



## First Day

Wednesday, December 16

O101

## Pentoxifylline Can Improve Anemia of Hemodialysis Patients via Overcoming Iron Reticuloendothelial Blockade

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**Introduction.** Chronic inflammation is one of the etiologies of inadequate response to erythropoietin in treatment of anemia of chronic hemodialysis patients. Reticuloendothelial blockade that is clinically expressed by high serum ferritin level ( $> 800$  ng/ml) and low serum iron and transferrin saturation test (TSAT;  $< 25\%$ ) in spite of iron supplementation is the well known mechanism of causing anemia in these patients. Pentoxifylline, a methyl xanthine derivative used for treatment of peripheral vascular disease has been found to have anti-inflammatory properties due to many cytokines inhibition. We hypothesized that pentoxifylline, because of anti-inflammatory effects, overcomes iron reticuloendothelial blockade and improves anemia of chronic hemodialysis patients.

**Methods.** In 110 patients (M/F = 52/58) from the three hemodialysis centers of Tehran, we found 15 patients (13.6%; M/F = 6/9) who displayed elevated ferritin level ( $> 800$  ng/ml) and TSAT  $< 25\%$  as defined. They received pentoxifylline with the dose of 400mg twice daily for two months. At beginning, baseline levels of hemoglobin, hematocrit, and serum iron, TIBC, ferritin, and TSAT were recorded and then measurements were repeated after 2 months.

**Results.** At the end of the study, pentoxifylline increased hemoglobin level in 13 of 15 patients ( $11.7 \pm 1.87$  vs.  $9.8 \pm 1.23$  g/dl,  $P < 0.002$ ). Ferritin values markedly decreased after treatment ( $849 \pm 586.7$  vs.  $1139 \pm 673.3$  ng/ml,  $P < 0.003$ ). Serum iron also increased ( $66.8 \pm 28.6$  vs.  $51 \pm 18.52$   $\mu$ g/dl,  $P < 0.03$ ). Finally, transferrin saturation ratio increased in 11 patients. Mean TSAT values increased ( $23.3 \pm 7.87$  vs.  $16.4 \pm 5.2$  %,  $P < 0.004$ ) at the end of study.

**Conclusion.** This study indicates that pentoxifylline, as an anti-inflammatory drug, can improve anemia of hemodialysis patients by correcting reticuloendothelial blockade of iron.

O102

## Effect of Zinc Supplementation on Triglyceride, Cholesterol, LDL, and HDL Level in Zinc Deficient Hemodialysis Patients

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**Introduction.** Zinc deficiency is known to occur in widely diverse areas of the world. It has now been recognized in many disease states such as ESRD patients on maintenance hemodialysis (HD). The purpose of this research was to study the effects of zinc supplementation on the concentration of serum zinc, total cholesterol, triglyceride, and cholesterol fractions (HDL, LDL) in HD patients.

**Methods.** In a double blind trial, the effects of oral zinc supplementation on the serum concentration of zinc, total cholesterol, HDL and LDL cholesterol, and triglyceride in HD patients were evaluated.

**Results.** After 42 days, the mean serum zinc concentration among participants in the zinc supplemented group increased. There was a significant elevation in the serum total cholesterol and also in the mean serum level of LDL, HDL cholesterol, and serum triglyceride for the subjects in the zinc supplemented group.

**Conclusion.** A suboptimal level of the serum total cholesterol concentration is a factor associated with malnutrition and morbidity in the HD patients. Maintenance HD patients with both low serum zinc and low serum total cholesterol concentrations may benefit from zinc supplementation. Therefore, it is advisable to obtain baseline measurement of the serum zinc and total cholesterol concentrations in maintenance HD patients.

O103

## Combination Effect of Methylprednisolone and Vitamin C in Renal Ischemia/Reperfusion Injury

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**Introduction.** Renal ischemia/reperfusion (I/R) injury contributes to kidney dysfunction and patient morbidity and is the most common cause of delayed graft function or organ failure. There are two important pathways underlying renal I/R injury including inflammatory pathways and free radicals. The purpose of this study was to evaluate the combination pretreatment of vitamin C (Vit C) and methylprednisolone on renal I/R model.

