we confirmed that activation of PPAR-γ by RGZ and 15d-PGJ2 inhibited TGF-β-induced EMT, and down-regulation of PPAR-γ expression and activity by TGF-β via

induction of ROS production was involved in EMT suggesting that PPAR-γ agonist might be a new therapeutic target against kidney fibrosis.

Abstract# P-SUN404

Glycation and carbamylation in diabetes and chronic kidney disease

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Objective: Chronic kidney disease (CKD) and diabetes are diseases prone to molecular aging acceleration through carbamylation and glycation. These two nonenzymatic post-translational modifications are characterized by the addition of oses (for glycation) or isocyanic acid, coming from urea decomposition (for carbamylation), on the same binding sites of proteins and thus can compete. Our aim was to evaluate their competitive effect in *in vitro* and *in vivo* conditions reproducing diabetes and CKD.
Methods and Results: Albumin and polylysine were incubated with glucose, urea or cyanate in different conditions, and CKD was induced/or not in diabetic (*db/db*) or non-diabetic (*db/+*) mice by subtotal nephrectomy. Carbamylation (homocitrulline (Hcit), and glycation (carboxyméthyllysine (CML), fructosamines) markers were measured by LC-MS/MS or colorimetric assay. After 3 weeks of albumin incubation a reciprocal inhibition of 30% ($p < 0.05$) between glycation and carbamylation was evidenced.
Conclusions: In the case of polylysine, glycation inhibited 30% of carbamylation ($p < 0.05$), but carbamylation inhibited only 6% of glycation ($p < 0.05$). After 5 weeks of CKD, plasma Hcit concentrations were similar in diabetic and in non-diabetic mice, whereas fructosamines were significantly decreased in diabetic-CKD mice compared to diabetic-non CKD ones ($p < 0.05$). In conclusion, our results show that glycation and carbamylation compete for common binding sites and can both inhibit the other reaction *in vitro* depending on the acessibility and the number of free binding sites. However, they suggest that, *in vivo*, carbamylation gets the upper hand. Thus, classical markers of diabetes metabolic control should be interpreted with caution in diabetic patients with CKD.

Abstract# P-SUN405

Kidney Fibrosis in Autosomal Dominant Polycystic Kidney Disease is not related to Epithelial Mesenchymal Transition

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Objective: Autosomal dominant polycystic kidney disease (ADPKD) is the most common inherited human kidney disease and more than half of patients with ADPKD progress to end stage renal disease. Although cyst expansion and loss of renal function are usually associated with progressive fibrosis, little is known about the mechanisms underlying progression of fibrosis in ADPKD. The concept that epithelial-mesenchymal transition (EMT), where fibroblasts arise from tubular epithelial cells is controversial even in well studied fibrosis models such as unilateral uretheral obstruction and especially in ADPKD.
Methods: $PKD1^{nl/mcw}$ mice (Nozu et al in press) that develop classic ADPKD cyst formation in collecting tubules (CT) with subsequent progression to severe interstitial fibrosis were crossed the Costantini-*Hoxb-7*-GFP mouse (Dev. Genet.24:241–251, 1999.) to label and fate map the CT cystic epithelial cells in $PKD1^{nl/mcw+GFP}$ and test the EMT hypothesis in ADPKD. Fibroblasts and myofibroblasts were detected by fibroblast specific protein-1 (FSP-1) and α-smooth muscle actin (αSMA).
Results: 1) Cyst epithelial cells in $PKD1^{(nl/mcw+GFP)}$ mice were clearly labeled with GFP. 2) A number of interstitial cells were stained either with αSMA or FSP-1. 3) A few cyst epithelial cells show FSP-1 positive. 4) No interstitial fibroblasts were GFP positive.
Conclusions: We used transgenic mice with GFP expression in CT crossed to a *PKD1* hypomorph to fate map the destiny of cystic CT epithelia. We believe this approach, using genetic labeling techniques provides the best evidence of cellular mechanisms and strongly suggest that EMT does not contribute directly to fibrosis development in ADPKD in the $PKD1^{(nl/mcw+GFP)}$ mouse model of ADPKD

Abstract# P-SUN406

INTRAUTERINE GROWTH RESTRICTION AFFECTS RENAL WT1 GENE EXPRESSION AND DNA METHYLATION PROFILING

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Objective: Intrauterine growth retardation (IUGR) is linked with long-term detrimental effects on health in late life. We have previously shown that IUGR leads to proteinuria and a reduced number of glomeruli in adult offspring, but the mechanism is unknown. In this study, we investigated the impact of IUGR upon renal WT1 expression and epigenetic characteristics.
Methods: A rat model of IUGR was built by maternal low-protein (6%) diet throughout pregnancy. We chose male pups as our study objects. Methylation of WT1 promoters were analyzed by MassARRAY assay. Renal expressions of WT1 and DNMT enzymes (DNMT1, DNMT3a & DNMT3b) mRNAs were examined by real-time PCR.
Results: The birth weights of the pups from low-protein pregnancies were approximately 30% lower than those in controls. Body weights remained lower in the IUGR group throughout life. Histopathologic analysis showed not only the cortex appeared thinner in 1-day-old IUGR offsprings compared to controls, but also the proportion of cortex that was in the nephrogenic zone was increased. Electron microscopy showed that fusion of foot process was scarcely observed in IUGR rats. Renal WT1 mRNA level was significantly reduced in IUGR newborns, but increased at 4 weeks and 12 weeks of age, even if the difference was no statistically significant. There was negative correlation between DNA methylation status in WT1 promoter region and the WT1 mRNA level in the kidney of IUGR rats. In IUGR group, DNMT1, DNMT3a mRNA levels were significantly increased in newborns, DNMT1 mRNA level was decreased at 4 weeks, and DNMT1, DNMT3b mRNA levels were significantly decreased at 12 weeks of age.
Conclusions: Dynamic changes of DNA methylation status in WT1 promoter region may be one of the epigenetic mechanisms by which fetal protein restriction lead to proteinuria. DNMT1 is involved in regulation of methylation status of WT1 gene in the kidney of IUGR rats.

Abstract# P-SUN407

Effects of trametes robinioplila intervention on the expression CD2AP and α-actinin-4 in glomeruli of adrimacycin-induced nephropathy rats

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Objective: Trametes Robinioplila,is a commonly applied herbal medicine in the treatment of nephritic syndrome. CD2AP mostly expressed in the podocyte,linked by nephrin and podocin of intracellular region plays an significant role in maintaining an integral SD.α-actinin-4, an actin microfilament cross-linking protein,codes gene ACTN4 mutation causing FSGS. To investigate the expression of CD2AP and α-actinin-4 in glomeruli of adrimacycin-induced nephropathy rats and the pharmacalogical mechanism for Trametes Robinioplila(TRRP) intervention.
Methods: (1) The CD2AP mRNA and α-actinin-4 mRNA respectively in renal cortex in each group after adriamycin injection were measured by Real time quantitative RT-PCR. The CD2AP and α-actinin-4 in glomeruli were examined by western blotting.
Results: 1. For CD2AP mRNA level, they were 1.000±0.000, 1.249 ±0.383,1.725±0.253,1.458±0.174,1.307±0.654 in control group(C), Model group(M),TRRP treated group(T),Glucocorticoid(GLCC) treated group(G) and TRRP-GLCC treated group(TG) respectively;At week 10 they were 1.269±0.388,1.026±0.217,0.819±0.200,and 0.787 ±0.141; 2.For α-actinin-4 protein level they were 0.298±0.262,0.288 ±0.225,0.606±0.336,0.264±0.097,and 0.214±0.127 at week 6 ; 0.136 ±0.114,0.24±0.259,0.571±0.410,0.257±0.218,and 0.335±0.265 at week 8; 0.213±0.175,0.166±0.129,0.317±0.154,0.173±0.114,0.229 ±0.131 at week 10;For CD2AP protein level, they were 0.112 ±0.095,0.153±0.082,0.153±0.137,0.074±0.026,0.300±0.221 in above groups at week 6;At week 8 they were 0.173±0.059,0.130 ±0.103,0.145±0.085,0.367±0.339,0.227±0.209;At the 10th week, the α-actinin-4 level were 0.282±0.181,0.303±0.104,0.217±0.131,0.242 ±0.073,and 0.205±0.15 respectively.
Conclusions: (1)Compared with normal rats, the α-actinin-4 mRNA in model rats was increased at week 8, and its protein level in group T was higher than those in other groups($P<0.05$), it showed that TRRP may enhance α-actinin-4 expression. (2)The CD2AP mRNA level in TRRP group was higher than in those in models and TRRP-GLCC group($P<0.05$); The results suggested that TRRP might enhance the expression of CD2AP mRNA.

Abstract# P-SUN408

The Repair Effects of Transplant Bone Marrow Derived Endothelial Progenitor Cells on renal interstitial fibrosis in 5/6 Nephrectomy Rats

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Objective: Transplant of the bone marrow-derived endothelial progenitor cells (EPCs) in rats undergone 5/6 subtotal nephrectomy via caudal vein and study the effects of EPCs transplantation to renal interstitial fibrosis and epithelial-mesenchymal transition (EMT).
Methods: Rat bone marrow-derived EPCs were separated by gradient centrifugation of Ficoll and cultured. Immune-fluorescence assay, Acidic-β-gal staining, MTT, and flow cytometry were used respectively to measure the surface antigen and the abilities of EPCs to senescence, proliferation, and apoptosis. Transplant of EPCs into rats undergone 5/6 subtotal nephrectomy via caudal vein and observe the renal interstitial fibrosis and EMT indicator through techniques of Real-Time PCR and Western blotting at the time of 4th weeks, 8th weeks, 12th weeks after transplantation.
Results: Bone marrow derived mononuclear cells showed endothelial progenitor cells morphology, expressed CD133, vWF, and VEGFR -2, and could uptake DIL-ac-LDL and bind FITC-UEA-Isimultaneously. The rates of senescence, apoptosis cells in EPCs were lower, and the proliferate rate were higher. The degree of renal interstitial fibrosis of remnant kidney in EPCs group was less than in model group ($P<0.01$). The kidney expressions of TGF-β1 mRNA and protein were higher in model group than in sham group ($P<0.01$), with the tendency of elevation with the time prolongs. The expressions were decreased in EPCs group than that in model group ($P<0.01$). Compared with sham rats, the model rats displayed the progressive higher expressions of vimentin and α-SMA, and lower expression of cytokeratin. While in the EPCs group these changes were decreased than those in model group ($P<0.01$).
Conclusion: Isolated and cultured endothelial progenitor cells successfully in vitro. The transplantation of EPCs into remnant kidney rats could inhibit the progression of renal interstitial fibrosis and down-regulating TGF-β1 and repressing EMT.

Abstract# P-SUN409

Study on effects of Ermiao Pill, Atractylodes lancea and Phellodendron chinense in hyperuricemic mice

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Objective: To investigate the effects of Ermiao Pill, Atractylodes lancea and Phellodendron chinense on levels change of urine uric acid and creatinine in hyperuricemic (HUA) mice, then study the drug mechanism.
Methods: 1. Male Wistar rats were Selected and divided into 7 groups, and 10 mice in each group: the normal control group, HUA model group, allopurinol (inhibition of the production of uric acid) group (positive control), benzbromarone (promotion the excretion of uric acid) group(positive control), Phellodendron chinense group, Atractylodes lancea group and Ermiao Pill group, 2. To establish a semi-high-performance liquid chromatography - tandem mass spectrometry (Semi-LC-MS/MS) quantitative detection method of serum and urine uric acid and creatinine, N, N-dimethyl-L-phenylalanine as the internal standard compounds, use a segment of chromatography guard column to separate out most of the interference component, enrich the target compound. Multiple Reaction Monitoring (MRM) scan mode for quantitative detection of analytes.
Results: 1. With concentration range of uric acid is 0.5-300 μmol / L, uric acid in a good linear relationship; while to creatinine, it is 0.2-400 μmol / L. 2. allopurinol and benzbromarone both can significantly lower blood uric acid level of hyperuricemia rat; and benzbromarone group lower the total excretion than hyperuricemia group. Ermiao Pill, Atractylodes lancea and Phellodendron chinense can reduce blood levels of uric acid. Ermiao Pill and Atractylodes lancea groups lower the total excretion than hyperuricemia group.
Conclusions: Semi-LC-MS/MS is an method rapidly quantitative analysis of uric acid and creatinine in blood and urine samples. Phellodendron chinense reduce blood levels of uric acid by inhibiting uric acid production. Ermiao Pill and Atractylodes lancea enhance animal renal excretion of uric acid functionality. They can significantly reverse renal injury, protect renal

Abstract# P-SUN410

Participation of Endoplasmic Reticulum Stress in the Pathogenesis of Spontaneous Glomerulosclerosis - Role of Intra-Renal Angiotensin System

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Objective: Endoplasmic reticulum (ER) is the site of synthesis, folding, assembly, and degradation of proteins. Disruption of ER function leads to

ER stress, which is marked by accumulation of unfolded proteins in the ER lumen. Detection of unfolded proteins by the ER membrane receptors triggers the "unfolded protein response (UPR)" designed to restore ER function via activation of the adaptive/cytoprotective responses. Failure of UPR or persistent stress triggers activation of ER stress-mediated apoptotic pathway. Several in vivo and in vitro studies have demonstrated the association of ER stress with glomerular diseases. Imai rats develop progressive glomerulosclerosis (GS), which is associated with oxidative stress, inflammation and activation of intra-renal angiotensin system, and can be prevented by AT-1 receptor blockade (ARB). Since persistent oxidative and inflammatory stresses trigger ER stress-induced apoptosis and tissue injury, we hypothesized that kidneys in the Imai rats may exhibit failure of the adaptive and activation of the apoptotic ER stress responses, which could be prevented by ARB.
Methods: To this end 10-week old Imai rats were randomized to untreated and ARB-treated groups and observed for 24 weeks.
Results: At age 34 weeks, untreated rats showed heavy proteinuria, azotemia, advanced GS, impaired ER stress adaptive/cytoprotective responses (depletion of UPR-mediating proteins), and activation of ER stressapoptotic responses.
Conclusion: ARB treatment attenuated GS, suppressed intra-renal oxidative stress, restored ER-associated adaptive/cytoprotective system, and prevented the ER stress mediated apoptotic response in this model.Thus, progressiveprogressive GS in Imai rats is accompanied by activation of ER stress-associated apoptosis, which can be prevented by ARB

Dialysis: Critical Care Dialysis

Abstract# P-SUN411
The Application of Continuous Blood Purification Combined with Hemoperfusion Treating Children with Hemolysis Urine Syndrome

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Objective: To observe the therapeutic effect and discuss the treatment mechanism of continuous blood purification(CBP) combined with hemoperfusion(HP) on children with hemolytic uremic syndrome(HUS).
Methods: Based on the medical treatment, the acute phase all use CBP combined with HP treatment in our hospital from June 2009 ~ April 2012 of 8 children with HUS. By Chemiluminescence method testing IL-6, IL-8, TNF-α levels, and testing levels of BUN, SCr, ALT, AST, CK, CKMB, Hb, PLT, CRP. Combined with literatures review HUS pathogenesis, this paper discusses the feasibility mechanism of CBP combined with HP treating HUS.
Results: After treatment of CBP combined with HP, 8 children all survived. The Hb and PLT levels rised up, IL-6, IL-8, TNF-α, BUN, Cr,A LT, CK, CRP levels descend,there was a significant difference ($P < 0.05$). AST and CKMB levels descend, but there wasn't a statistically significant difference ($P > 0.05$).
Conclusion: CBP combined with HP treating HUS can quickly remove pathogenic factor, and can continually eliminate inflammation and toxin, reverse multiple organ dysfunction, is one of effective method on treating children with HUS.

