

P301

Is Serum T3 a Marker of Inflammation in Peritoneal and Hemodialysis Patients?

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Introduction. Because inflammation influences thyroid function, it was hypothesized that low plasma triiodothyronine (fT3) in ESRD may be an unsuspected expression of the inflammatory state of these patients. This study evaluated the correlation between T3 and hs-CRP levels in peritoneal (PD) and hemodialysis (HD) patients.

Methods. This is a cross-sectional study which aims to specify the correlation between T3 and hs-CRP levels among 30 PD and 30 HD patients and 20 healthy controls. Serum levels of hs-CRP, T3, T4, TSH, and T3RU were determined in all cases and controls. For this purpose, Pearson's correlation coefficient method was used.

Results. The mean age of the participants in the PD, HD, and normal groups was 51.64 ± 16.29 , 45.64 ± 16.89 , and 43.86 ± 17.73 years, respectively. The mean hs-CRP in CAPD, HD, and normal subjects was 3.97 ± 2.20 , 3.59 ± 1.98 , and 3.68 ± 1.84 $\mu\text{g}/\text{dl}$, respectively ($P = 0.49$). The mean of T3 in PD, HD, and normal subjects was 103.83 ± 31.36 , 86.05 ± 31.5 , and 107 ± 38 , 23 ng/dl , respectively ($P = 0.001$). In peritoneal and hemodialysis patients, T3 was lower than in normal subjects ($P < 0.001$), but there was no statistically significant difference between PD and HD patients ($P = 0.066$). T3RU and TSH0 differed statistically between PD and HD patients. There was a significant inverse correlation between T3 and hs-CRP levels among hemodialysis patients ($P = 0.036$). But, there was not a significant correlation between T3 and hs-CRP levels in patients under peritoneal dialysis.

Conclusion. The relationship between T3 and CRP suggests that inflammation might be involved in the low T3 syndrome in HD patients. But, we did not find a significant correlation between T3 and hs-CRP levels in patients under peritoneal dialysis.

P302

Pentoxifylline and Improvement of Anemia in End Stage Renal Disease

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Introduction. One of the most important causes of anemia in ESRD is increasing of inflammatory cytokines in these patients. In this study, pentoxifylline was

assessed for improvement of anemia, because of its anti-inflammatory and anti-cytokine effect and because it is a relatively safe drug in these patients.

Methods. In this study, 84 ESRD patients (46 males, 38 females), that had Hb level >9 g/dl , Hct $> 20\%$, ferritin $< 50\text{mg}$, transferrin saturation (TS) $< 20\%$, and PTH > 300 pg/dl , were selected. These patients had no other reason for their anemia except that they had ESRD. They were divided into two equal groups with maximum matching, case and control. Case group received EPO (100U/kg/week as S.C. injection, 3 times/week), venofer (100mg as IV, slowly infusion, weekly), and pentoxifyllin (400mg PO, daily). Control group received only EPO and venofer without pentoxifyllin as ordered for case group. Duration of study was one year. In the beginning and then monthly, Hb, Hct, Ferritin, PTH, TS, Alb, and quantitative CRP were measured.

Results. Average of increasing of measurements in case and control groups were: Hb, 5.9 g/dl and 2.2 g/dl ($P = 0.001$); Hct, 15.7% and 6.1% ($P = 0.02$); Alb, 1.4 mg/dl and 0.04 mg/dl ($P = 0.01$), respectively. Average decrease of CRP in case group was 14.6 mg/liter and in the control group was $8.3\text{mg}/\text{liter}$. During the study, ferritin <50 mg , TS $< 20\%$, and PTH >300 pg/dl had been controlled.

Conclusion. Pentoxifylline can significantly improve anemia in ESRD patients.

P303

Impact of Behavioral Modification in Treatment of Nocturnal Enuresis

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Introduction. Nocturnal enuresis (NE) is a pathologic state that is more frequent in 5- to 10-year-old children and is characterized by urine loss during the night in children over the age at which bladder control is supposed to be present. The spontaneous cure rate in NE is about 15% per year and at the age of 16, only 1% to 2% of the children still have enuresis. The current therapies for a sub-group of patients with enuresis associated with nocturnal polyuria and normal bladder function consist of some non-pharmacologic behavioral modifications and few drugs such as desmopressin; but, response to these therapies is unpredictable and depends on many factors. In this study we evaluated the response of enuretic patients to all kinds of therapies.