**Methods.** Male wistar rats (n = 50) were assigned into 5 groups of 10 animals; 1- Sham, laparotomy without I/R; 2- I/R; renal I/R; 3- I/R+ vit C (500 mg/kg, IV); 4- I/R+MP (10 mg/kg, IV); and 5- I/R+Vit C+MP. The kidney was subjected to ischemia by clamping renal pedicles for 30 minutes and was reperfused for 6 hours after ischemia by removing the clamps.

**Results.** Level of glutathione peroxidase (GPx) and superoxide dismutase (SOD) decreased after renal I/R in all groups. Level of GPx and SOD were higher in I/R+Vit C+MP group comparing to I/R, I/R+Vit C, and I/R+MP groups and they were higher in I/R+Vit C group comparing to I/R and I/R+MP groups significantly ( $P < 0.05$ ). Level of Cr, urea, TNF- $\alpha$ , renal tissue malondialdehyde (MDA), and renal injury index increased after renal I/R. Level of Cr, urea, tissue MDA, and tissue injury index were lower in I/R+Vit C+MP group comparing to I/R, I/R+VitC, and I/R+MP groups, and in I/R+Vit C was lower than I/R+MP group significantly ( $P < 0.05$ ). There were no differences in tissue injury between I/R+VitC and I/R+MP groups. TNF- $\alpha$  level was lower in I/R+Vit C+MP group comparing to other groups and was also significantly lower in I/R+MP group than I/R+Vit C and I/R groups ( $P < 0.05$ ).

**Conclusion.** MP attenuated the inflammatory response and Vit C reduced oxidative stress after renal I/R, while MP and Vit C combination had better tissue protection comparing to administration of MP and Vit C alone.

0104

## Evaluation of Treatment Adequacy of Hemodialysis in Iran, A National Multi-Center Study

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**Introduction.** Assessment of adequacy of dialysis is a central issue in the management of HD patients and also is a key measure in monitoring of health systems services. We aimed in this study to evaluate the adequacy of dialysis among Iranian patients under maintenance hemodialysis and to check its compliance with K/DOQI guidelines as gold standard.

**Methods.** In a prospective, multi-center, national study, we enrolled patients of 127 adult HD facilities affiliated to 30 medical universities in Iran. For each patient, demographic data as well as treatment measures like blood flow rate, duration of hemodialysis session,

type of membrane, and type of dialyzer solution were collected. Kt/V and Urea Reduction Ration (URR) were calculated by means of a computer program.

**Results.** Valid data on the outcomes was available on 4004 patients, including 2345 (58.6%) men and 1659 (41.4%) women. The mean blood flow rate was  $242.9 \pm 39.21$  cc/min. The mean duration of hemodialysis was  $229.16 \pm 22.16$  minutes. Bicarbonate-buffered dialyzer was used for 67% of the patients. The mean Kt/V and URR for the study patients were  $1.17 \pm 0.36$  and  $61.04 \pm 11.83$ , respectively. The KT/V values were below 1.2 in 56.7% of the cases. The URR values were below 65% in 65.2% of the cases.

**Conclusion.** In this multi-center, countrywide study, substantial insufficient dialysis, according to the K-DOQI criteria, was reviewed. Regarding considerable impact of adequacy of dialysis on quality of life and survival of HD patients as well as health-care costs, it leaves room for health-authorities to develop effective policies to overcome this scarcity.

O105

## BNP Prognostic Value to Assess Ventricle Function in the Chronic Renal Failure Patients

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**Introduction.** The synthesis of B-type natriuretic peptide (BNP) occurs mainly from myocytes in cardiac ventricles in response to excessive cardiac ventricular wall distension. Since the level of BNP increases in the heart failure patients, elevated plasma BNP concentration is used as a predictor in the diagnosis and management of heart failure. BNP is a useful predictive value in development, widespreading, and prognosis of heart failure patients. Use of BNP as a prognostic value for dyspnea in the emergency departments can be cost-effective and improves clinical outcomes. Due to the renal clearance of BNP, its level is above normal in the patients with renal failure. The present study evaluates the BNP prognostic value for assessing ventricular function in the chronic renal failure patients.