Abstract# P-SUN412
Comparison of CVVH, IHD and SLEDD-f for Critically ill Children

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Objective: Different modalities of renal replacement therapy (RRT) such as continuous venovenous hemofiltration (CVVH), intermittent hemodialysis (IHD) and sustained low-efficiency daily diafiltration (SLEDD-f) provide renal support for critically ill conditions. CVVH is usually advocated in hemodynamically unstable patients for continuing removing fluid and wide-distributed molecules, such as inborn error of metabolism and poisoning. IHD is often prescribed for fluid overload, metabolism disorder and electrolyte imbalance. SLEDD-f as a conceptual and technical hybrid of IHD and CVVH, is as increasingly popular RRT for acute kidney injury (AKI) patients. Inconsistent results yields when comparing hemodynamic tolerability, superior survival and clinical parameters of different RRT. In the study, we analyzed these three modalities for critically ill children in our hospital.
Methods: From December 2005 to December 2010, critically ill children in pediatric intensive care unit (PICU) required RRT were retrospectively studied. Total fifty-six patients were included. Twenty-two patients received IHD, twenty patients were prescribed with CVVH and fourteen were treated with SLEDD-f.
Results: Pediatric Risk of Mortality (PRISM) scores and correction electrolyte imbalance were similar among these three groups. Children treated with CVVH were younger with lighter body weight, lower blood pressure, higher ratio of multi-organ dysfunction syndrome (MODS) and higher mortality. More sessions were interrupted during CVVH due to tube clotting. IHD had highest efficacy for ultrafiltration than CVVH and SLEDD-f, while SLEDD-f could be provided for patients intolerant to IHD. SLEDD-f had better ability in correcting metabolic acidosis than CVVH and IHD.
Conclusion: Bias existed when choosing RRT for critically ill children with AKI. CVVH was preferred for smaller children with unstable hemodynamics and inborn error of metabolism. IHD was suitable for hemodynamically stable patients. SLEDD-f is a new option to substitute CVVH for older children due to hemodynamic tolerability and feasibility.

Abstract# P-SUN413
Incidence and evolution of short-term femoral venous catheter-related thrombosis in children blood purification

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Objective: To determine incidence and evolution of femoral venous catheter-related thrombosis in children blood purification.
Methods: 119 children with Henoch-Schonlein purpura(HSP) receiving blood perfusion were enrolled from 2011 to 2012. Catheters were placed in the right femoral vein for three days. Demographic data, coagulation status, catheter type, catheter duration , thrombosis-related symptoms and signs were recorded. Color Doppler Ultrasound study of the right femoral vein were performed before catheter removal , 1 month and 2 months post.
Results: 95 children (79.8%) developed mural thrombus on vena iliaca externa. The frequency had no significant difference between children under 6 years (13/17, 76.47%),6~12years (72/86, 83.72%) and above 12 years (25/32, 78.13%) ($x^2=0.808$, $P=0.668$). The size of thrombus varied from 1.84 cm^3 to 0.01 cm^3 (Mean 0.37+/-0.35 cm^3) and had no significant difference between children under 6 years(0.31+/-0.28 cm^3), 6~12 years(0.21+/-0.28 cm^3) and above 12 years (0.28+/-0.47 cm^3) ($F=0.633$, $P=0.533$). Sex and catheter type did not influence either the frequency or the size of thrombus. 96.84% thrombus dissolved within 1 month of oral dipyridamole and 100% within 2 months. There was no significant difference of platelet count, prothrombin time(PT), activeated partial thromboplastin time(APTT), fibrinogen(Fg) and thrombin time(TT) between children with and without thrombus.
Conclusion: Short-term femoral venous catheter induces thrombosis in around 80% children receiving blood purification. The frequency and size of thrombus was unrelated to age, gender or catheter type.

Abstract# P-SUN414

Blood Purification improves prognosis of Children with Multiple Organ Dysfunction Syndrome

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Objective: To investigate the efficacy of blood purification for children with multiple organ dysfunction syndrome(MODS).
Methods: Cases of 194 children diagnosed with MODS in our hospital from 2007-2011 were retrospectively reviewed. Some received blood purification(N=96) and others received conventional therapy(N=98). Compare baseline characteristics, mortality, hospitalizing time and laboratory findings between the two groups.
Results: The mortality was 20.8%(n=20) in blood purification group and 42.9%(n=42) in conventional therapy group (P=0.002); there was no significant difference of time from admission to death between the two groups(P=0.045). After treatment serum creatinine(SCr) decreased by 29.0+/-00mmol/L in purification and 7.5+/-8mmol/L in convention (P=0.019) ; blood urea nitrogen(Bun) decrease by 4.1+/-5.5 mmol/L in purification and 0.7+/-1.7 mmol/L in convention (P=0.012); blood aspartate transaminase (AST) decrease by 57 +/- 17U/L in purification and 47+/-55U/L in convention(P=0.117); cardiac troponin I (cTnI) decrease by 0.12+/-0.68mg/L in purification and 0.20+/-0.32mg/L in convention(P=0.527) ; Na+ increased by 5.0+/-0.8mmol/L in purification while decreased by 0.1+/-4.8 mmol/L in convention(P=0.002); PaO_2 / FiO_2 decrease by 26.3+/-33.0 in purification and 61.1+/-24.6 in convention(P=0.987).
Conclusion: Blood purification can decrease the mortality of children with MODS and improve their renal function significantly.

Abstract# P-SUN415

Clinical study of 77 pediatric and neonatal patients who were performed extracorporeal membrane oxygenation (ECMO) with CRRT(Continuous Renal Replacement Therapy)

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Objective: Patients with congenital heart disease (CHD) are sometimes performed extracorporeal membrane oxygenation (ECMO). CRRT are necessary to control fluid balance and electrolyte balance for these patients. We studied efficacy of CRRT for the patients.
Methods: There were 19 patients who were performed ECMO with CRRT (CHF) from 1997 to 2002.(CHF period) From 2003 to 2005(initial CHDF period), there were 5 patients who were performed ECMO with CRRT (CHDF). From 2005 to 2012(high flow CHDF period), there were 53 patients performed ECMO with CRRT (high flow CHDF). All of them are 77 patients performed ECMO with CRRT at Shizuoka children's hospital. We checked age, diagnosis, CRRT, survival rate, prognosis of kidney function and so on.
Results: In CHF period, average age was 4 years old. Diagnosis were CHD(14 cases), acute myocarditis(2), congenital diaphragm hernia (CDH)(2), persistent pulmonary hypertension of the newborn(PPHN) (1) and Sepsis(4). Modality of CRRT were mainly CHF(20), CHDF(1) and PEX(1).survival rate was 28.6% (survivor; 6). Their CKD stage was 1(eGFR>90) as prognosis of kidney function. In initial CHDF period, average age was 1 months old. Diagnosis were CHD (4 cases), persistent pulmonary hypertension of the newborn(PPHN)(1) and Sepsis(3). Modality of CRRT were mainly CHDF(5) and PMX-DHP(3).survival rate was 40% (2).The one's CKD stage was 1(eGFR>90), the others was Cs2(eGFR60~90). In high flow CHDF period, average age was 2 years and 11 months old. Diagnosis were CHD(46 cases), acute myocarditis (4),CDH(1), Croup(1), the other(1 case) and Sepsis(6). Modality of CRRT were mainly high flow CHDF(53), PMX-DHP(1) and PEX(1). Survival rate was 75.5% (survivor; 40).Cs 1(eGFR>90) was 25 patients. Cs 2(eGFR60~90) was 3 patients. Cs 3(eGFR30~60) was one patient. Survival rate in high flow CHDF period significantly improved. ($p<0.005$)
Conclusions: From CHF to high flow CHDF period, we could achieve better survival rate. But, the better the survival rate improved, the worse the prognosis of kidney function became. We should improve both survival rate and prognosis of kidney function.

Abstract# P-SUN416

The use of nafamostat mesilate as an anticoagulant in pediatric continuous renal replacement therapy

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Objectives: Continuous renal replacement therapy (CRRT) is the treatment of choice for supporting pediatric acute kidney injury patients. Although heparins have been the most commonly used as an anticoagulant for CRRT, alternative methods of anticoagulation including nafamostat mesilate, a synthetic protease inhibitor, have been investigated for the patients with high risk of bleeding. However, little is known about the clinical utility of nafamostat mesilate in pediatric patients with CRRT. The aim of this study was to evaluate the ideal dosage, efficacy and safety of nafamostat mesilate in CRRT among critically ill pediatric patients.
Methods: We undertook as retrospective study in pediatric patients with high risk of bleeding who underwent at least 24 hours of venovenous CRRT at Samsung Medical Center from January 2012 to January 2013. Demographic, clinical and laboratory data were extracted from medical records.
Results: Thirty patients were enrolled in this study (18 males with the median age at the initiation of CRRT of 8 years). The median time for CRRT in each patient was 5 days (range, 2 to 112 days). We started CRRT without anticoagulation, and nafamostat mesilate was used if filter survival was less than 12 h. The starting dosage of nafamostat mesilate was 0.25 mg/kg/h and titrated according to the activated clotting time. Of the 30 patients, 14 (46.7 %) patients received nafamostat mesilate and the median filter survival was improved from 9.5 h (range, 2 to 17 h) to 23.5 h (range, 11 to 71 h) after the use of nafamostat mesilate ($p < 0.001$). The median filter survival was 41 h (range, 12 to 72 h) in patients without anticoagulation. No patients experienced major bleeding while treated with nafamostat mesilate.
Conclusion: These data suggest that nafamostat mesilate is a good alternative as an anticoagulant in critically ill pediatric patients with high risk of bleeding who require CRRT.

Abstract# P-SUN417

Analysis of clinical manifestations and prognosis of 68 cases of children with acute paraquat intoxication

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Objective: To study the clinical manifestations and the correlation factors of children's acute paraquat intoxication prognosis and search for reasonable and effective treatments.
Methods: The study included 68 patients from March 2005 to June 2012 who were subjected to acute paraquat intoxication .According to the amount of poison taken and clinical symptoms which were divided into three groups(mild,severe and fulminan),by retrospective analysis of clinical manifestation, auxiliary examination and prognosis among

the groups and following up the survival of these patients,explore the risk factors which may affect the prognosis.
Results: 66 cases were poisoned by taking orally in 68 cases and the other 2 cases were poisoned by the skin absorption.Gastrointestinal symptoms were the most common,but lung and kidney is the most sensitive organ which could be involved in this disease.Results among 68 cases,6 cases was lost to follow-up,20 cases died in the other 62 cases(32.26% mortality):mild type(n=22),all patients survived;severe type(n=26),8 patients died(30.77% mortality);fulminant type(n=14),12 patients died(85.71% mortality).As the degree of the clinical classification deteriorated,the mortality was increasing,there was statistical signification between each other and so did the blood urea nitrogen and the creatinine(P<0.05).But there are no significant differences in blood gas analysis and lung function between each other(P>0.05).By following up,the renal function could fully recovered, the pulmonary fibrosis might be reversed.The logistic regression analysis indicated that children who had been diagnosed with acute kidney injury and multiple organ dysfunction syndrome showed the worse prognosis,while acute lung injury,vomiting immediately, gastrolavage within 2 hours and the blood purification within 6 hours had little to do with the prognosis.
Conclusion: Acute kidney injury is a very important factor for the short term prognosis of paraquat intoxication and pulmonary fibrosis determine the Long-term outcomes,lung injury may be reversed in the course of the disease,so we shou-ld take active treatmenta.

Abstract# P-SUN418
Clinical efficacy of hemoperfusion in 10 children with severe drug eruption

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Objective: To investigate the therapeutic effect of hemoperfusion in children with severe drug eruption.
Methods: Three to five sessions of hemoperfusion was performed to treat 10 children with severe drug eruption including six cases of Stevens-Johnson syndrome, three cases of toxic epidermal necrolysis and one case of drug-induced hypersensitivity syndrome who were unresponsive to methylprednisolone and immunoglobulin.
Results: Hemoperfusion led to prompt halting of disease progression with relief of general condition and clinical symptoms, restoration of liver function ,return to negative of proteinurina and eventually total recovery of all children. Adverse reactions occurred in 4 children, which included femoral vein thrombosis(n=2) ,hypotention(n=1), palpitation(n=1).
Conclusion: Hemoperfusion is beneficial for the control of severe drug eruption in children.