Methods. In this study, all consecutive patients who referred with NE to nephrology clinic of Abuzar Children's Hospital in Ahvaz between September 2007 and August 2009 met the criteria for inclusion and were enrolled in study. Parents of all patients were advised to empty the bladder and restrict fluid and fruit intake from 2 hours prior to going to bed, restrict salt,

sugar, and heavy diets at night, wake up their children routinely 3 hours after sleeping, and give awards for dry nights. After one month of non-pharmacologic therapy, all patients received nasal desmopressin. Wet and dry nights were documented both before and after non-pharmacologic and pharmacologic treatment by means of a voiding diary. We also divided NE patients into two groups based on presence of hypercalciuria.

Results. Hypercalciuria was found in 32(26.2%) NE patients and it was significantly associated with lower age (7.5 ± 2.28 years vs. 9.15 ± 2.45 years, $P = 0.002$), lower body mass index (15.5 ± 2.2 vs. 18.62 ± 4.79 , $P = 0.002$) and the female gender ($P = 0.021$). The mean age in boys and girls was 9.24 ± 2.59 and 8.07 ± 2.42 , respectively ($P = 0.021$) but there were no significant difference between them in body mass index, [Urine Ca/24h]/Bw ratio, mean wetting nights per week, and their ultimate response to the therapy. Mean of wetting night per week in NE patient with and without hypercalciuria in first visit were 6.04 ± 1.49 and 5.3 ± 2.01 , respectively ($P = 0.06$); but, after non-pharmacologic advices, it changed to 2.8 ± 2.03 and 1.9 ± 1.33 , respectively ($P = 0.02$). Mean overall success in this stage was 53.98%. After Combination of pharmacologic and non-pharmacologic therapy, we had 86.39% success to decrease nocturnal enuresis and it had no difference between hypercalciuric and non-hypercalciuric NE patients ($P > 0.05$).

Conclusion. Hypercalciuria and non-pharmacologic behavioral modification therapy are two important factors in nocturnal enuresis.

P304

Results of Voiding Cystourethrography in the First Week and Second to Sixth Weeks After Urinary Tract Infection in Children Referring to Amirkabir Hospital of Arak

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Introduction. Urinary tract infection (UTI) is the most prevalent genitourinary disease in children. About 40% of the children with UTI suffer from reflux accompanied by some consequences such as pyelonephritis and kidney paranchymal injury. Since the diagnostic method for reflux is voiding cystourethrography (VCUG), and there is controversial idea about its timing, the present research was conducted to compare the timing of VCUG in children with UTI in the first week and after the first week of urinary tract infection.

Methods. In this case-control study, 104 cases and 104 controls between 1 month and 12 years of age with the complain of urinary tract infection who had referred to the clinic of Arak Amirkabir hospital in 2006 were enrolled in the study. VCUG was performed at the first

week of infection in the case group, and in the control group, VCUG was performed after the first week of infection. The results were analyzed and compared using Mann-Whitney-U, Chi square, and N par tests and SPSS software.

Results. The case group consisted of 17 boys and 87 girls with average age of 46 months. The control group consisted of 21 boys and 83 girls with average age of 41 months, and there was no meaningful difference between the age and sex of the two groups. Overall, the incidence of reflux was 49.5% and 50% in the case and control groups, respectively. The incidence of reflux in the left kidney 36.5% in both case and control groups, and in right kidney, these measures were 31.1% and 41.5% with no meaningful difference between the two groups. Also, 2/3 of the children had VCUG complications in the first week after UTI including dysuria. The other group, there was no complication.

Conclusion. Performing VCUG in first week of UTI does not increase pseudo incidence and grade of reflux in these patients.

P305

Comparison of Voiding Color Doppler Ultrasonography versus Voiding Cystourethrography in Diagnosis of Vesicouretral Reflux

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Introduction. Vesicouretral reflux (VUR) is one of the most important anomalies of the urinary system. The incidence of VUR in children with UTI is 25% to 50%. VCUG is the gold standard for VUR diagnosis. This procedure is invasive for its radiation exposure and catheterization. This study was done to evaluate the reliability of color flow Doppler sonography (CFDS) as a less invasive alternative method for detection of VUR.