**Methods.** All the participants covered in the study were those with renal failure. Echocardiography was employed to assess levels of BMI, CR, and BNP for all the patients. Age and sex were also included and finally, while statistical analysis was available, BNP prognostic value was used in order to assess ventricular function in the chronic renal failure patients. Subjects with level of BNP above 5000 ng/ml were excluded from the study.

**Results.** A total of 44 patients including 34 males and 10 females were entered into the study. Level of BNP had a positive correlation to levels of BMI and EF,

while it showed a negative correlation with age and sex. We found a sensitivity and specificity for BNP = 150 ng/ml and BNP = 705 ng/ml of 93.3% and 28.6% and 50% and 85.7%, respectively for the diagnosis of health or disorder of ventricular function in the renal failure patients.

**Conclusion.** The findings suggest that level of BNP can be an appropriate predictive factor for the rate of heart failure in the renal failure patients. BNP of 705 ng/ml seems to be rather acceptable; however, BNP of 150 ng/ml, being identified in most of studies, seems to have poor specificity despite its elevated sensitivity. Of course the participants' height and weight were contributed to this.

### O106

## 25 (OH) Vitamin-D Deficiency in Chronic Hemodialysis Patients and its Correlations with Intact PTH, Calcium and Phosphorus

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**Introduction.** Vit-D not only has essential effects on bone biology but also there are convincing evidences about the protective role of vitamin D in overall and cardiovascular mortality, hypertension, LVH, and malignancies. Based on recent studies, vitamin D deficiency is quite common in chronic renal failure and ESRD patients in North America and European countries. Concerning the impact of nutrition, climate, and culture, this study was conducted to evaluate the frequency of vitamin D deficiency and its correlation with other clinical and laboratory characteristics of our chronic hemodialysis patients.

**Method.** In chronic hemodialysis patients of our center, plasma level of 25 (OH) vitamin-D was measured and its relation with other variables like Ca, P, intact PTH (iPTH), age, sex, duration on chronic hemodialysis, Hb, WBC, PLT, and serum albumin were evaluated. Patients were divided into 3 groups; 1: Vit-D level  $\leq$  10 ng/ml, as severe vit-D deficiency; 2: Vit-D level between 10 and 30 ng/ml, as moderate Vit-D deficiency; and 3: Vit-D level  $>$  30 ng/ml, as normal Vit-D level. Then, we evaluated all variables according to these categories.

**Result.** A total of 46 patients (27 males and 19 females) were evaluated in this study. The average of Vit-D was  $20.85 \pm 9.4$  mg/l (minimum level, 5.6 ng/ml; maximum level, 43.6 ng/ml). A total of 67% of the patients had moderate Vit-D deficiency, 11% had severe Vit-D deficiency, and 22% had normal level. Comparing severe

and moderate Vit-D deficiency groups, there were not any significant differences, except sex and Hb level. Of 5 patients in severe vit-D deficiency group, 20% were male and 80% were female; in contrast, in moderate vit-D deficiency group, 68% were male and 32% were female ( $P < 0.05$ ). In severe vit-D deficiency group, mean Hb level was  $8.5 \pm 1.5$ ; in contrast, in moderate vit-D deficiency group, the mean Hb level was  $10.8 \pm 2.0$  ( $P < 0.05$ ). According to iPTH level, all patients were divided into 2 groups, 1: [ $\leq$  300 pg/ml (12 patients)] and 2: [ $>$ 300 pg/ml (34 patients)]. Comparing these 2 groups, the Vit-D level and sex had significant differences ( $P < 0.05$ ). The averages of Vit-D level in low and high PTH groups were  $16 \pm 7$  ng/ml and  $22.5 \pm 7.5$ , respectively. The odd of finding low PTH in vitamin D deficient group was 2. In low PTH group, 92% were male while, 47% were male in high PTH group (odds ratio = 9).