Dialysis: Hemodialysis

Abstract# P-SUN419
Intradialytic Thrombocytopenia During Home Haemodialysis

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Objective: Home hemodialysis (HD) using the NxStage system was introduced to the UKin 2009. We would like to present a case series of intradialytic thrombocytopaenia in children on home HD using the standard NxStage circuit. This has not been previously reported in the literature.
Methods & Results: The first case was a 14-year old male with posterior urethral valves. He was on in-centre HD as an infant and was transplanted at 3 years of age. He re-commenced HD at 12 years of age, in-centre, 4hours, 3 times/week anticoagulating the circuit with heparin. At 13 years of age he started training for home HD using the NxStage system. He was commenced on 5 hours dialysis, 4 times/week using the standard circuit with preattached PUREMA® gamma sterilized dialyser. The circuit was anti-coagulated with a single intravenous dose of dalteparin at the start of treatment. The PUREMA® filter is a high permeability, glycerin-free polyethersulfone membrane. During the first week of dialysis he reported feeling cold. Day 10 into training he developed acute, intradialytic thrombocytopaenia in association with shivering and light headedness. His largest absolute intradialytic platelet fall was from $163x10^9$/L to $46x10^9$/L and the lowest platelet count was a fall from 95 $x10^9$/L to 28 $x10^9$/L. His haemoglobin and white blood cell count remained stable throughout. Subsequent investigations excluded heparin and viral induced thrombocytopenia. By week 4 of training he became symptomatic with mild mucosal bleeding and a petechial rash and was recommenced on in-centre dialysis and no intradialytic thrombocytopenia was witnessed. He then returned to the NxStage dialyser with a modified circuit incorporating his original Gambro 140H, steam sterilised dialyser. Over the next 6 months he has been well and his platelet count has remained stable. We have since identified two other paediatric cases of dialyser induced thrombocytopaenia with the NxStage system resolving with a dialyser and circuit change.
Conclusion: We have witnessed significant dialyser induced thrombocytopenia in 60% of children using the gamma sterilized, PUREMA® dialyser that is part of the standard NxStage circuit.

Abstract# P-SUN420
Use of Low Molecular Weight Heparin during Paediatric Home Haemodialysis

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Objective: Adequate anticoagulation is necessary to maintain the life of the extracorporeal circuit for the duration of a haemodialysis (HD) treatment. In children an intravenous heparin infusion is most commonly used but it is very labour intensive. We report our single centre experience with a single intravenous dose of a low molecular weight heparin, dalteparin, in home HD patients.
Methods: 11 children aged from 3 to 17 years are receiving HD at home. Schedules range from 4hrs, 4 times/week to 5 hours, 5 times/week with nocturnal programmes of 8 to 9 hours 4 to 5 times per week. All patients were commenced on 50u/kg of dalteparin as a single intravenous dose, administered just before connecting to the circuit at the start of dialysis. The dose was then adjusted in 20% aliquots according to percentage of visible clot formation in the dialyser at the end of dialysis, pre-dialysis anti-Xa levels and in those with fistulae the presence of prolonged bleeding times after removing fistulae needles. All the patients with AVF (5/11) were also on low dose aspirin.
Results: All 11 patients tolerated the dalteparin and no patient lost a circuit from excessive clotting. The final dose of dalteparin ranged from 21u/kg to 58u/kg. One patient with atypical HUS with a normal platelet count but continued activation of the complement cascade required 90u/kg. There was a trend for infants and young children to be on higher doses of dalteparin (52-58u/kg) compared with teenagers (21-41u/kg). Those switching from an evening dialysis schedule to nocturnal schedule required on average a 50% increase in their dalteparin dose. The anti-Xa level one hour after dosing ranged from 0.13-0.6. In all patients the pre-dialysis anti-Xa ranged from 0-0.05 and over time there was no suggestion of bioaccumulation of dalteparin.
Conclusions: A single intravenous dose of dalteparin at the start of HD provides a safe, effective and simple option for anticoagulating dialysis circuits for those patients on home HD, including higher risks patients such as infants and those on nocturnal schedules.

Abstract# P-SUN421

A Weight Criteria for Home Haemodialysis: How Low Can We Go?

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Objective: The haemodialysis (HD) extracorporeal circuit and dialyser pose a potential haemodynamic stress. Owing to the limited availability of smaller paediatric dialysers and circuits, infants are often challenged with larger than desired circuits. The resultant effects are intradialytic symptoms, hypotension and premature discontinuation of dialysis. We present our experience of 2 children aged 4 and 5 years dialysing at home on the NxStage™ system using a modified CRRT circuit, the CAR-125-B.
Methods: The NxStage™ machine can be used for both end stage renal failure and acute renal failure. Currently the only circuit that the company routinely offers for home use has a volume of 175 - 200mls. This includes a pre-attached dialyser with a surface area of 1.6m2. Using this circuit we could only accept children weighing greater than 20kg onto the home HD programme. In order to safely dialyse smaller children at home we requested a trial with the smaller volume CAR-125-B CRRT circuit. The circuit is designed primarily for CRRT use and thus required some adaptations to function as a home HD circuit and the NxStage™ system settings had to be reset to allow the machine to prime. This circuit is licenced for use with a CRRT dialyser that has Luer lock connections for the dialysate and waste lines. Therefore, dialysate adaptors where sourced to allow a chronic HD dialyser to be attached. The line volumes of the circuit are 55mls plus the additional volume of the chosen dialyser. No NxStage™ internal system setting changes were required for the treatment stage. In addition to the technical changes several additional safety measures were set in place for infants dialysing at home. Parents feedback after each dialysis sessions to ensure a proactive response to safety is taken.
Results: Two children aged 4 and 5 years are being sucessfully dialysed at home using the CAR-125-B circuit. There is no increase in training time. The circuit set-up times are longer. The smaller circuit is not an increased risk of clotting and the clearance achieved equates to a Kt/V of 1.2 per session.
Conclusion: The CAR-125-B circuit can be used safely at home. It can theoretically provide the option of home HD for children weighing greater than 10kg.

Abstract# P-SUN422

Managing A Hypotensive Child with Severe, Symptomatic Heart Failure on Home Haemodialysis

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Objective: Conventional HD schedules of 4hrs of treatment, 3 times/week is often complicated with symptoms and intradialytic hypotension especially in children with poor residual renal function. Uraemia combined with inadequate volume control then sets the scene for increasing cardiovascular morbitiy. More frequent and /or prolonged treatments can reduce the burden of dialysis.
Methods: We report a case of an anuric, dialysis dependent 11 year old girl with severe symptomatic cardiac failure with resting blood pressures (BP) of 50-60mmHg systolic. As a consequence of deteriorating volume control on conventional HD she was switched to quotidian HD.
Results: Our patient was diagnosed with bilateral Wilms' tumours aged 3 and was treated with anthracyclines and bilateral nephrectomies. She commenced conventional dialysis in 2005. From 2010 she became breathless, lethargic with poor weight gain and developed several episodes of overt pulmonary oedema. Her echo in 2010 showed good myocardial function. In 2011 considering the possibility of a renal transplant she underwent a number of cardiac investigations that demonstrated frequent ventricular ectopics and severe cardiac dysfunction. She was diagnosed with cardiomyopathy secondary to anthracycline cardiotoxicity and volume overload. We commenced 4 hrs dialysis, 5 times/wk in-centre on the NxStage™. Her predialysis systolic BP ranged from 70-80mmHg falling to the 60s and occasionally 50s during dialysis without her mounting a tachycardic response. After a period of intensive training for both parents she was transferred home 6 weeks later. 5 months later she switched to nocturnal HD (8-9hrs, 5 times/wk). A repeat cardiac MRI one month later demonstrated normal biventricular function with normalisation of LV volumes.

	EF %	CO (l/min)
LV (t0)	29	2.4
LV (+6mth)	60	2.9
RV (t0)	51	2.3
RV (+6mth)	58	3.0

Conclusion: Quotidian HD schedules offer superior clearance and volume control to conventional HD and is thus the optimal treatment for children with cardiac disease. Furthermore with appropriate training and risk assessment even the most complicated patients can be considered for home HD.

Abstract# P-SUN423

Assisted Home Haemodialysis

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Objective: In the UK 13 haemodialysis (HD) centres serve the paediatric population. Consequently some children travel large distances for their dialysis but at a significant cost to their schooling, psychosocial health and family dynamics. Home HD offers an obvious solution but it is not suitable for every family.
Methods: We report the case of a 8 year old girl with complex medical needs whose HD was carefully transitioned to East Anglia Children's hospice close to her home.
Results: Patient K with VACTERL has a tracheostomy, colostomy, poor vascular access and renal failure. She travelled up to 3 hrs each way for in-centre HD and had repeated, frequent admissions to hospital with acute, often infective, respiratory symptoms. . Peritoneal dialysis was not an option. Home HD was medically optimal but not possible at home. Therefore we approached the hospice familiar to the family that was providing respite care and proposed a package of care that eventually transitioned Patient K's dialysis care to them. They agreed in principle. Funding was secured from the local council. The NxStage™ dialysis system was chosen as it required no water conversion and was mobile. A robust 3 month training programme was designed and executed for 4 hospice nurses to learn to provide HD in the hospice 4 times/week. A risk assessment and symptoms care plan was written for the patient's specific needs. We secured the hospice local medical support from her local General Paediatric consultant and a honorary contract was put in place which enabled the hospice nurses to dialyse Patient K at the local hospital during admissions.
The impact has been extremely positive. Patient K id of dietary and fluid restrictions and she is growing. She has made excellent progress at school with improved social skills with children her own age and for the first time mum has worked. The change in the quality if life for Patient K has been dramatic.
Conclusions: We present the first reported case of assisted home HD that has been successful in improving a child's health and rehabilitating

them back into school, social and family life. Mum- "S*he sings on the way to the hospice and says it's where she goes for a holiday - it's such a relief for me".*

Abstract# P-SUN424
Home Haemodialysis Educational Package

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Objective: We at Great Ormond Street Hospital were the first centre in Europe to use the NxStage™ system to deliver home haemodialysis (HD) in children. In order to ensure patients and their parents had the confidence and capability to take responsibility for the dialysis treatments, independently, within their homes we had to develop a robust training programme.
Methods: NxStage™ have a wealth of written training guides and checklists primarily for adult use. Initially we adapted these for UK and paediatric use. We then developed pathways, protocols, and individualised treatment plans and records. On completing training, competencies were formally signed of by the nurse specialist. Parents and the child/young adult were asked to sign a treatment adherence contract prior to discharge. The nurse specialist accompanied families on the first 2 treatments at home. We then secured funding to produce a professional educational DVD set. The first DVD was an introduction to renal failure and all forms of dialysis. The subsequent ones described each of the circuits (CAR 172, CAR 124, CAR 125) in detail, with step by step instructions on set-up and disconnection using both central lines and fistulae, alarms, complications and medication commonly during the HD session.
Results: We currently have 11 patients on the home HD programme. In the majority the dialysis is undertaken by parents. 1 young adult is completely independent and understands set-up, disconnections and alarms, 1 young adult sets up the machine and a further 2 are learning. The DVD set has reduced the initial training time by 1-2 weeks. As a result of immediate access to visual and written, step by step instructions, families report feeling more secure and confident managing alarms and complications. Some families have used the DVDs for refreshing their memory on certain procedures.
Conclusion: A training programme written in a language more easily understood by parents and young adults, in a number of different formats has proven very successful in giving parents and young adults the confidence to undertake the responsibility of HD at home. The DVD training sets have also largely addressed the issue of re-training for patients, families, and staff.

Abstract# P-SUN425
Enhancing Safe Administration of Anticoagulation Therapy in the Philippines - A Challenge in Dialysis Practice

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Objective: Effective heparinization during dialysis is vital since it allows blood to flow into the extracorporeal circuit.
This study aimed to develop a relationship between errors in Heparin administration and the study of Partial Thromboplastin Time (PTT), Hemoglobin (Hgb), Hematocrit (Hct), and Platelet levels (Plt) of hemodialysis (HD) patients.
Methods: 255 HD patient records were examined for compliance and errors in heparin administration practices. With multiple tendencies, cox regression was used to analyze trends whilst Pearson rho moment correlation determined relationships.
Results: The results indicated that heparin was administered via three routes namely bolus (90.47%), maintenance (100% via machine, 19.04% via manual approach), and preparation and administration. It was significant that only 8% of nurses followed the *Independent Double Check* method of heparin preparation and administration which was a required standard within the unit. Data showing both medication administration practices and extent of errors versus the mean scores of the PTT, Hct, Hgb and Plt were analyzed individually showing a significant regression of PTT (r=1.38, 1.50), Hgb (r=0.80, 1.03), Hct (r=1.11, 1.07), and Plt (r=1.22, 1.27). Results were summed and revealed strong correlation between the errors versus the mean values of the PTT (p=+0.77), Hct (p==0.55), Plt (p=+0.67) with the exception of Hgb which did not show any correlation at all p=(+0.04).
Conclusion: The results of this study led to the development of a standardized protocol minimizing errors relating to heparin administration during dialysis. Additionally, the study provided a *Process Map* when untoward incidences relating to use of Low Molecular Weight Heparins occurred. Further, the study has led to a significant decline in errors in medication administration practices in general within the unit.