Methods. In this study, 24 patients aged from 12 days to 13 years were evaluated. All patients underwent color Doppler and VCUG while the sonologist was unaware of VCUG results. Diagnostic value of color Doppler was assessed as sensitivity, specificity, and positive predictive value, using VCUG results as standard.

Results. In 20 (83.3%) of 24, the results of color Doppler correlated well with VCUG findings. One case was false positive (4.2%) and 2 cases were reported as false negative (8.3%). Statistical analysis showed contingency coefficient between color Doppler and VCUG ($r = 0.798$, $P < 0.001$). Of 24 patients suspected for reflux by VCUG, 14 cases were positive and 10 negative, while 13 cases were reported positive and 11 negative by color Doppler. Color Doppler sensitivity, specificity, positive predictive value, and negative predictive values were 85%, 90%, 92%, and 81%, respectively.

Conclusion. Color Doppler sonography at filling and micturating phases is a reliable and sensitive alternate modality for urethral jets diagnosis and VUR detection. This method nullifies the danger of exposure to ionizing radiation and avoids the unpleasant urethral catheterization. Therefore, Color flow Doppler is a promising, new, noninvasive technique that can act as adjunct to standard sonography for detection and follow-up of children with VUR.

P306

Serum Leptin Levels and Nutritional Factors in CAPD Patients

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Introduction. Leptin is produced by fat cells and is secreted into the blood stream. Leptin is freely filtered into the renal tubules but its concentration in the urine is very low. Serum leptin level is higher in continuous ambulatory peritoneal dialysis (CAPD) patients, compared to the healthy peoples. It seems that hyperleptinemia has a role in malnutrition and anorexia in dialysis patients.

Methods. In a cross sectional study, CAPD patients in Alzahra Hospital in Isfahan were enrolled from October 2007 to February 2008. Serum levels of leptin, albumin, triglyceride, KT/V, renal creatinine clearance (Crcl) and demographic findings were measured in all patients.

Results. Average age of the patents was 53±14.76. History of hemodialysis was seen in 23 patients. Mean serum leptin level in women and men were 27±23µg/l and 16±13µg/l respectively. There was a significant correlation between serum leptin level with body mass index (BMI) ($P < 0.0001$) and Crcl ($P < 0.001$) were found. There was no significant correlation between serum leptin level and KT/V, duration of renal failure, serum triglycerides (TG), serum low density lipoprotein (LDL) cholesterol and mid arm circumference ($P > 0.05$).

Conclusions. By our knowledge, probably it is the first time that has been reported that serum leptin level has a direct positive correlation with Crcl in CAPD patients. This may explain increasing of mortality in patients with lower serum leptin levels. There was no relationship between serum leptin levels and midarm circumference, serum TG and total cholesterol and LDL cholesterol and KT/V.

P307

Comparison of HD and CAPD for Preparation of Renal Transplantation

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Introduction. Kidney transplantation is the optimal curative modality in the patients with ESRD. However, only 50% of the patients with ESRD have received renal transplantation. It is extremely low and most patients should continue dialysis for their whole life. Recently, high survival rate of renal transplantation after peritoneal dialysis (PD) was reported; however, it was unclear whether a difference in dialysis modality could influence the outcome. Therefore, we evaluated the influence of dialysis modality on the complication of kidney transplantation, graft loss, and outcome in our center.

Methods. Eleven kidney transplants were chosen from 110 dialysis patients between 2001 and 2008 in our center. The incidence of acute rejection episodes, chronic rejection, complications after receiving transplantations, and comorbide diseases were also evaluated.

Results. A total of 90% and 10% of our patients received HD and PD, respectively. Seven patients received living-donor kidney transplantation. Overall graft survival was 89%. Dialysis modality prior to transplantation was HD and PD in 81% and 19% of the patients. The transfer rate from PD to transplantation was significant ($P = 0.005$). The reason for the high transfer rate of PD patients might be cooperation with their family and the provision of relevant information by nephrologists during PD. There were no differences between the two modalities regarding graft survival rate, incidence of acute rejection, chronic rejection, and complications before and after transplantation.