**Conclusion.** Our data shows that frequency of 25 OH-D3 deficiency in our hemodialysis patients is very high (78%). Also, it demonstrates that the odds of Vit-D deficiency in patients with lower iPTH and women are more than the other groups. Also, we found that the frequency of lower iPTH in men was more than women.

### O107

## Herbal Medicine Used in Renal Diseases in Europe

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Herbal medicinal products are trusted by the public. Their therapeutic indications are validated in established authorization procedures by regulatory authorities in Europe. Herbal drugs for "well-established use" or "traditional use" and herbal medicinal products with therapeutic indications are authorized by European drug regulatory agencies as e.g. the German drug regulatory authority BfArM.

The use of phytopharmaceuticals as an alternative to chemically-defined medicinal products has proved effective in day-to-day clinical practice also in the treatment of renal diseases. However, not all phytopharmaceuticals and health food consumed among renal patients have yet been sufficiently investigated for their effects, mechanisms of action, their effects in human pharmacology and their effectiveness and harmlessness. According to a new study physicians are currently not adequately informed about herbal medicines by their patients suffering from renal diseases. Because many products are at risk to either accumulate or cause interactions with medication, physicians should take an active role to inform them.

Examples of drug interactions, e.g. Cyclosporine and St. John's Wort, and drugs indicated and used for treatment of renal diseases are presented.

O201

## Urinary Adrenomedullin Level in Children with Acute Pyelonephritis

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**Introduction.** Acute pyelonephritis is one of the most common infectious diseases in children. Persistent renal infection and scarring is the leading cause of end stage renal disease (ESRD) in some parts of the world. None of the routine tests for diagnosis of pyelonephritis is reliable in children. Adrenomedullin (AM) is a peptide stimulated by inflammatory process. It is postulated that pyelonephritis may be associated with elevated urinary AM level. In this study, we examined this hypothesis.

**Methods.** Urinary AM was quantified in 31 children with clinical and paraclinical pyelonephritis and 30 age-matched controls by high performance liquid chromatography (HPLC). Urinary Creatinine (Cr) was measured using standard methods. To omit the effect of urinary flow rate, urinary AM to Cr was considered for analysis of the results. The measurements were compared in case and control groups and before and after treatment in pyelonephritis group. Results were analyzed by paired and independent *t* test using SPSS version 15 software.

**Results.** Mean age of the patients with acute pyelonephritis and control group was  $48.8 \pm 30.7$  and  $36 \pm 30$  months, respectively. Mean urinary AM/Cr was higher in pyelonephritis group ( $61.3 \pm 119.4$  vs.  $4.26 \pm 11.4$  respectively;  $P = 0.012$ ). Urinary AM/Cr decreased after treatment significantly ( $61.3 \pm 119.4$  vs.  $13.1 \pm 21.9$ ;  $P = 0.021$ ). There was significant correlation between urinary AM and ESR and CRP. There was not a significant relationship between urinary AM and blood WBC count. In cut-off point of 100 pg/dl, the sensitivity and specificity of urinary AM for diagnosis of pyelonephritis were 67.7% and 70%, respectively.

**Conclusion.** As AM level is elevated in urine of patients with acute pyelonephritis, it can be used for diagnosis of these patients. Further studies are necessary for final judgment.

O202

## Risk Factors of Progression of Chronic Allograft Dysfunction in Renal Transplant Recipients

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**Introduction.** Graft loss due to chronic allograft dysfunction (CAD) is a major concern in renal transplant recipients (RTR). In this paper, we assessed the impact of immune and non-immune risk factors on death-censored graft loss in RTR with CAD.

**Methods.** We performed a retrospective single-center study on 214 RTR with CAD among 1534 RTR in our center between 1997 and 2005. Data registry includes details from all renal transplants carried out in our center. The RTR information is regularly updated to determine current graft function, graft loss, or RTR death. The selection criteria were a functional renal allograft for at least 1 year and a progressive decline in allograft function.