Abstract# P-SUN426
Using The NxStage System To Deliver Evening and Nocturnal Paediatric Home Haemodialysis

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Objective: We were the first paediatric department in Europe to develop a paediatric home haemodialysis (HHD) programme using the NxStage™ dialyser system. We report on our experience of evening and nocturnal dialysis in 11 children aged 5 to 17 years.
Methods: In September 2010 we secured funding for our HHD programme, using the NxStage™ dialyser with pre-prepared dialysate bags. We are currently using 3 circuits: the standard CAR172 circuit, CAR124 for those developing intradialytic thrmbocytopenia and CAR125 for children weighing less than 18kg. Each circuit is anticoagulated with a single bolus of intravenous dalteparin. Routinely children start on 4-5 hrs of dialysis 4 evenings/wk. From 2 months onwards we discuss the possibility of switching to nocturnal HD where appropriate. Ordinarily 2 people are trained, either both parents or one parent and the young adult.
Results: Over a 24 mth period we have recruited 11 children, aged 5-17yrs, 7 children using a tunnelled central line and 4 via an arteriovenous fistula. The std Kt/V range from 2.83 (evening) to 1.86 (infants) and 3.92 (nocturnal). All children report reduced or no post dialysis recovery times and improved energy and quality of life scores. All the children except the infants report improved appetites and in 3 children growth has significantly improved. All the children on 20 hrs or more of dialysis/week are free of diet and fluid restrictions except one patient with underlying cardiac disease. 2 children were dependent on antihypertensives to maintain BP control when they started the programme and in both these have been stopped. Cardiac echocardiograms were normal at baseline in 6/11, in the 5 remaining signs of LVH and/or fluid overload had regressed within 6 months. PTH levels were successfully maintained within twice upper limit of normal in all except 2 teenagers who became calcium deficient on 1.5mmol/l calcium dialysate baths.
Conclusion: We have demonstrated excellent recruitment and retention of children onto a HHD programme using the mobile NxStage™ dialyser system. Parents and children report improved health and well-being but most importantly reduced burden of in-centre dialysis- *"I would never go back to in-centre dialysis".*

Abstract# P-SUN427

Experience With the Use of Buttonhole Technique for Vascular Access in Children: a single pediatric hemodialysis centre experience

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Objective: Hemodialysis is an accepted dialysis modality in the pediatric population. Vascular access is the keystone of a successful hemodialysis treatment. In our opinion arterio-venous fistula (AVF) is the access of preference whenever possible. We describe the experience with the use of Buttonhole Technique in our pediatric hemodialysis department in The Netherlands.
Methods: During the last five years from December 2007 until December 2012 eight children with an AVF as vascular access for their hemodialysis treatment have been selected for creating one or two buttonholes. Indications for buttonhole creation are: limited area for puncture, fear, pain and/or aneurysmatic dilatation. Sharp needles (15 Gauche stainless steel or 17 Gauche supercath® Clampcath) are used to create the buttonholes. After successful creation of the buttonholes dull edged needles (15 Gauche stainless steel) are used if possible and tolerated by the patient. In almost all children Biohole™ plugs are used during creation of the buttonholes. Emla® cream is used as local anesthetic before puncture. For every child an individualized nurse-lead approach is designed. Special attention is given to guidelines for disinfection. Specially trained-vascular access nurses" create the buttonhole tracks.
Results: Age and weight at the time of creation of the buttonholes were 6-16 years and 16-55 kg. The AVF was already in use for 3 weeks-19 months before creating the buttonhole in 5 children. In three children the buttonhole was created by first use of the AVF. In all children the buttonholes could be successfully created and used for hemodialysis. In one child it was necessary to create a new buttonhole shortly after creating the first one, due to an infection related to the Biohole™ plug. The second buttonhole was created without Biohole™ plug. One child has learned to puncture his own buttonholes at the age of 13 years (home hemodialysis patient). Puncturing the buttonholes was tolerated in all children. With supportive care during puncture less fear and pain was noticed.
Conclusion: The Buttonhole Technique is a new promising technique in children with a patent AVF, even in a very small AVF in young children.

Abstract# P-SUN428

A Trial to Compare Hemodiafiltration v. Conventional Hemodialysis in Pediatric Patients with End-Stage Renal Disease

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Objective: The pitfalls of conventional hemodialysis (HD) as related to middle molecule (MM) accumulation have been identified. Hemodiafiltration (HDF) provides a superior method of extracorporeal blood purification utilizing efficient removal of small solutes via diffusion in conjunction with convective removal of middle and large molecules. HDF is more biocompatible due to addition of a sterile replacement solution.
This study aimed to compare HDF compared to HD by assessing MM and small molecule clearances, and tolerability in pediatric patients. HDF use in the US is limited due to lack of an online system.
Methods: Prospective, randomized, crossover feasibility pilot study. Baseline measures included electrolytes, BUN, creatinine, intact parathyroid hormone, serum albumin, and complete blood count.; and were repeated monthly. Clearance of MM (B-2M and leptin), were monitored monthly with pre and post therapy samples collected. For HDF treatments, blood was passed through a dialyzer against countercurrent dialysate, as in HD. A replacement solution (normal saline) was also infused post dialysis (rate=1mL/kg/min) and ultrafiltration increased to equal fluid infused, leading to a net patient delivery volume of 0. Prescribed dialysate flow rate=800ml/min. Heparin anticoagulation was used.
Results: 2 patients completed the study. One patient, was male, age 16 years, weight 60kg and the other was a 18 year old female, weight 35kg. Neither patient had hypotension. Acid-base status remained stable. MM clearances and nPCR did not differ between treatments. Kt/V and URR were significantly improved in HDF v. HD ($p<0.05$). Serum phosphorus levels improved, but not statistically significant.
Conclusions: We established HDF tolerability without an online system, but preliminary data did not show improved MM clearance. Small molecule clearance was enhanced. Future large scale studies are needed to determine if HDF is effective.

Abstract# P-SUN429

An Educational Workshop for Arteriovenous Fistulae in Children: Overcoming Barriers to Placement and Usage

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Objective: Although the need for increased arteriovenous fistula (AVF) use and decreased central venous catheter use has been established in adults, pediatric studies show low AVF usage rates at hemodialysis (HD) initiation in the US. Prevalent AVF rates also remain low in children. Previously identified barriers to placement and usage of AVF included lack of education and technical expertise. In 2005, IPFFI was founded via a collaborative effort with the Midwest Pediatric Nephrology Consortium (MWPNC) to alert nephrologists and dialysis staff to consider a fistula first in long-term pediatric hemodialysis patients. Seven study centers were included as part of the collaborative. Participants were invited to a multidisciplinary, interactive, educational workshop to enhance surgical and interventional salvage techniques, cannulation methods, and monitoring protocols.
Methods and Results: Vascular access surgeons, pediatric interventional radiologists, dialysis nurses, and pediatric nephrologists attended a one day workshop to gain expertise. Surgeons utilized the operating microscope under supervision from a highly experienced surgeon to perform fine suture anastomoses. A cannulation simulaton station allowed dialysis nurses to cannulate-vessels-embedded in a chicken breast. Various ongoing monitoring techniques were demonstrated. Interventional radiologists were taken to the radiology suite to review salvage techniques and equipment choices. Patient education brochures specific to children receiving hemodialysis were disseminated, as well. A total of 33 practitioners attended the workshop: 8 pediatric nephrologists, 6 surgeons, 7 interventional radiologists, and 12 dialysis nurses. Each station successfully addressed areas that were previously identified as barriers to use of AVF. Each center provided written details of new technique implementation within their own units.
Conclusion: A workshop provides and excellent format for key personnel providing educational and networking opportunities to allow

sharing of best practices and strategies to optimize successful AVF placement and usage in children.

Abstract# P-SUN430

Use of recombinant tissue plasminogen activator infusions in increasing haemodialysis catheter longevity: A single tertiary centre experience

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Objective: Haemodialysis catheter occlusion is a common cause of poor blood flow, inadequate dialysis and HD catheter loss. From Jan 2009, our unit used recombinant tissue plasminogen activator (rtPA), Alteplase 0.1-0.2mg/kg/hour for 1-4 hours for thrombolysis of occluded catheters. We describe our experience with the use of rtPA as an agent for haemodialysis catheter thrombolysis.
Methods: Retrospective review of outcomes of all patients in our unit with haemodialysis catheter occlusion who were treated with rtPA infusion between Jan 2009-Dec 2012. In our practice, inadequate/reversal of flows during dialysis are managed initially with rtPA locks. Failure to respond is investigated by radiographic contrast studies/echocardiography. Following diagnosis of thrombus, Alteplase 0.1-0.2mg/kg/hour is infused for 1-4 hours depending on response, prior to dialysis. Treatment is continued until resolution of thrombus.
Results: A total of 20 patients underwent 5,407 sessions of catheter-directed haemodialysis in our unit between Jan 2009-Dec 2012 (mean age 8.4 years, range 0.5-17 years). Ten patients accounted for 271 rtPA infusions (median 12, range 1-121). A total of 36 radiographic contrast studies were performed. The immediate success rate, defined as return of manual aspiration and infusion capabilities to both ports was 100%. No potential patients required exclusion from thrombolytic therapy due to contraindications. One patient had rtPA infusion discontinued after 7 infusions (Alteplase 0.1 mg/kg over 1 hour) due to spontaneous bruising despite normal fibrinogen levels. The remainder of patients tolerated the treatment well.
Conclusion: In our haemodialysis population, low-dose Alteplase infusion appears to be safe and efficacious in the management of HD catheter thrombus. No HD catheters were surgically changed due to occlusion during the 4 year period.

Abstract# P-SUN431

The Research of Estimating the Body Volume Status in Hemodialysis Children with Multi-frequency Bioelectrical Impedance

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Objective: In order to know the distribution of body water in maintenance HD children and the effect of HD on the distribution of body water, we evaluated the body volume status in maintenance hemodialysis (HD) children and normal children with multi-frequency bioelectrical impedance.
Methods: 9 end-stage-renal-disease patients undergoing maintenance hemodialysis from August 2011 to March 2012 and 171 cases of normal control group were investigated. We measured OH, total body water (TBW), extracellular water (ECW), intracellular water (ICW) with multi-frequency bioelectrical impedance. The TBW%(TBW/body weight), ECW% and ICW% were calculated.
Results: There are statistical differences of OH, TBW, ECW, ECW% before and after dialysis, but no statistical difference of ICW. Compared with normal children, there was no significant difference of ICW % and TBW % pre and post HD. ECW of predialysis is significantly higher than the control group, but no significant difference between post-HD and control group. Before dialysis ECW% is significantly higher than the control group, but lower than the control group after dialysis. TBW and ICW were higher than the control group before and after dialysis.
Conclusion: ECW% are increased in maintenance hemodialysis children; the main function of normal hemodialysis is to remove extra ECW, which has little effect on ICW. The measurement of Multi-frequency bioelectrical impedance can provide an objective basis for capacity status.

Abstract# P-SUN432

Factors affecting long-term haemodialysis catheter survival

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Objective: We describe our experience with factors affecting haemodialysis catheter (HDC) survival over a 10 year period.
Methods: Retrospective review of factors affecting HDC survival in patients undergoing haemodialysis between Jan 2003 – Dec 2012. All HDCs are placed by experienced paediatric surgeons and accessed by small team of specialist nurses within strict sterile non-touch protocol. All children dialysed 3 times/week. 2 children with primary oxalosis dialysed 4 times/week.
Results: 36 patients accounted for 50 HDC [3 catheters (2 patients), 2 catheters (10 patients), 1 catheter (24 patients)]. At start of haemodialysis, mean age was 7.97 years (range 0.44-19.60) years. Mean duration on HD was 1.84 years (range 0.09-5.47). Reasons for HDC changes: Malposition (3), line fracture (3), thrombus (1), dislodged (2), discontinuation of HD (4) and change in size (1). HDCs were placed in RIJV (41) and LIJV (9). Median HDC survival was 3.12 years (range 0.01-4.66) with a rate of 0.20 line changes/patient year.HDC thrombi were a significant problem and were initially treated with rtPA locks. Failure to respond is investigated by radiographic contrast studies/echocardiography. Following diagnosis, we treated 7 patients with subcutaneous tinzaparin 175 IU/kg/day for 10 HDC thrombi (our practice between 2003-2009). Treatment ranged from 0.5-6 months. From 2009, rtPA infusions were used to treat HDC thrombi. 9 episodes of HDC infection were successfully treated with antibiotics. Infection rate was 0.35 episodes per 1,000 patient days. No HDCs were lost due to infection.
Conclusion: In comparison to published data, the longevity of our lines is striking. Contributing factors include avoidance of temporary lines, our practice to treat HDC thrombi, meticulous adherence to strict sterile non-touch protocol and restriction to specialist nurses to access HDC. There is a culture within our unit to avoid frequent HDC changes if possible.

Abstract# P-SUN433

Blood Volume Monitoring Assessment of Dryweight in Pediatric Chronic Hemodialysis Patient

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Objective: The significance of chronic volume overload from overestimation dry weight leads to hypertension in hemodialysis. Accurate dry weight assessment in pediatric hemodialysis patients is difficult for a number of reasons including growth. Blood volume

monitoring (BVM) has been proposed as an accurate method of estimating dry weight to prevent volume overload, improve blood pressure control, reduce cardiovascular morbidity and decrease hospitalization rate due to intradialytic hypotension. To study the difference between dry weight, postdialysis body weight, predialysis blood pressure and the incidence of intradialytic hypotension after assessment of dry weight with BVM compared with clinical adjustment in pediatric chronic hemodialysis patients.
Methods: chronic hemodialytic patient, BVM was performed to guide ultrafiltration to adjust dry weight compared with clinical adjustment. Data including dry weight, postdialysis body weight, predialysis blood pressure, and incidence of intradialytic hypotension were analyzed over each 1-month period of treatment course.
Results: In this prospective study, 10 patients (5F/5M, aged 16.55 + 2.49 years) were enrolled. Comparing clinical adjustment to assess dry weight with BVM, there were no statistically significant differences in dry weight (38.38±7.43 vs 38.12±7.58 kg, p = 0.939) and postdialysis body weight (38.54±7.61 vs 38.23±7.35 (p = 0.927)). Despite statistically significant, dry weight adjusted by clinical adjustment trends to increase more than by BVM. (0.14 ±0.46 vs -0.26±0.57 kg (p = 0.939)). There are also no difference between predialysis blood pressure. There are no incidence of intradialytic hypotension but we found abnormal intradialytic symptoms in clinical adjustment more than i:n BVM, especially thirst. (2.08± (0-8.33) vs 0 (p = 0.042))
Conclusion: The use of BVM guided ultrafiltration tends to decrease dry weight in chronic volume overload patients, consequently reduce hypertension. BVM reduce abnormal intradialytic symptoms, especially thirst. There is no gold standard to achieve ideal dry weight. For the best way, we should use clinical adjustment dry weight with other helping methods such as BVM.
There are no incidence of intradialytic hypotension but we found abnormal intradialytic symptoms in clinical adjustment more than in BVM, especially thirst. (2.08± (0-8.33) vs 0 (p = 0.042))

Abstract# P-SUN434
Importance of objective hydration measurement on blood pressure management in children on hemodialysis

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Objective: Hypertension is frequent in chronic HD patients and usually treated by reducing extracellular fluid i.e. overhydration. Probing dry weight only based on a clinical evaluation may be hazardous, especially in case of volume independent hypertension. In clinical routine accurate assessment of the water, sodium and nutritional status, however, is still challenging. Bioelectrical impedance analysis at 50 different frequencies between 5 kHz and 1 MHz, using the Body Composition Monitor (BCM®, Fresenius), is a non-invasive, simple and fast tool for the determination of the different body compartments, but has not systematically been applied in children with CKD5D.
Methods: We performed a one-year retrospective study in three pediatric centers to define the relation between blood pressure (BP) and hydration status, assessed by whole body bioimpedance spectroscopy (BIS). We analyzed 463 concomitant predialysis measurements of standardized BP, relative overhydration (rel. OH) and plasma sodium (Napl) in 23 children (mean age 13.9 ±5.1 years).
Results: Pre-dialytic underhydration (rel. OH<-7%) was present in 5.4% of the sessions, out of which 24% showed hypertension. Normohydration (rel. OH -7-+7%) was observed in 62.4% of the sessions, 45.3% of them revealed hypertension. Moderate OH (rel. OH +7-+15%) was present in 21% of the sessions, 47.4% of them showed normal BP. In 11.2% of the sessions severe overhydration (rel. OH>+15%) was assessed, however the majority (73%) showed normal BP. Patient specific predialytic Napl setpoint could not be described. Mean dialysate sodium concentration prescription was higher than mean predialytic Napl.
Conclusion: Hypertension is not always related to overhydration: volume independent hypertension is frequent in children on chronic HD. Therefore, BIS should restrict the practice of "probing dry weight" in hypertensive children. Moreover, dialytic sodium balance needs to be considered to improve BP management besides ultrafiltration/dry weight targets.