Conclusion. Difference in pre- transplant dialysis modality did not affect the outcomes; however, the transfer rate from PD was significantly higher than from HD. Accordingly, PD is useful compared to HD for preparation of living-donor kidney transplantation.

P308

Efficacy of Oral Granisetron in Uremic Pruritus

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Introduction. Uremic pruritus is a relatively common and distressing problem for patients with chronic renal failure. Serotonin and histamine have been reported as possible mediators of uremic pruritus. Granisetron, a potent and selective inhibitor of 5-HT₃ receptors was developed for relief of chemotherapy-induced nausea. There are some studies about effect of ondansetron in uremic pruritus and recently, one case report described relief of renal itching by Granisetron. The aim of our study was to evaluate the effect of Granisetron on uremic pruritus in patients with chronic renal failure on dialysis.

Methods. Fourteen uremic patients on hemodialysis with moderate and severe pruritus were enrolled in this

open trial. Patients received Granisetron tablet (1 mg twice a day) for 1 month and were asked to complete a questionnaire assessing the severity of pruritus, twice a day.

Results. A total of 77% of the patients responded to the treatment and on the 1st, 2nd, and 4th weeks of treatment, the mean values of pruritus score were 23 (range, 11 to 40), 16 (range, 8 to 35), and 8 (range, 0 to 35) points, respectively, while at baseline (before treatment) it was 31 (range, 20 to 35) points ($P = 0.03$). Pruritus disappeared in 7 patients at the end of the 4th week, and was mild in 3 others. This effect was maintained during the study. Weekly clinical and laboratory examinations showed no side effects.

Conclusion. Granisetron may be an effective, safe, and well tolerated drug for the treatment of uremic pruritus in hemodialysis patients.

P309

Oxidative Stress Status and Liver Damage in Renal Ischemia-Reperfusion Injury: Pretreatment with Low Dose Lipopolysaccharide (LPS)

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Introduction. Renal ischemia-reperfusion (IR) injury is known as a major cause of acute renal failure which results in inflammatory responses and production of reactive oxygen species (ROS). These changes induce local and distant organ injuries. There are many reports on the liver changes as a result of renal IR injury. Recent studies demonstrate that LPS-preconditioning increases resistance of myocardial tissues to subsequent IR injuries. The aim of the present study is to assess the protective effect of low-dose LPS on kidney and liver oxidative stress and damage after induction of renal bilateral IR injury.

Methods. Male Sprague-Dawley rats were randomly assigned into two groups, LPS-pretreatment group in which LPS was injected (0.2mg/kg, intraperitoneally) 24 hours before induction of renal IR and control non-pretreated group (normal saline injection). Bilateral renal ischemia was conducted by 45-minute clamping of both renal arteries followed by 1 hour reperfusion. At the end of the experiments, blood and tissue samples were collected for renal and liver functional measurements and tissue MDA (Malondialdehyde) evaluation as an oxidative stress index.

Results. Renal IR resulted in significant increase in serum urea and creatinine levels as well as significant increases in liver enzyme (including ALT (alanine transferase) and AST (aspartate transferase)) activities. There were also significant increases in liver MDA levels. Pretreatment with low-dose LPS had no significant

effect on prevention of the reduction in renal and liver function and MDA levels.

Conclusion. Pretreatment with low-dose LPS has no protective effect in prevention of renal bilateral IR injuries (45 minute ischemia- 60 minute reperfusion). Since 1 hour of reperfusion may not be long enough for achievement of protective effects of the treatment, further studies are needed for evaluation of renal and liver function in longer reperfusion periods.

P310

Proper Assessment of a Patient Saves More Than a 1,000,000\$!

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Introduction. Remembering back to medical training, it was always stated that it is important to treat the patient and not the laboratory values. With the advancement of technology, it appears that this concept is fading. Proper assessment is of greatest importance to the welfare of a patient, first and foremost. In addition, with the current changing economy and its affects on healthcare, it is of vast significance that we stress the importance of a proper assessment. This case report uses an example to highlight this importance.

Methods. Although Fabry's disease is one of the most common lysosomal storage disorders, affecting approximately 1 in 40,000 to 60,000 males, how often do we encounter Fabry's disease in our professional career? Our education has taught us to consider Fabry's disease in patients with signs of multisystemic involvement in a pattern consistent with renal, cardiac, and cerebrovascular involvement. A detailed and complete medical history, family history, and a thorough physical examination are necessary. Our patient presented with some neurological impairment and lab studies showed a deficiency in the enzyme alpha galactosidase A. Treatment for this finding is estimated at to be approximately 100,000\$ annually.