**Results.** Increasing donor age (RR = 1.066,  $P < 0.001$ ), recipient age (RR = 1.021,  $P = 0.0$ ), recipient weight (RR = 1.024,  $P = 0.029$ ), waiting time on dialysis to transplantation (RR = 1.047,  $P = 0.006$ ), pre-transplant hypertension (RR = 3.126,  $P < 0.001$ ), pre-transplant diabetes (RR=5.787,  $P < 0.001$ ), DGF (RR=6.087,  $P < 0.001$ ), proteinuria (RR = 2.663,  $P = 0.001$ ), post-transplant diabetes (RR=2.285,  $P = 0.015$ ), post-transplant hypertension (RR = 2.047,  $P = 0.017$ ), AR (RR = 3.125,  $P < 0.001$ ), Pts in stage 2 at the beginning of CAD regarding to stage 1 (RR=4.823,  $P < 0.001$ ) and Pts in stage 3 at the beginning of CAD regarding to stage 1 (RR=123.06,  $P < 0.001$ ) were significant risk factors for death-censored graft loss. Using MMF versus AZA reduced death-censored graft loss (RR = 0.499,  $P < 0.001$ ).

**Conclusion.** We found that age of donor, pre-transplant hypertension, pre-transplant diabetes, type of immunosuppression (MMF vs AZA), delayed graft function, proteinuria, and stage of allograft dysfunction in start of CAD process were the major risk factors for late renal allograft dysfunction.

O203

## Recurrent Focal Segmental Glomerulosclerosis in Transplant Kidney

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**Introduction.** Focal segmental glomerulosclerosis is one of the causes of ESRD that can recur in the transplant kidney (TX). Proteinuria may recur within hours after the graft is received whereas overt sclerosis is not evident until weeks or months later. Extensive foot process effacement is sometimes the earliest sign of recurrence of FSGS. However, segmentally sclerotic glomeruli in transplant kidney could also be seen secondarily due to other causes like hypertension, chronic allograft

nephropathy, chronic transplant glomerulopathy, and calcineurin inhibitor toxicity. Otherwise, it could also be considered as de novo FSGS. In this study, regarding the importance of differential diagnosis of recurrent primary FSGS (Rec FSGS) from secondary FSGS (Sec FSGS) due to the possible recurrence of FSGS in next transplant, we tried to find out the diagnostic criteria of Rec vs Sec FSGS based on clinical findings at presentation, time of diagnosis after transplant, and light microscopic and EM findings. We also studied the spectrum of different morphologic variants of FSGS in transplant kidney based on new Columbia classification.

**Methods.** All Tx biopsies with segmental sclerosis and/or extensive foot process effacement (FPE) and negative IF between 1995 and 2006 were reviewed excluding cases diagnosed as Tx glomerulopathy. All slides, reports, EM photomicrograph, clinical history, and follow-up reports were reviewed. Light microscopic findings were classified by the Columbia schema. Findings of Sec FSGS such as CNI toxicity, expanded lamina rara interna of GBM, and limited FPE were assessed and cases were classified as primary vs Sec FSGS.

**Results.** Forty-two patients (29 males, 13 females) met entry criteria. Average age was  $37 \pm 13.8$  years (range, 11 to 56 years). Four patients were children (< 18 years old). Twenty cases (48%) were African American and 13 (31%) were Caucasian. Twenty-three (55%) had nephrotic proteinuria at the time of biopsy. Biopsy interval ranged from 4 days to 8 years after Tx. Twenty-three (54%) cases were classified as Rec FSGS, 15 (35%) as Sec FSGS, and 4 (10%) as likely de novo FSGS. Ten (54%) cases showed only extensive FPE, 4 (17%) cellular (CELL), 4 (17%) collapsing (COLL), and 4 (17%) not otherwise specified (NOS) lesions. In cases classified as likely Sec FSGS, NOS lesion was the most common morphologic variant, in 6 (40%), followed by 3 (20%) COLL, 2 (13%) CELL, and 3 (20%) with only FPE. Rec FSGS was the most common in early biopsies (85% of all FSGS cases in first 6 months). In contrast, 13 (65%) biopsies at > 2 years showed Sec FSGS. Nearly all patients, whether Rec or Sec FSGS, lost their kidney during the following months to years.