Abstract# P-SUN435
Six years experience of incenter nocturnal hemodialysis in children

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Objective: Conventional hemodialysis performed during the day is a burden for children with renal failure. We report the results of a single center experience with dialysis overnight.
Methods: Since six years, six children between 8 and 18 year old receive slow nocturnal hemodialysis in the hospital, three times/ week for 8 h.
Results: After a period of 3 x 4 h daily dialysis the children were switched to 3 x 8 h nocturnal dialysis. The dialysis regimen was individually adapted to the patients, using high flux membranes, blood flow between 150 –220 ml/min and dialysate flow between 250-350 ml. The antihypertensive medications were markedly reduced. Erytropoetin could be reduced from 70 ± 12.5 to 35 ±15 U/ kg/week. Intradialytic weight gain did not significantly change. There was a marked improvement of calcium/phosphate metabolism 3 months after switching from standard dialysis to nocturnal dialysis, with a lower dose of phosphate binders. 2 children grew normal without need for growth hormone. The appetite increased significantly with an increase in ideal body weight. However, the schoolperformance did not markedly change.
Conclusion: Slow nocturnal hemodialysis has the potential for overcoming some of the limitations of conventional hemodialysis. It provides better elimination of middle molecules with increased energy, strength and endurance, fewer dietary restriction and less requirement for erythropoietin. Although it appears to be the best arrangement and the most attractive solution at present, children often have a reduced schoolattendance.

Abstract# P-SUN436
A comparison of Body Composition Monitoring (BCM®) derived urea distribution volume to anthropometric equations in children on hemodialysis

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Objective: Urea kinetic modeling (Kt/V) is used for dialysis dose assessment. Modern hemodialysis machines measure ionic dialysance online to continuously monitor the achieved Kt/V. The accuracy of the latter depends on the correct input of the volume of total body water, i.e. the urea distribution volume (V). V can be assessed by anthropometric equations, and by body composition monitoring (BCM®), which yielded excellent accordance with gold-standard dilution methods in adults.
Methods: We compared the V determined by predialysis BCM® (n = 512 determinations) to the V obtained from the modified equation of Mellits-Cheek, and from the Watson, Hume-Weyers and Morgenstern formula in 24 pediatric HD patients from three pediatric HD centers: mean age 15.8(2.4-26.1) years. Moreover, we compared the online Kt/V using V values assessed by BCM® and the Kt/V calculated from pre- and post-dialytic urea of 65 HD sessions using the single pool second generation Daugirdas equation.
Results: Mellits-Cheek and Hume-Weyers formula significantly overestimated V by BCM® by a mean of 11(-3-35) and 11(-11-42)% (both $p<0.001$), independent of age. Watson formula overestimated V by 31(2-148)% ($p<0.001$), with an overestimation rate of 115(96-148)% in children below 5 and 19(4-56)% in patients above 16 years of age (both $p<0.001$). In contrast, V calculated by the Morgenstern equation was similar to V by BCM® throughout the entire age range, with a mean difference of 0.8(-14-17)% (p=n.s.). Online Kt/V determination based on V by BCM® were similar and highly correlated with the Daugirdas Kt/V ($r=0.80$; $p<0.001$).
Conclusion: V measured by BCM® is highly correlated with V calculated by the Morgenstern equation, the only equation validated in children on dialysis, but not with other anthropometric equations. BCM® derived V allows for accurate online determination of Kt/V in children on HD, without the need of any blood samplinge (pre/post), therefore allowing for adequacy assessment at each session.

Abstract# P-SUN437

Ultrastructural assessment of hemodialysis membrane structure in relation to dialyzer reuse

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Objective: Dialyzer reuse is common in hemodialysis units despite potential adverse effects.Structural alteration during dialyzer reuse could accentuate alterations in biomembrane permeability and adversely impact safety. Published literature on morphology of dialyzer membrane after reuse is sparse.This study aimed to investigate ultramicroscopic surface alteration of hollow fiber cellulose acetate(CT) and polysulfone(PS) dialyzer membranes following reuse and reprocessing with formalin disinfection.
Methods: Morphologic analysis by Scanning Electron Microscopy(SEM) (at 4-15 KV) of hollow fibers obtained from midportion of dialyzer(Nissho Nipro FB-150T, Fresenius Hemoflow F5/6) after a hemodialysis session with standard protocol of unfractioned heparin anticoagulation, postdialysis saline flush and formalin disinfection. Comparison of surface topology, pore characteristics and deposits was done between Group A (Control - no dialysis), Group B (Single use), Group C(Single reuse), and Group D (more than one reuse). Indication of dialysis in all was chronic kidney disease. None had any adverse reaction.
Results: 36 dialyzer units were studied with maximum reuse of 5 and 8 times for cellulose acetate and polysulfone dialyzers respectively. Pore size alteration, deposits, surface blebs and microfractures increased with reuse(Table 1,Fig 1)
Conclusion: Significant structural alterations of the dialyzer are observed on SEM during multiple reuse. Polysulfone is better than cellulose acetate for reuse beyond two times.

Table 1 Morphologic findings on SEM (CT-cellulose acetate dialyzer; PS-Polysulfone dialyzer)

Group (No)	**A(N=6)**	**B(N=6)**	**C(N=6)**	**D (N=12)**	**D (N=6)**
(Type of dialyzer)	**(CT-3,PS-3)**	**(CT-3,PS-3)**	**(CT-3,PS-3)**	**(CT-6,PS-6)**	**(PS-6)**
No of dialysis	0	1	2	**3-5**	**>5**
Range of Pore size (nm)					
-Cellulose acetate	20-100	20-100	30-300	30-1000	-
-Polysulfone	30-1000	30-1000	30-1000	50-2000	90-3000
Acellular deposits (n)	**0**	**0**	**1**	**4**	**3**
-Cellulose acetate	0	0	1	3	-
-Polysulfone	0	0	0	1	3
Cellular deposits (n)	**0**	**1**	**1**	**5**	**4**
-Cellulose acetate	0	1	1	3	-
-Polysulfone	0	0	0	2	4
Surface Blebs (n)	**0**	**1**	**3**	**8**	**6**
-Cellulose acetate	0	0	2	5	-
-Polysulfone	0	0	1	3	6
MicroFractures (n)	**0**	**0**	**2**	**10**	**6**
-cellulose acetate	0	0	2	8	-
-polysulfone	0	0	0	2	6

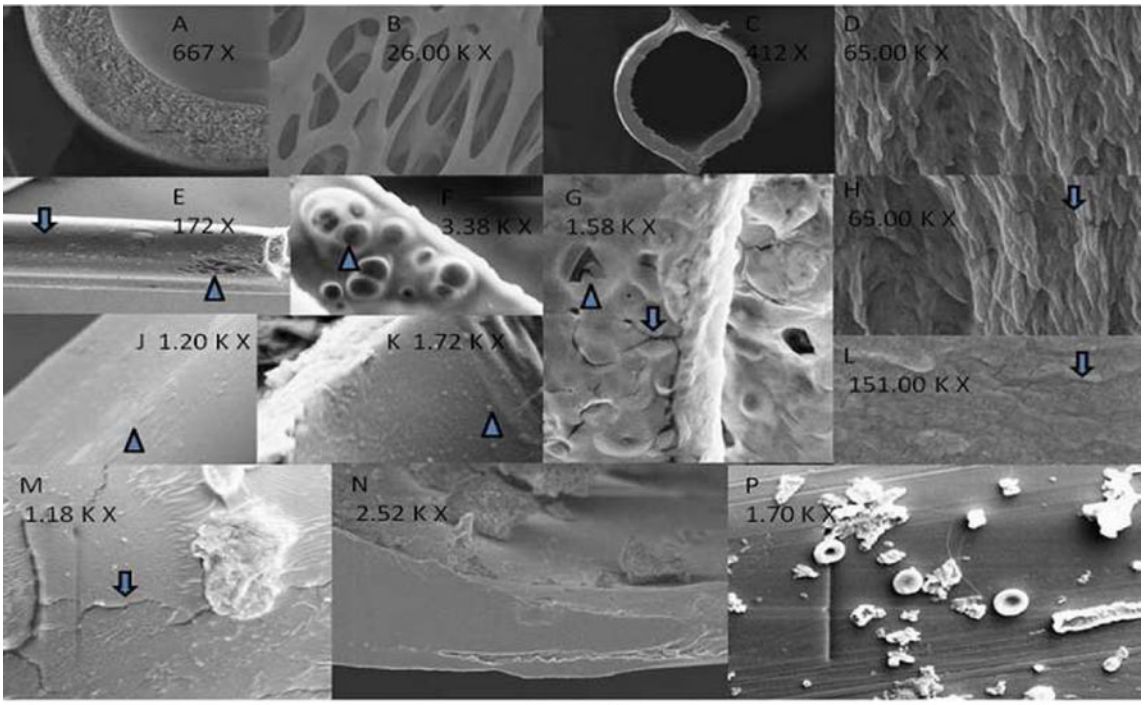

Figure 1. Representative SEM pictures (X – magnification factor; K=1000 times). **A-D** Cross Sectional images of polysulfone and cellulose acetate dialyzers in Group A to C **E-L** Outer and inner surface profiles showing microfractures(small arrows) and blebs(arrowheads) after second (L), third(J,K), and fifth(E,F,G,H) reuse. Note alterations in pore geometry **M-N** Deposits acellular (M,N) and cellular (P) in a dialyzer after 3rd reuse

Abstract# P-SUN438

Haemodialysis in Paediatric Patients - Experience at Bangabandhu Sheikh Mujib Medical University (BSMMU)

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Objective: Haemodialysis is one of the common renal replacement therapy throughout the world. Requirement of technical expertise, expensive equipment and intensive monitoring make the haemodialysis less available in Bangladesh. BSMMU is the only centre in Bangladesh doing paediatric haemodialysis since 2004. Therefore, we have very little experience of haemodialysis in children in our country. Here, we report our experience with 40 children who underwent haemodialysis.

Methods: This is a retrospective analysis of 40 children age 2-17 years, conducted in the Paediatric Nephrology Department of Bangabandhu Sheikh Mujib Medical University between January 2011 and December 2012.

Results: Forty children underwent haemodialysis over the 2 year period. The median age of the dialysis was 12 years. Male-Female ratio was 1.7:1. Obstructive uropathy and renal dysplasia was the most common causes of paediatric haemodialysis. Total 56 vascular accesses were created in 40 patients. Arteriovenous fistula was created in 32% of cases. Six patients recovered after getting emergency haemodialysis. Twenty six patients underwent maintenance haemodialysis; only 7 of them got more than 6 months haemodialysis. The urea reduction rate among the patients those getting >6 month haemodialysis is >65%. Both systolic and diastolic blood pressure was significantly reduced following haemodialysis. The dropout rate among these patients was very high (32%). Intradialytic hypotension was observed most frequently followed by nausea and vomiting, muscle cramp, hypertension, fever and disequilibrium syndrome.

Conclusion: This study suggests that haemodialysis by the trained personnel can be a safe and effective measure for children who require renal replacement therapy. However, emphasis should be given to minimize the intradialytic complications and dropout rate.

Abstract# P-SUN439

Application of chronic hemodialysis with portable water-treatment system: effectiveness and safety in pediatric hemodialysis center in Shanghai, China

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Objective: Hemodialysis (HD) with portable water-treatment system is more suitable for small-sized HD center, ICU bedside dialysis and home dialysis. We firstly applied the chronic HD with portable water-treatment system in China in 2010. The aim of this study was to analyze the effectiveness and safety of chronic HD with portable water-treatment system in pediatric HD center.

Methods: One HD machine connected with one portable water-treatment system. According to the water quality inShanghai, the portable water-treatment system included two carbon tanks, one filter cartridge, one water softener (Gambro SWF300) and one water purification unit for one single patient (Gambro WRO300). Water chloride, solidity, cultural, endotoxin, and dialysate cultural, endotoxin and heavy metals were tested according to the Chinese Blood Purification Standard Operating Procedure. Cleaning and disinfection of machines were carried on and carbon tanks and filter cartridge were changed regularly according to the

operation manual and the results of the water test. Clinical data and records of the patients and machines were analyzed retrospectively.
Results: From May 2010 to Dec. 2012, 11 ESRD cases (2 boys and 9 girls, aged from 10 to 16 years old) received chronic HD with portable water-treatment system in our center. All the water tests and dialysate tests were in the normal range. Among these 11 cases, 3 cases used AVF for HD and the other 8 cases used semi-permanent vascular access with a cuff of central venous catheter. 7 cases only received HD and the other 4 cases received HD combined with peritoneal dialysis. The mean URR was 69.1+/-2.6% and the mean Kt/V was 1.30+/-0.05. The survival rate of patients was 100% and the vascular access failure rate was 1/11 (9.1%, due to trauma to the AVF). During the HD therapy, no severe complication was happened. The infection rate of the vascular access was 0%.
Conclusion: Z: Chronic HD with portable water-treatment system is more suitable for small-scale hemodialysis centers, ICU bedside dialysis and home dialysis. The application of chronic HD with portable water-treatment system is safe, effective and reliable.