Results. Upon further investigation, our patient was diagnosed with a rare mutation [D313Y allele] that led us to the conclusion that he did not have Fabry's disease.

Conclusion. Based on this finding, there was no need for lifelong enzyme replacement therapy and most importantly, the patient's life expectancy as well as quality of life would significantly improve knowing that he did not have a debilitating and possibly lethal disease and on top of that, it is estimated that he saved over 1,000,000\$ for the next ten years.

P311

The Effects of Race and the Season on Hypovitaminosis D in Patient on Hemodialysis

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Introduction. Seasonal and racial differences in serum 25-hydroxyvitamin D levels have been studied extensively in the general population but not in patients with End Stage Renal Disease (ESRD).

Methods. Serum 25-hydroxyvitamin D levels, the best available index of vitamin D nutrition, was measured at the end of summer (September) in 142 chronic hemodialysis patients and again at the end of winter (April) in 73 of these 142 patients, to determine the prevalence and risk factors for vitamin D deficiency.

Results. The prevalence of vitamin D depletion, as defined by serum 25-hydroxyvitamin D level of less than 20 ng/ml (50 nmol/l), was 54% at the end of summer and further increased to 86% by the end of winter ($P < 0.0001$ summer versus winter). We observed that women and African Americans had a greater prevalence of hypovitaminosis D ($P < 0.0002$ and $P < 0.001$ for both comparisons, respectively). Surprisingly, diabetic status, age, and the duration of ESRD were not associated with a significant increase in risk of vitamin D depletion.

Conclusion. Vitamin D depletion is present in about half of ESRD patients with marked seasonal variations. Patients with ESRD should have more frequent assessments of their vitamin D nutrition by serum 25-hydroxyvitamin D levels, and vitamin D supplementation should be routinely prescribed, which may prevent many of the complications related to vitamin D deficiency and secondary hyperparathyroidism.

P312

Hypophosphatemia in Peritoneal Dialysis Patients

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Introduction. Binder therapy, nutritional status, parathyroidectomy (hungry bone syndrome), and intracellular shifting are the major causes of hypophosphatemia among PD patients.

Methods. In this retrospective single center study, we reviewed the medical records of our peritoneal dialysis patients. Hypophosphatemia was defined as plasma

phosphate concentration below 2.5 mg/dl (normal range, 2.5 to 4.5 mg/dl). Severe hypophosphatemia was defined as phosphorus below 1 mg/dl (0.30 mmol/L). All patients with at least one recorded phosphate below 2.5 mg/dl was considered hypophosphatemic. In all of them, the following data was retrospectively recorded: history of diabetes mellitus, insulin therapy, parathyroidectomy, and recent peritonitis (within the past 4 weeks).

Results. In a 7-year period, CAPD was started in 248 patients (M/F: 130/118, age: 2 to 87 year) in our center. Hypophosphatemia (< 2.5 mg/dl) was detected in 11 patients. In eight patients (73%), hypophosphatemia was developed after a recent peritonitis and in three of them, it was developed early after peritoneal dialysis start. Death occurred in three old aged diabetic females with hypophosphatemia.

Conclusion. The results of this study showed that hypophosphatemia could occur in a substantial number of peritoneal dialysis patients. Patients with early initiation of peritoneal dialysis and those with recent peritonitis are at risk for development of hypophosphatemia.

P313

Predictors of Vascular Calcification in Peritoneal Dialysis Patients

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Introduction. Vascular calcification is an important predictor of cardiovascular mortality in end stage renal disease patients. Uremia associated risk factors of vascular calcification including hyperphosphatemia, inflammation, and adynamic bone disease. Because of calcium absorption via peritoneal membrane, these patients are at increased risk of adynamic bone disease and vascular calcification.

Methods. In this prospective cohort, we tried to identify the prevalence and risk factors of vascular calcification in a group of peritoneal dialysis patients. We used the conventional X-ray to detect the presence or absence of radial artery calcification. Those patients who had at least one year history of peritoneal dialysis were entered. The clinical and laboratory data including age, duration of dialysis, diabetes mellitus, treatment with warfarin, serum calcium, phosphorus, albumin, intact parathyroid hormone, and serum albumin were recorded in each individual.