**Conclusion.** Early time of recurrence and extensive FPE were characteristic of Rec FSGS. NOS variant is more common in Sec, whereas extensive FPE alone is the most common finding in Rec FSGS. COLL, related to CNI toxicity, and CELL lesion can be seen in both Rec and Sec FSGS. We conclude that integrated analysis of LM, EM, and clinical data help to differentiate varying etiologies of sclerotic lesions in the Tx.

#### O204

### Urinary Tumor Necrosis Factor-Alpha, Interleukin 8, Procalcitonin, and N-Acetyl-Beta-D-Glucosaminidase in Children with Acute Pyelonephritis;

### Relationship to Markers of Inflammation, Renal Function, and Imaging Studies

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**Introduction.** Analysis of urinary proteins and cytokines is emerging as an important area of pediatric nephrologic research. Urinary cytokines and proteins may be elevated in urinary tract infections and may play a key role in defining the pyelonephritis. This article contributes to studying the diagnostic value of urinary TNF- $\alpha$ , interleukin 8, procalcitonin, and N-acetyl-beta-D-glucosaminidase in children with acute pyelonephritis. **Methods.** These prospective quasi experimental studies were carried out between 2002 and 2008 on the children with acute pyelonephritis. Fresh random urine samples were obtained before and after the treatment. Urine samples were tested for TNF- $\alpha$ , interleukin 8, procalcitonin, N-acetyl-beta-D-glucosaminidase, and creatinine. We also evaluated our patients' serum inflammatory markers (complete blood count, ESR, CRP), renal scintigraphy, kidney ultrasonography, VCUG (voiding cystoureterography), and routine biochemical studies.

**Results.** A total of 334 children with acute pyelonephritis were perused. Urinary TNF- $\alpha$ /Cr, interleukin 8/Cr, procalcitonin/Cr, and N-acetyl-beta-D-glucosaminidase/Cr were significantly higher in pretreatment than post-treatment values ( $P < 0.03, 0.001, 0.002, \text{ and } 0.001$ , respectively). The sensitivity and specificity of urinary TNF- $\alpha$  /Cr in diagnosis of pyelonephritis were 91% and 100%, respectively. We found urinary TNF- $\alpha$  /Cr as the most sensitive test in comparison to urinary interleukin 8/Cr, procalcitonin/Cr, and N-acetyl-beta-D-glucosaminidase/Cr for diagnosis of pyelonephritis. Our study showed a significant difference between the level of urinary TNF- $\alpha$ /Cr in patients with normal kidney ultrasonography and those who had abnormal kidney ultrasonography and the same results between first time urinary TNF- $\alpha$ /Cr and urine leukocytes, urine protein, urine specific gravity, urine culture, erythrocyte sedimentation rate, C- reactive protein, hemoglobin, dimercaptosuccinic acid scintigraphy, and voiding cystoureterography.

**Conclusion.** We concluded that the ratio of urinary TNF- $\alpha$ /Cr, interleukin 8/Cr, procalcitonin/Cr, and N-acetyl-beta-D-glucosaminidase/Cr were increased in pyelonephritis and were decreased after appropriate therapy. Urinary TNF- $\alpha$ /Cr might be a better indicator for inflammatory response and urological abnormality in children with acute pyelonephritis.

O205

## Results of Renal Transplantation in Children in Iran, a Multicenter Study

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**Introduction.** Kidney transplantation is the treatment of choice for children with end-stage renal disease. Here, we report the results of the patient and graft survival in children with renal transplantation in the most centers of pediatric transplantation in Iran.

**Methods.** A total of 521 renal transplants had been performed and followed in transplant centers in Iran [Labafi-Nejad Hospital (290), Urmia university (80), Tabriz university (23), Jundishapoor university (35), Dr. Shariati Hospital (55), and Namazi Hospital (38)].