Dialysis: Peritoneal Dialysis

Abstract# P-SUN440
Attention deficit Hyperactivity disorder in children undergoing peritoneal dialysis

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Objective: Attention deficit/ Hyperactivity disorder (ADHD) is the most common neurobehavioral disorder of childhood. This disorder is more prevalent in some chronic diseases. ADHD may has high prevalence in children with end stage renal disease (ESRD) undergoing peritoneal dialysis, due to negative body image. The aim of this study was evaluation of ADHD in children undergoing peritoneal dialysis at least for 6 months.
Methods: 30 peritoneal dialysis children (between 5 to 16 year) and 30 healthy children were enrolled in this case control study.
ADHD was diagnosed by Conners Rating Scale and DSM IV criteria and was confirmed by psychologist consult. Data were analyzed by chi-square tests and SPSS statistics 15.
Results: 9 children (30%) of 30 children in peritoneal dialysis group (case group) and 1 child (3%) of 30 children in healthy group (control group) were affected to attention deficit (P value = 0.006). 8 children (26%) of 30 children in case group and no child in control group were affected to hyperactivity disorder.
Conclusion: ADHD is more prevalent in ESRD patient undergoing peritoneal dialysis. Therefore screening methods for ADHD is necessary in these patients.

Abstract# P-SUN441
A Survey of Current Paediatric Peritoneal Dialysis Practices in Australia and New Zealand and the Correlation with Peritonitis

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Objective: To determine if differences in paediatric peritoneal dialysis (PD) practices result in different rates of peritonitis.
Methods: An online survey, incorporating previously documented risk factors for peritonitis, was distributed to all paediatric renal units in Australia & New Zealand. Data on peritonitis rates, time to first peritonitis, technique survival & causative organisms from 2009-2011 was obtained from Australian and New Zealand Dialysis and Transplant Registry (ANZDATA).
Results: Nine units (100% of paediatric renal units) participated in the survey. Variations in self reported practice included 2 units not using prophylactic antibiotics at the time of catheter insertion. Seventy three children started PD during the study period, giving a total of 119 patient years on PD. There were a total of 84 peritonitis episodes, the most common causative organisms being *Coagulase negative staphylococcus species* (23%), S*taphylococcus aureus species* (14%), *Pseudomonas species* (8%) and 8% were culture negative. There was significant variation in peritonitis rates between centres ranging from 0.53 to 8.93 patient years per peritonitis episode. No peritonitis episodes occurred within 3 months after catheter insertion in the 9 patients not receiving antibiotic prophylaxis, compared to 16 in the 64 receiving prophylaxis (NS Fisher exact). Early peritonitis, less than 3 months, did not affect technique survival, censored for transplant, at 6 or 12 months.
Conclusion: Significant variations in practice were identified; specifically not all units were in concordance with International Society for Peritoneal Dialysis (ISPD) guidelines, however no association was seen between practice and peritonitis rates or technique survival.

Abstract# P-SUN442
Carnitine deficiency in chronic kidney diseases stage V: comparing hemodialysis with chronic peritoneal dialysis subjects

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Objective: L -carnitine facilitates the entry of long-chain fatty acids into the mitochondria for oxidation, and provides energy in the form of ATP and plays an important role in skeletal and cardiac muscles metabolism. In normal population Carnitine deficiency is greater in female, elder people, malnourished and vegetarians.Carnitine deficiency is common in chronic hemodialysis patients due to increased losses during the dialysis procedure, low dietary intake and endogenous production. Few studies about Carnitine deficiency in chronic peritoneal dialysis patients have been done. This study aims to define the frequency of Carnitine deficiency in both hemodialysis and peritoneal dialysis patients with considering the effects of age, gender, duration of dialysis and modality of dialysis.
Methods: The study population consisted of 47 dialysis patients in an academic children hospital center including20 girls (42.5%) and 27 boys (57.5%).The modalities of dialysis were peritoneal (CAPD) and hemodialysis in 13(31.7%) and 28(68.3%) cases respectively. The patients' aged 19-300 (166.02±76.09) months. They were placed on dialysis from 1-128(44.28±31.26) months before the study. Serum levels of free carnitine and plasma levels of Acyl carnitine were measured and amounts of 7-45 umol/land >15 umol/ were defined as normal levels respectively. According to plasma levels of Acyl carnitine patients divided into 2 groups: Patients with normal and those with low plasma levels. Chi square and student T tests were used and P values <0.05 were considered as statistically significant differences.
Results: Serum levels of free carnitine were normal in 45(95.7%) patients and High serum levels were reported in 2(4.3%). plasma levels of Acyl carnitine were low in 23(48.9%) and normal in 24(51.1%) of enrolled cases .High plasmas levels were not find in any patient. The frequencies of Acyl carnitine deficiency were compared based on age ,

gender , modality and duration from placing on dialysis and treatment with oral carnitine versus no receiving carnitine supplement .There was no significant differences in frequencies of Acyl carnitine deficiency in hemo versus peritoneal dialysis subjects (P=0.135) , and girls versus boys(P=0.76).Mean ages of patients with normal and those with low plasma levels didn't differ significantly(P=0.179) as duration of placing on dialysis(P=0.126).22 patients received oral carnitine 250-1000mg/day while 13 didn't receive any carnitine supplement , low plasma levels of Acyl carnitine were reported in 11 and 6 subjects respectively(P>0.05).

Conclusion: The study revealed that Acyl carnitine is the main form of carnitine metabolite that is deficient in our dialysis patients, whereas free carnitine levels were normal or high. It seems that carnitine deficiency is as common in hemodialysis as peritoneal dialysis cases.Althogh in normal population the deficiency is greater in females; in dialysis patients the deficiency is as common in boys as girls. In addition age and duration of dialysis don't affect on plasma levels of Acyl carnitine.

Abstract# P-SUN443

Treatment of eosinophilic peritonitis with montelukast: a case report and review of the literature

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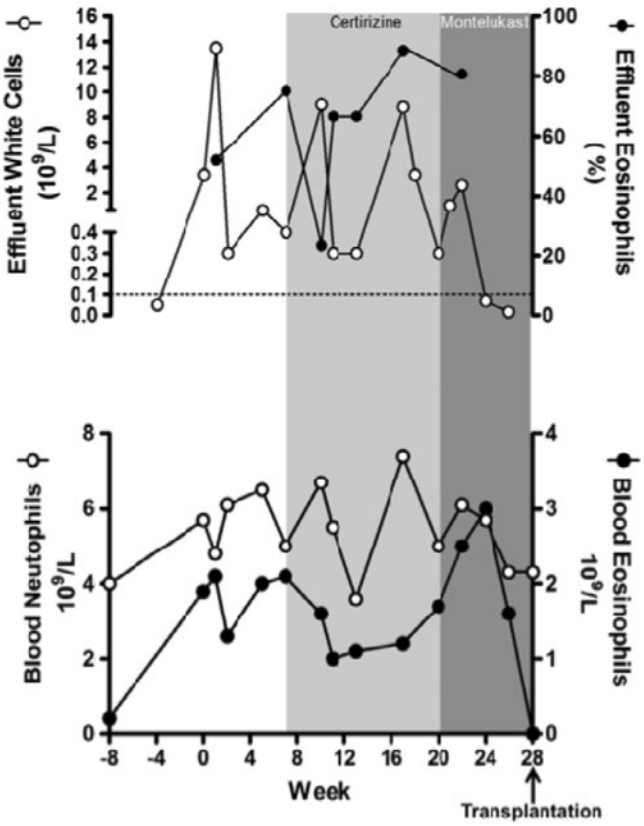
We present the first reported case of recurrent, symptomatic, eosinophilic peritonitis (EP) successfully treated with leukotriene receptor antagonist montelukast. Four weeks prior to deceased donor transplantation, initiation of oral montelukast resulted in normalisation of peritoneal effluent and serum eosinophil counts after changes in dialysate and use of oral certirizine had been unsuccessful.



A review of the literature and discussion of the pathophysiology and evidence base for the treatment of EP is presented. The treatment of EP using change of dialysate, change of peritoneal dialysis modality, intraperitoneal steroids or oral antihistamines is supported only by case reports with a lack of controlled trials or evidence-based guidelines. Montelukast is a leukotriene receptor antagonist commonly used in the management of childhood atopic illness. Current scientific evidence suggests leukotrienes play a role as chemotactic agents aiding migration of eosinophils into tissues. Prior studies involving leukotreine receptor deficient mice have demonstrated reduced peritoneal eosinophil migration following chemical peritoneal lavage. Montelukast pharmacokinetics and pharmacodynamics have been extensively studied in children. It is rapidly absorbed, heavily protein bound and undergoes hepatic degradation and near-total biliary excretion, suggesting safe use in renal insufficiency. It is formulated as a chewable tablet aiding adherence in young children. It has a favourable tolerability profile in children and adults. Our case alongside current scientific understanding of leukotrienes and eosinophil migration suggest that compared to previously described treatments, montelukast is a potentially safe, well-tolerated and efficacious treatment for EP. Controlled, multicentre, prospective studies examining the management of EP are required.

Abstract# P-SUN444

Peritoneal dialysis in Chinese infants

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Objective: To review infants who were on peritoneal dialysis for the past fifteen years in a paediatric nephrology centre in Hong Kong

Methods: We performed a retrospective review on infants who were started on peritoneal dialysis (PD) from 31 July 1996 till 31 July 2012. Patient demographics, dialysis morbidity, biochemical data, dialysis adequacy, growth parameters and final patient outcomes were analyzed.

Results: A total of 9 patients (3 boys and 6 girls) with median age of 0.45 years (0-2.1y) were started on peritoneal dialysis during the study period. The median duration of PD was 16.5 months (3-75m). Three patients suffered from congenital abnormalities of the kidneys and urinary tract, 3 had haemolytic uraemic syndrome(HUS), 1 had primary hyperoxaluria and 2 had severe asphyxia which led to renal failure. Half of the patients had hypertension. A third of patients had either a feeding tube or gastrostomy for feeding problems and half of the patients were delayed in development. Dialysis adequacy (KT/V) was estimated to be more than 1.8 in 83% of patients. Two patients were on growth hormone. The mean height standard deviation score was -1.86 on start of PD, -2.03 at 24 months post dialysis and -1.28 at 48 months after dialysis, signifying catch up growth. Peritonitis incidence was 1:35 (episodes: patient months) and catheter survival rate was 67% . The most common cause of access failure was catheter blockage. Incidence of exit site infection was 1:24 (episode: patient months). There was no mortality at the end of the study period. One patient with HUS recovered from renal failure, 4 were transplanted, 1 on both haemodialysis and PD while 3 remained on PD.

Conclusion: Our data suggested that although PD in infants remained to be challenging, infant mortality was low. Laboratory parameters, dialysis adequacy, peritonitis rate and exit site infection rate were acceptable but hypertension and developmental delay were prevalent. Increased efforts must be placed on optimizing the dialysis efficiency, nutrition and developmental training on all infants on PD.

Abstract# P-SUN445

Vitamin D-induced antibacterial activity in cells obtained from peritoneal dialysate effluents

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Objective: Vitamin D has potent immunomodulatory properties with the induction of antibacterial innate immunity. The aim of this study was to assess its potential antibacterial benefits in patients undergoing peritoneal dialysis (PD), hypothesizing that peritoneal monocytes may be targets for vitamin D.
Methods: We studied PD cells isolated from 24 hr PD effluent in 27 non-infected patients by FACS (leukocyte marker CD45 and monocyte marker CD14), and RT-PCR to study the expression of vitamin D-related genes (VDR, CYP27B1, CYP24A1, LL37 encoding antibacterial cathelicidin) at baseline and after in vitro exposure to vitamin D.We also performed a clinical prospective trial in 12 PD patients (median age 20.8 yrs) to study the impact of an oral supplementation with vitamin D2 (100, 000 IU/wk for 4 wks).
Results: In the 27 samples obtained at baseline, PD cells were mainly monocytic since 38+/- 18% were CD14/CD45 double positive, while 25 +/-15% were only CD45 positive and 32 +/-20% were double negative. There was a strong association between expression of CYP27B1 and LL37 ($r= 0.637$, $p<0.001$). In vitro treatment with 25D (100 nM, 6hrs) or 1, 25D (5 nM) induced expression of LL37 in PD cells, demonstrating the ability of these cells to utilize different forms of vitamin D for antibacterial responses. After one month of vitamin D2 supplementation, patient serum levels of 25D rose from 19 +/-8 ng/ml to 40+/- 15 ($p=0.002$) but this had no effect on: 1) associated circulating markers such as PTH; 2) express of CD14/CD45 by PD cells; concentrations of LL37 in dialysis effluent. However, after adjustment for the proportion of CD14 negative/CD45 positive cells, PD cells showed significantly higher levels of LL37 expression following vitamin D supplementation (1.85-fold, $p=0.01$).
Conclusion: This study is the first demonstration that PD cells have a functional intracrine system for vitamin D-induced innate immunity. This response is enhanced following vitamin D supplementation in vivo, highlighting an important new function for vitamin D in preventing infectious related complications in PD patients.

Abstract# P-SUN446

Adapted APD (A-APD) for the control of volume and blood pressure

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Objective: A-APD a new dialysis prescription concept, of varying the dwell time and fill volume in APD, appears as promising to allow for improvement of volume control and blood pressure control in PD patients. We investigated the efficacy of the repetition of sequences of one short/small "hypertonic" exchange before each long/large "isotonic" exchange (A-APD hyper/iso), in order to optimize the volume control, by optimized water and sodium removal.
Methods: Therefore, we compared A-APD iso/iso to A-APD hyper/iso in an anuric child, mean of three consecutives sessions only varying the dialysate applied for the short/small exchange, either hypertonic (3.86% glucose) or isotonic (1.36% glucose) dialysate.