Results. In a 13-month period (July 2008 to August 2009), we studied 96 patients. Radial artery calcification was detected in 21 patients (22%; M/F: 11/10, mean age; 46 ± 14.6). Albumin, intact parathyroid hormone, serum calcium, and serum phosphorus levels were 4.0 ± 0.6

gram/l, 24 to 1553, 9.5 ± 0.82 mg/dl, and 6 ± 1.7 mg/dl, respectively. Logistic regression analysis revealed that diabetes mellitus and treatment with warfarin were the major risk factors of radial artery calcification.

Conclusion. Although plain X-ray detects only advanced stages of vascular calcification, it is instead an easy method. Warfarin blocks the production of matrix GLA protein, an important inhibitor of calcification. This can explain a higher risk of vascular calcification in these patients.

P314

Cause of Primary Nephrotic Syndrome in Adult Patients in Khuzestan Province

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Introduction. The glomerular diseases that cause nephrotic syndrome can generally be divided into primary and secondary etiologies. Primary nephrotic syndrome (PNS) is associated with glomerular diseases intrinsic to kidney and not related to systemic causes. The subcategories of PNS are based on histological descriptions and aim of this study is to determine the clinical manifestations and prevalence of its causes.

Methods. In a prospective study, we evaluated all patients with primary nephrotic syndrome who HAD referred to Imam Khomeini hospital of Ahvaz between January 1998 and August 2009. We also performed kidney biopsy for them and the specimens were investigated by light microscope.

Results. Ninety-two patients (53 males and 39 females, mean age, 42 ± 18 years) were included. Mean serum creatinine and a median rate of urinary protein excretion were 1.47 mg/dl and 5250 mg/day, respectively. The most common histological finding was focal and segmental glomerular sclerosis (FSGS; 28 patients, 30.43%), followed by membranous glomerulonephritis (MGN; 24 patients, 26.08%), minimal change disease (MCD; 12 patients, 13.04%), membranoproliferative glomerulonephritis (MPGN; 10 patients, 10.86%), IgA nephropathy (8 patients, 8.69%), focal and segmental glomerulonephritis (FSGN; 4 patients, 4.34%), mesangial proliferative glomerulonephritis (3 patients, 3.26%), and diffuse proliferative glomerulonephritis (3 patients 3.26%). Male to female ratio in MGN, MCD, and IgA nephropathy was 3 to 1, and 2 to 1 in MPGN and FSGS.

Conclusion. FSGS is the most common and MGN is the second cause of primary nephrotic syndrome in adult patients in Khuzestan province.

P315

Complete or Partial Remission in Idiopathic Membranous Glomerulonephritis

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Introduction. Although Membranous Glomerulonephritis (MGN) remains the first or second cause of adult-onset nephrotic syndrome, its management is still controversial. In this study, we evaluated the response of patients with MGN to different regimens.

Methods. Between July 2006 and June 2008, we prospectively conducted four protocols of treatments in 21 biopsy-proven idiopathic MGN according to the laboratory and clinical manifestations: 1-Conservative management with ACE inhibitors and statines. 2-Prednisolone (0.5 mg/kg/day). 3-Chlorambucil (0.15 mg/kg/day) with low dose of prednisolone (0.15 mg/kg/day), and 4-Cyclosporine (4 mg/kg/day) with low dose of prednisolone (0.15 mg/kg/day). Complete and partial remissions were defined as proteinuria less than 200 mg/day and 1500 mg/day, respectively.

Results. Twenty-one patients (14 males and 7 females) with mean age of 40 ± 15 years at diagnosis were enrolled in the study. Median rate of urinary protein excretion and average length of follow-up were 8500 mg/day and 42 months, respectively. Complete remission in conservative, steroid, chlorambucil, and cyclosporine groups was 25%, 50%, 0%, and 40% and partial remission was 75%, 25%, 60%, and 30%, respectively. Overall, complete and partial remission was seen in 31.57% and 42.10% of the patients.

Conclusion. This study suggests that in patients with idiopathic MGN, complete or partial remission achieves in more than 70% of the patients with different regimens.