**Results.** The mean age of the patients was  $12.7 \pm 3.45$  years; 28 patients were younger than 7 years old; and 54.5% of our patients were female. Transplantation was often performed between 1998 and 2006. The most etiologies included inherited and structural renal disorders. In adolescence, glomerulonephritis increased progressively. A total of 27.5% of our patients were transplanted pre-emptively. The mean duration of dialysis was  $12.7 \pm 13.06$  months; 94% of patients underwent hemodialysis; 11% of the donors had familial relationship with the recipients. The mean age of donors was 27.9 years; 79% of the donors were male; 5.2% of the donors were cadaver. Delayed graft function occurred in 17% of the patients. The incidence of delayed graft function was declined by time. It was seen in 24.4% between 1983 and 1990, 20% between 1991 and 2000, and 9% after 2001. Acute rejection happened in 45% of our patients. The mean duration of acute rejection episodes was  $1 \pm 0.89$ . The episodes of acute rejection were declined by time. The incidence of acute rejection episode was 76.5% between 1983 and 1990, 52.6% between 1991 and 2000, and 30% after 2001. Mean time of follow-up was 53.9 months. Graft failure was seen in 29% of the cases. The most common causes of graft failure were chronic rejection, acute rejection, and delayed graft function respectively. Graft survival rate at 1, 3, 5, 7, 10, 12 and 14 years was 87.8%, 79.2%, 70.4%, 54%, 46.4%, and 39%, respectively.

**Conclusion.** We showed that the acute rejection, delayed graft function, and the year of transplantation

had significant relationship with graft survival.

O206

## ADAMTS-13 Metalloproteinase Activity and Complement Inhibitory Factor H Level in a Group of Patients with Thrombotic Microangiopathy

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**Introduction.** Thrombotic microangiopathy (TMA) is a unifying term for both hemolytic uremic syndrome (HUS) and thrombotic thrombocytopenia purpura (TTP). TMA is characterized by thrombocytopenia, hemolytic anemia, and microvascular thrombi in different organ systems. Known risk factors for development of TMA including bacterial toxins, viral infection, autoimmune disease, and pregnancy catastrophes. Inherited deficiency of complement inhibitory factor H (FH) and metalloproteinase ADAMTS-13 (vWF-cleaving protease) deficiencies or inhibitors are another important risk factor for development of TMA and may coexist with above risk factors.

**Methods.** In this single center prospective study, all patients with clinical diagnosis of TMA were entered. Patients' clinical presentation and routine laboratory measurements were re-ordered and serum samples were taken for measurement of complement inhibitory factor H, ADAMTS-13 activity, and presence or absence of ADAMTS-13 inhibitor. Serum complement C3, C4, CH50 level, serologic test for hepatitis B, hepatitis C, HIV, systemic lupus erythematosus, and rheumatoid arthritis were performed. History of recent diarrhea and obstetric complications was recorded. We followed recurrence of TMA and renal outcome of these patients for two years.

**Results.** Between 2003 and 2005, we diagnosed 11 consecutive TMA patients (f/m 10/1, age; 22 to 70 years). Majority of our patients were young women. Routine laboratory measurements were as the following: hemoglobin:  $8.8 \pm 0.9$  mg/dl, platelet count:  $40800 \pm 14793/\mu\text{l}$ , LDH:  $1793 \pm 585$  IU/L, C3:  $195 \pm 60$  mg/dl, C4:  $51 \pm 11$  mg/dl, complement factor H:  $772 \pm 211$  mg/dl, and ADAMTS-13 activity percentage:  $32.2\% \pm 13.7\%$  (range, 50% to 150% activity). One patient had ADAMTS-13 inhibitory factor. Acute dialysis was started in four patients (37%). One patient had a positive history of diarrhea. Two patients (2/11) had systemic lupus erythematosus. HBS-Ag and HCV-

antibody positive results were detected in two patients. Obstetric catastrophes, including IUFD and severe pre-eclampsia were detected in two patients. One patient with ADAMTS-13 inhibitory factor who presented with unconsciousness and convulsion died in his first week of admission. Recurrent TMA occurred in a patient with

low C3 complement level. Chronic Renal dysfunction was developed in two patients.

**Conclusion.** In our study, majority of the patients with TMA were young women. Patients with ADAMTS-13 inhibitory factors and complement factors deficiency had a poor prognosis outcome.