	UF (ml)	Na removal (mmol)
A-APD (iso/iso) (N=3)	408+/-31	9+/-14
A-APD (hyper/iso) (N=3)	715+/-49	15.3+/-1.6
mean gap	+75 %	+70 %

Results: A-APD hyper/iso improved significantly UF and sodium dialysis removal compared to A-APD iso/iso. Indeed, the short/small "hypertonic" exchanges favor ultrafiltration, mainly related to "aquaporins water", that is sodium-free water allowing for an increase of UF over the session. Nevertheless, despite achievement of more sodium-free water especially over the short/small exchanges, sodium dialysis removal was increased in A-APD hyper/iso.
Conclusion: This result is presumed to be related to an increased diffusive sodium concentration gradient, from plasma to dialysate, allowing for more sodium removal and therefore more coupled sodium and water removal, mainly through the small pores over the long/large exchanges. The optimized diffusive Napl to NaD gradient of a long/large exchange could be impacted both by hemo-concentration (higher Napl) secondary to the sodium-free water generated over the short/small exchange and, by dilution of the dialysate (lowered NaD) secondary to the residual intraperitoneal volume constituted over the short/small exchange mainly sodium-free water.

Abstract# P-SUN447

The impact of age of children at the initiation of chronic peritoneal dialysis on peritonitis infection rate and peritonitis-free duration

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Objective: to study peritonitis in children receiving long-term peritoneal dialysis and the impact of age at the initiation of treatment on peritonitis infection rate and peritonitis-free duration.
Methods: A retrospective cohort study of children less than 18 years old receiving chronic peritoneal dialysis at King Chulalongkorn Memorial Hospital during May 1, 1996 to Dec 31, 2011.
Results: 46 children (20 male, 43.5%) were enrolled. The average age at the initiation of dialysis treatment was 9.9 ± 4.1 years (range 0.3-15.9 years) with a total treatment period of 1, 590 months (range 3 -44 months). 10 children (21.7%) were less than 5 years old at dialysis initiation. 86 peritonitis episodes occurred in 25 children. The overall peritonitis rate was 0.65 episodes/patient-year. 48% of children had at least 1 episode of peritonitis within the first 2 years of treatment. 70% of children age less than 5 years old had peritonitis episodes compared to 50 % of older children. The median time from the initiation of dialysis to first episode of peritonitis was 11.5 months. Children less than 5 years old who had peritonitis, had shorter peritonitis-free duration compared to older age group (median 3 months vs. 7 months).
Conclusion: Peritonitis is a significant complication of children receiving chronic peritoneal dialysis. Smaller children (less than 5 years old) had higher peritonitis infection rate and shorter peritonitis-free duration.

P-SUN448

Outcomes of peritonitis in children on peritoneal dialysis: A 25-year experience at a single center in Korea

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Objective: Relatively little is known on the microbiology, risk factors and outcomes of peritoneal dialysis (PD)-associated peritonitis in Korean children. We performed this study in order to evaluate the incidence, treatment and clinical outcomes of peritonitis in pediatric PD patients at a single center in Korea.
Methods: We analyzed data from 57 PD patients aged less than 18 years during the period between June 1, 1986 and December 31, 2011. The collected data included gender, age at commencement of PD, age at peritonitis, incidence of peritonitis, underlying causes of end stage renal disease (ESRD), microbiology of peritonitis episodes, antibiotics sensitivity, modality and outcomes of PD.
Results: During the study period, there were 56 episodes of peritonitis in 23 of the 57 PD patients (0.43 episodes/patient-year). Gram-positive bacteria were the most commonly isolated organisms (48 patients, 85.7%). Peritonitis developed in 18 patients during the first 6 months following initiation of PD (78.3%). Peritonitis episodes rarely resulted in relapse or the need for permanent hemodialysis and no patient deaths were directly attributable to peritonitis. Antibiotic regimens included cefazolin + tobramycin from the years of 1986 to 2000 and cefazolin + ceftazidime from the years of 2001 to 2011. While antibiotic therapy was successful in 48 episodes (85.7%), the treatment was ineffective in 8 episodes (14.3%). The rate of continuous ambulatory PD (CAPD) peritonitis was statistically lower than that of automated PD (APD) (p=0.025).
Conclusion: Peritonitis was shown to be an important complication of PD therapy and we observed a higher incidence of PD peritonitis in patients with CAPD when compared to APD.

Abstract# P-SUN449

Cause Analysis and Countermeasures for Domiciliary Peritoneal Dialysis Related Infections in Children

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Objective: To analyze the causes of domiciliary peritoneal dialysis related infections which occur in children patients so as to take corresponding prevention and control measures to reduce the incidence of infection and improve the quality of peritoneal dialysis.
Methods: Diets and nutrition conditions of 13 children with domiciliary peritoneal dialysis were collected. Examinations of the operation situation and detailed inquiries about their life habits were performed to analyze the causes of related infections. Relevant preventions and control strategy are then formulated according to the causes.
Results: Dialysis time of the 13 children with domiciliary peritoneal dialysis is 301 patients month. There are 10 patients infected (12 cases), among which 7 are with sinus path skin infections (2 resulted from scratching and 1 due to the use of application with poor permeability before the disinfected exit skin dried); 5 suffered peritonitis (2 because of nonstandard operation, 1 misconduct after falling off of the short pipe , 1 short pipe rupture and 1umbilical fistula) . The left 3 remained uninfected. Staphylococcus aureus was detected in sinus secretion in 1 case; staphylococcus epidermidis was found in the Dialysis fluid in 2cases. Except the one with umbilical fistula, the rest 9 children received befitting treatment and continued peritoneal dialysis after the infection was controlled.
Conclusion: In addition to children's own characteristics, the main cause of domiciliary peritoneal dialysis-related infection in children is exogenous infection. Strict training, emphasis of aseptic concept, standardized operation, comprehensive management of the dialysis environment , the children's diet, nutrition condition and each link of dialysis, establishment and improvement of the follow-up and management system, handling the detailed situation of domiciliary peritoneal dialysis, and timely detection and control factors that leading to infection, can effectively reduce or prevent peritoneal dialysis-related infection.

Abstract# P-SUN450

Risk factors for decline of residual renal function in children on peritoneal dialysis

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Objective: Aim of the study was to assess risk factors for residual renal function (RRF) decline in children on chronic peritoneal dialysis (PD).
Methods: The study group included 56 children, aged 10.13+/-4.86 yrs, CAPD 18, APD 38. In all patients during 12 mths we evaluated: RRF (daily diuresis [mL/kg/24h], residual rGFR [mL/min/1.73m^2]), etiology of CKD, peritoneal permeability ($D/P_{Crea\ 4h}$, $D/D_{0\ Glu\ 4h}$), volume of PD fluids (PDF) [mL/kg/24h], glucose load (GL) [g/kg/24h], ultrafiltration (UF) [mL/kg/24h], adequacy (total weekly: twKt/V, twCCr), peritonitis rate, arterial hypertension (AH), biochemical parameters, medications.
Results: In the study group median annual rate of diuresis decline was -19.39 [mL/kg/24h]. Patients were divided into 2 groups: with faster (F) and slower (S) rate of diuresis decline. Patients from group F had higher daily diuresis at onset of PD ($p<0.05$); the groups did not differ significantly in: baseline rGFR, peritoneal permeability, peritonitis rate, prevalence of AH, biochemical parameters, and medications. After 12 mths GL and UF increased significantly ($p<0.05$) in F and S groups, PDF volume only in F group ($p<0.005$). Residual GFR and twCCr decreased significantly in both groups ($p<0.05$), with higher rate of decline in F group ($p<0.05$); twKt/V did not change (NS). In 56 children rate of diuresis decline correlated positively with delta 0-12 rGFR ($r=0.51$, $p<0.05$) and delta 0-12 twCCr ($r=0.38$, $p<0.05$), negatively with diuresis at onset of PD ($r=-0.34$, $p<0.05$), proteinuria ($r=-0$, 28, $p<0.05$), delta 0-12 PDF volume ($r=-0.41$, $p<0.05$), delta 0-12 GL ($r=-0.29$, $p<0.05$), and delta 0-12 UF ($r=-0.29$, $p<0.05$). On multivariate analysis, diuresis (beta=-0.51, $p<0.0001$) and proteinuria (beta=-0.32, $p<0.05$) at onset of PD were significant predictors of rate of daily diuresis decline. The rate of RRF decline was independent of CKD etiology and peritoneal permeability.
Conclusion: Our results suggest that main risk factors for rapid decline of RRF in children treated with PD are high baseline diuresis and proteinuria.

Abstract# P-SUN451

Frequency of PD-associated peritonitis in children

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Objective: Peritoneal dialysis (PD) is a common dialysis modality used in patients with end-stage renal disease. Peritonitis remains a major PD complication in the pediatric population. PD-associated peritonitis is the most significant cause of patients discontinuing PD

and switching to hemodialysis (HD). The aim of the study was to evaluate frequency of PD-associated peritonitis in children.
Methods: Children < 18 years old receiving chronic PD in the period of 1999 to 2012 were included in the study. Patients age and age at PD initiation, PD duration, rate of peritonitis, aetiology and outcomes of peritonitis were evaluated. PD patients presenting with abdominal pain and cloudy effluent were resumed to have peritonitis. The diagnosis of peritonitis was confirmed when the effluent white blood cell count is ≥100 cells/μl and there is at least 50% polymorphonuclear cells in the diferential cell count.
Results: Twenty-six (11 female, 15 male) patients were enrolled in the study. The mean age of the patients at dialysis initiation was 7.4±5.7 years (2 weeks - 17.2 years), and the mean duration of PD was 25, 0 ±23.8 months (0.5-86 months). There were 72 episodes of peritonitis in 627.5 months of follow-up for an annualized rate of 1.4 (one episode every 8.7 months). Aetiology of peritonitis was as following:bacterial (68.3%), mixed (10 %), fungal (1.7%) and culture-negative (20%). Nine children (34.6%) had no peritonitis during PD, five children had 1 episode of peritonitis (19.2%). Eight patients (30.8%) had >3 episodes of peritonitis. Younger patients (4.9±4.9 years) had more frequently peritonitis than the older (12.2±4.0 years) (*p≤0.005*). First episode of peritonitis was after 6.5±9.9 month's post-dialysis initiation (0.3-39.5 months). Five episodes of peritonitis (6.9%) ended in stopping PD and switching to HD or death of the patient.
Conclusion: Annualized rate of peritonitis is 1.4. More than a half PD patients had less than 1 peritonitis. There is relationship between the age of patients and peritonitis rate.

Abstract# P-SUN452
Outcome of Peritoneal Dialysis Related Peritonitis in Turkish Children

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Objective: The aim of this study was to clarify the etiology, clinical presentation, treatment of peritonitis, peritonitis rate and to analyze the microbiologic profile of peritonitis in our pediatric dialysis unit.
Methods: This study was performed with children treated with chronic peritoneal dialysis and diagnosed for peritonitis during the period from January 2004 to December 2011 at the Peritoneal Dialysis Unit of the Pediatric Nephrology Department, Uludag University Medical Faculty.
Results: The patient cohort comprised 55 patients (30 males, 25 females) who were treated for peritoneal dialysis related peritonitis. The total number of peritonitis episodes was 157. The mean peritonitis rate was one episode every 23.9 patient-months (one episode every 26.8 patient-months for CAPD and one episode every 20.1 patient-months for APD). Initial empiric therapy was cefazolin-ceftazidim in 139 episodes, ceftazidim-vancomycin in 18 episodes. Clinical response on day 3 was taken in %72.6 of the patients. The yield of culture positivity was %69.5. Coagulase-negative staphylococcus was the most common cause, accounting for %17.1 of all episodes. Other organisms isolated were gram-positive other group (%15.9), staphylococcus aureus non-MRSA (%3.2), staphylococcus aureus MRSA (%3.2), enterococci (%0.6), gram-negative other group (%8.9), pseudomonas aeruginosa (%2.5), enterobacter species (7.6), klebsiella species (%0.6) and polymicrobial organisms (%7.6). Catheter had to be removed in % 27.3 of the patients. The mean number of peritonitis episodes was 3+/-2.3 in 42 patients with double-cuffed swan neck catheter whereas the number of peritonitis episodes was 2.3+/-1.6 in 13 patients with double-cuffed tenckhoff catheter. There was no relation between catheter type and the number of peritonitis episodes (p>0.05). Peritonitis led to a switch to temporary haemodialysis in 4 patients. Seven patients switched to permanent haemodialysis.
Conclusions: The most common cause of peritonitis was found to be coagulase-negative staphylococcus. It was concluded that age, gender, catheter type, catheter insertion techniques were not associated with the number of peritonitis episodes.

Abstract# P-SUN453
Analysis of the Consulting data of Parents of Peritoneal Dialysis Children and Implication for Health Education

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Objective: To analyse the care demands of parents of peritoneal dialysis (PD) children, and to enrich and enhance the training contents of health education.
Methods: A medical group consisted of peritoneal dialysis(PD) nurses and doctors was established, and a 24h consulting telephone for parents of PD children was set up, the PD group members were responsible for answering. Patients' names, patterns of PD, time of PD catheter inserting, consulting contents and solutions were recorded into a self-designed record sheet. The consulting consents of parents of 25 PD children were classified into such four categories as responding to emergency condition of machine(machine failures, power outages), changes of patients' state(UF, urine volume, edema, blood pressure), complications and accidental situations(peritonitics, tube disconnect and exit site infection) and others(appointment for hospitalization, medication consulting and so on).
Results: There were totally 56 telephone consulting cases, of which 41 cases(82.1%) were effectively solved. The consulting contents were focused on responding to emergency condition of machine, changes of patients' state, complications and accidental situations and others, which accounted for 33.9%, 32.1%, 17.9%, 16.1% respectively.
Conclusion: Telephone consulting for parents of PD children after discharged could contribute to understand parents' care demands, to solve patients' problems timely and to improve patient's quality of life. It is important to strengthen education and training for family members of PD children.

Abstract# P-SUN454
Impact of PD Prescription on Fluid and Blood Pressure Control in Children Undergoing Automated Peritoneal Dialysis

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9 Children's Mercy Hospital, Kansas City, USA
10 IPPN

Objective: Automated PD allows a wide variation of dialysis prescriptions to achieve ultrafiltration and clearance targets. However, the effects of modifying fill volume, dwell time, the number of cycles and dextrose concentration are complex and the efficacy of different

PD prescriptions is difficult to predict. Here we utilized the IPPN Registry database to investigate associations between prescription patterns and achieved daily ultrafiltration and blood pressure control in children undergoing chronic APD.
Methods: Detailed information on dialysis prescription, average daily ultrafiltration and blood pressure was available for 1, 914 observations in 756 pediatric patients undergoing APD without daytime dwell (NIPD). Mixed model analysis was applied to adjust for the variable number of observations per subject and potential confounding factors such as age, time on PD and residual urine output.
Results: Daily ultrafiltration was independently inversely associated with patient age ($p<0.05$) and residual urine output ($p<0.0001$) and positively with the dialysate dextrose concentration ($p=0.0001$) and the number of PD cycles ($p<0.0001$), with no clear effect of dwell time modifications.
Higher diastolic blood pressure SDS (BP) was associated with shorter PD vintage ($p<0.0001$), younger patient age ($p<0.0001$), lower residual urine output ($p=0.0004$), and the need for high dialysate glucose concentrations ($p=0.0002$). Whereas diastolic BP was independent of the total number of cycles, shorter dwell times were associated with higher BP when 4 to 6 cycles were used ($p<0.0001$).
Conclusion: Our findings suggest that in children with automated PD, ultrafiltration can be maximized by increasing the number of cycles but not by concomitantly shortening dwell times. BP tends to be higher with short dwell times at a given number of cycles. We speculate that sodium sieving may occur with short dwell times.

Abstract# P-SUN455
Experience of Continuous Ambulatory Peritoneal Dialysis (CAPD) in Bangladeshi Children

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Objective: Now a days, CAPD is the commonly used modality of renal replacement therapy in children suffering from end-stage kidney failure (ESKF) in developing countries those lack finances and adequate technical support. Although CAPD facility for children is available in Bangladesh for last couple of years, a very limited number of children are getting CAPD due to expensive logistics and lack of adequate infrastructure to provide multidisciplinary support. Most of our patients on CAPD are facing frequent complications. The objective of this study was to review complications and out-come of CAPD modality in children of Bangladesh.
Methods: This observational study was done among the 8 ESKF children, age range from 3 years to 10 years, who were treated with CAPD in Dhaka Medical College Hospital, Bangladesh. The study period was from June 2011 to December 2012. Introduction of CAPD catheters were done by laparotomy and partial omentectomy under G.A by surgeons in 5 patients and by percuteneous placement by pediatric nephrologists in rest 3 patients. Subsequently all the patients were followed-up as per protocol for identification and management of complications.
Results: Frequent peritonitis, catheter blockage by omentum, high-up catheter tip were the common complications in percuteneously placed catheter cases.All the 3 cases needed subsequent laparotomy and partial omentectomy. On the other hand, peritonitis was less frequent in surgically placed cases and there was no catheter blockage or high-up catheter tip. Only one patient developed inguinal hernia. Abdominal pain and cloudy effluent were the presenting features of peritonitis in most of the patients. Most of the dialysate fluid cultures were negative. Peritonitis was treated empirically with Vancomycin and Ceftazidime loading, followed by intraperitoneal Ceftazidime only.
Conclusion: Although the percuteneous technique performed by experienced pediatric nephrologists is a reliable, safe and cost-effective method for placement of CAPD catheter, more long-term complications were associated in our series.

Abstract# P-SUN456
Long-Term Hospitalizations in Children Receiving Chronic Peritoneal Dialysis: A Case Control Study of the International Pediatric PD Network (IPPN)

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Objective: In dialysis patients, hospitalization times are used as a surrogate marker of morbidity and social disintegration. In pediatric PD, a few patients are subject to long-term hospitalizations. We explored the causes of long-term hospital stays and to compare the clinical course of patients 'living in the hospital' with that of non-hospitalized children.
Methods: 4, 663 hospitalizations occurred in 1, 253 of 1, 977 CPD patients during 3, 060 patient years. From this database, 65 children who spent >90 days per year in hospital were compared with 118 non-hospitalized children matched for age, country of residence and duration of follow-up.
Results: Among the 65 long-term hospitalized children, 78% were aged <5 and 46% <1 year. Patients most commonly came from Germany (14%), Chile (12%) and Poland (11%), the underlying renal diagnosis included renal a/hypodysplasia (24%), autosomal recesive policystic kidney disease (ARPKD) and congenital nephrotic syndrome (CNS) (11% each). Hospitalization causes included infections (32%), need for complex medical treatment such as dialysis from birth or daily albumin infusions (19%), non-PD related problems (15%), and social reasons (10%). Comorbidities were present in 68%, including cardiac or pulmonary abnormalities in 21 pts. Patient survival was 91% and 80% at 1 and 2 yrs in the hospitalized children, as compared to 96% and 95% in the controls ($p<0.05$). Peritonitis (1:14 v. 1:39 pt-months) and catheter-related infections (1:62 v. 1:123 pt-months) occurred more frequently in the hospitalized children. Height SDS was lower in the hospitalized children both at admission (-3.0±2.0) and at last update (-2.9±2.0) compared to the controls (-2.1±1.6 throughout). BMI SDS did not differ at baseline but increased by 0.26 SDS per 3 months in the hospitalized vs. 0.08 in the control children ($p=0.05$). Enteral feeding was more common in the hospitalized children (51 v. 35% $p<0.05$), whereas the use of rGH did not differ.
Conclusion: In children on CPD, long-term hospitalizations are associated with a higher risk of mortality, PD-related infections, and weight gain.

Abstract# P-SUN457
Percutaneously Performed Omentectomy For Peritoneal Dialysis Catheters Flow Obstruction in Children: A Single-Center Experience

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Objective: Early peritoneal dialysis (PD) catheter failure due to flow obstruction is frequently caused by omental wrapping, fibrin plugging and malposition of the catheter.Catheter dysfunction leads to interventions to replace the catheter.In this study, wanted to share our

experience on percutaneously performed omentectomy in pediatric PD patients who showed early catheter dysfunction and required catheter replacement.
Methods: We performed a retrospective review of clinical outcomes from pediatric PD patients who underwent cathter replacement.All procedure were performed by a pediatric nephrologist between 1995 -2012.Patient characteristics, surgical records, early catheter complications, post-omentectomy complications and outcomes were recorded. During the catheter replacement, partial omentectomy was performed in whom omental or adhesion trapping to the catheter tip was seen.The omentum portion that protrude from the abdominal wall (port site) was firmly ligated from the bottom by absorbable catgut and cut out.After bleeding control, catheter replacement was performed. We recieved approval from the Instutional Review Board for data collection.Statistical analysis was made by using IBM SPSS 20.0 software.
Results: Catheter dysfunction that required catheter replacement occured in 32 (21.9%) children.Nine patients (male/female=1:0, 8) were performed partial omentectomy via percutaneous route.Mean age at initiation of PD was 97, 48±46, 06 months.Three patients (33, 3%) had a history of previous abdominal surgery.Catheter dysfunction appeared after a mean 1, 20±0, 1 months. The causes of catheter dysfunction were omental wrapping (55, 6%) and malposition (44, 4%).Mean age at the time of omentectomy was 98, 53±45, 55 months.No complications were encountered.After omentectomy, mean catheter survival was 5, 92±6, 88 months.A total 5 peritonitis episodes occured.3 patients (33, 3%) were transferred to hemodialysis. 6 patients (66, 6%) are still on chronic PD treatment.
Conclusions: In conclusion, when performed by experienced nephrologist, the performance of partial omentectomy by percutaneous route when required, is an easy, safe and efficient therapeutic procedure in children on chronic PD treatment.

Abstract# P-SUN458
The method of improving the positive bacterial culture from peritoneal effluent of children with peritoneal dialysis related peritonitis by "Twin—bag system"

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Objective: To improve the positive bacterial culture from peritoneal effluent of children with peritoneal dialysis(PD) related peritonitis for further effective treatment and to protect the function of the peritoneum.
Methods: The peritoneal effluent sample of children with dialysis related peritonitis during the period from Sep 2011 to Jun 2012 was collected with the following methods. If the child did not have dialysate in his/her peritoneal cavity, Part of the 2-liter PD solution was infused into the peritoneal cavity and kept for 2 hours, the rest of the 2-liter PD solution was drained into the waste bag until the dialysis bag was empty. If the child had dialysate in his/her peritoneal cavity for more than 2 hours, The dialysate in the 2-liter dialysis bag was directly drained into the waste bag and the pathway was clipped in order to empty the dialysis bag. The cloudy effluent drained into the dialysis bag and was shaken gently until it was homogeneous before 20 ml of it was collected from that bag through the dosing inlet. Subsequently these 20 ml of peritoneal effluent was infused into 3 blood culture bottles with 6~8 ml in each bottle. The effluent sample was handled within 6 hours and cultured 3 times.
Results: There were 5 children who had 7 episodes of peritoneal dialysis related peritonitis in total. Bacterial culture was positive in 6 episodes and the positive rate was 85.7%. This has reached the standard of International Society for Peritoneal Dialysis which has stipulated the overall positive bacterial culture from peritoneal effluent of PD related peritonitis patients above 80%.
Conclusion: Though there are no special bags available to collect the peritoneal effluent, the twin-bag system of the 2-liter peritoneal dialysis solution enhances the positive bacterial culture by emptying the dialysis solution bag, collecting the sample of peritoneal effluent from the dosing inlet, and culturing with the blood culture bottles. This provides sufficient evidence for the treatment of peritonitis associated with peritoneal dialysis.

Abstract# P-SUN459
Changes in Mean Percentages of Mean Values of Blood Urea Nitrogen and Creatinine Over the Time Duration of Peritoneal Dialysis – The Philippine Children's Medical Center Experience

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Objective: The Philippine Children's Medical Center is a 250-bed government tertiary referral children's medical center that attends mainly to indigent patients. Financial resources for patients are inadequate. Our Section of Pediatric Nephrology in seeking answer to the question as to how the patient's peritoneal dialysis can be shortened to save on cost started this research. The objectives were : (1) To determine as to what point in time of peritoneal dialysis is adequacy reached; and (2) To find out the percentage changes in values of BUN, and creatinine over time of peritoneal dialysis.
Methods: We enrolled in a prospective study over a six-month period from August 2012 to January 2013. 11 patients who underwent peritoneal dialysis irrespective of causes were included in this study.
Results and Conclusion: There was continuous drop in the values of BUN and creatinine during the period of peritoneal dialysis as we have expected. The biggest drop in the percentage of baseline values of BUN and creatinine occurred at the 6^{th} hour, dropping continuously until 24th hour, with the ebb occurring at the 60^{th} hour, and stabilizing also at the 60^{th} hour. Our study showed that by the 60^{th} hour, the adequacy of PD was reached and PD can be safely discontinued.

Abstract# P-SUN460
Outcome on chronic peritoneal dialysis for children under 5 years old

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Objective: The aim of our study was to analyze long term outcome in children who initiated chronic peritoneal dialysis (PD) under the age of 5.
Methods: We made a retrospective analysis of the files of all the children submitted to PD for more than 3 months in our center, from January 2000 until December 2010. We excluded children who initiated dialysis over the age of 5, the ones who came from another center and children that made hemodialysis (HD) as the first treatment.
Results: 34 patients were eligible, 7(20%) girls and 27(80%) boys. Mean age at initiation of PD was 1, 52 years old (yo).Nineteen patients started on PD under the age of 1 yo, 6 from 1 to 2 yo, 7 between 2 and 3 yo and 2 between 4 and 5yo. Most patients had urologic malformations, but it was not statistically significant in relation to other causes (p= 0, 09). Sixteen patients had to change from PD to HD, 12 (75%) due to peritonitis and 25% due to abdominal surgery and non-adherence. Mean time on PD+HD was 96, 71 months. Mean age at the first transplant was 5, 65 yo, after mean time of 107, 32 months on dialysis. The renal function was improved in 4 children, 2 were transferred to other centers, 16 received a renal transplant, 4 remained

on HD and 8 were still on PD at the end of the study/death. Twelve (35%) patients died, 6 on PD, 4 in HD and 2 post-transplant.
Conclusion: Similar to other studies, male sex, urologic malformations and need to change of method due to peritonitis are more frequent in this population. Eventhough 12 patients died and we had a long time waiting for a transplant, the majority of patients were still alive at the end of the study, most of them already transplanted.

Abstract# P-SUN461
Study on the effect of break-in period after peritoneal dialysis catheter insertions on catheter-related complications in children

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Objective: To avoid the peritoneal dialysis (PD) catheter-related early and later complications and to promote the incision healing, it is usually recommended to delay the regular PD exchange for 2 to 4 weeks or more after catheter insertion (break-in period). However, much morbidity and expense could be saved by reducing dependency on hemodialysis by earlier initiation of PD post catheter insertion. The aim of this study was to study the effect of break-in period on catheter-related complications and determine an appropriate safe and short break-in period.
Methods: From 2008 to 2012, 32 children diagnosed with end-stage renal disease received surgical placement of pediatric Tenckhoff Catheters (with 2 cuffs) and chronic PD therapy in our center. Specialized nurses took care of their catheter after catheter insertions, mainly including dressing exchange and catheter irrigating. Based on the duration of break-in period, the patients were divided into three groups: group A (break-in period≤1 week, 14 cases), group B (1 week<break-in period≤2 weeks, 11 cases) and group C (2 weeks<break-in period≤4 weeks, 7 cases).Catheter-related complications were compared, including peritonitis, exit-site/tunnel infection, dialysate leakage and inadequate drainage.
Results: There is no statistic difference in the age at operation, surgical method, nutritional status, and residual renal function among these three groups (P>0.05). Totally 4 cases developed catheter-related complications. Of these complications, there were one with dialysate leakage (11 days after PD starts) and one with inadequate drainage (20 days after PD starts) in group A, one with peritonitis (1 day after PD starts) and the other one with inadequate drainage (1 day after PD starts) in group C, respectively. Compared the three groups, no statistic difference in catheter-related complications appeared (P>0.05).
Conclusion: The incidence of catheter-related complications did not rise despite a shorter break-in period. Specialized nurses are very important in the catheter care to minimize the complications. Further studies with larger numbers are needed to validate the effect of shorter break-in period in PD practice.