P316

Evaluation of Acquired Cystic Kidney Disease in Hemodialysis Patients with Ultrasonography

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Introduction. Acquired cystic kidney disease (ACKD) occurs in patients with prolonged azotemia and early detection is important because clinically significant complications, especially renal cell carcinoma, are associated with ACKD.

Methods. In a cross-sectional study from March 2007 to April 2008 we prospectively evaluated the prevalence of ACKD in our hemodialysis (HD) center in Imam Hospital of Ahvaz by ultrasonography (US). Criteria for the diagnosis of ACKD were the presence of at least four bilateral renal cysts in patients with non-cystic primary renal disease.

Results. A total of 148 patients (95 men and 53 women)

were included in the study. Mean age and mean HD period were 55.8 ± 16.4 years and 36.3 ± 22.8 months, respectively. The prevalence of ACKD was 20.3% (18.9% in men and 22.6% in women). There were no significant differences in the prevalence of ACKD in men and women ($P = 0.592$) and in different etiologies of ESRD ($P = 0.635$). The prevalence of ACKD was much more in HD patients with 3 years or more HD period ($P = 0.001$). **Conclusion.** ACKD is common in HD patients and we recommend that renal ultrasonography should be performed in patients who have been on HD for more than three years.

P317

Anti-Inflammatory Effects of Simvastatin in End Stage Renal Disease Patients

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Introduction. End Stage Renal Disease (ESRD) is associated with higher levels of inflammatory biomarkers. This markedly higher inflammatory status can lead to faster rates of renal function loss, greater incidence of cardiovascular events, chronic malnutrition, erythropoietin resistance, and decrease in survival among dialysis patients. In addition to the cholesterol lowering effects of statins, they exert a number of so called “pliotropic”, vasculoprotective actions that include improvement of endothelial function, increased antioxidant properties, plaque stabilization, and immunomodulatory effects.

Methods. We conducted our prospective, randomized, controlled trial on 40 patients on chronic hemodialysis and divided them into two groups: simvastatin treatment group (20 mg daily, $n = 25$) and placebo group ($n = 15$). We measured hs-CRP, IL-6, Hb level, and WBC count at baseline and after 3 months. We also evaluated muscular and hepatic side effects of the drugs in these patients.

Results. Qualitative parameters were homogenous between the groups at baseline. Mean CRP levels was elevated at baseline in both groups (10.47 mg/L and 9.3 mg/L) with normal level of up to 3 mg/L. Mean hs-CRP levels decreased from 10.47 mg/L to 7.8 after 3 months in treatment group ($P = 0.04$) but in the control group, values were 9.3 mg/L at baseline and 10.3 mg/L after 3 months. Mean serum IL-6 level decreased from 5.13 pg/ml to 3.96 pg/ml in treatment group ($P = 0.01$) but in placebo group, increased from 4.0 pg/ml to 4.3 pg/ml. After treatment, there was an elevation in mean Hb level in both groups from 10.1 g/dl to 10.9 g/dl in treatment group ($P = 0.007$) and 9.9 g/dl to 10.6 g/dl in control group ($P = 0.06$). WBC count was decreased from 8600 at mean baseline levels in treatment group to 6700 ($P = 0.003$) and from 7180 to 7150 in control group at the end of study. There were no significant changes

in liver and muscle enzymes during and after therapy. **Conclusion.** ESRD patients had elevated levels of inflammatory markers. Simvastatin significantly reduced serum hs-CRP, IL-6 levels, and WBC count in ESRD patients. Administration of simvastatin was safe in patients on hemodialysis.

P318

A Comparison between Experimental and Bioelectrical Impedance Analysis Methods in Evaluation of Dry Weight in Peritoneal Dialysis Patients

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Introduction. To optimize dialysis prescription and fluid balance of the peritoneal dialysis (PD) patients, it is important to assess their dry weight accurately. The experimental evaluation method often needs continuous and controlled reduction of the post dialysis weight down to the point where the patient does not show any signs of hypotension and volume overload. The quality of the experimental assessment depends mostly on the examiner’s capability, and takes time to achieve the dry weight but is still not so accurate. We aimed to compare experimental and bioelectrical impedance analysis (BIA) methods in evaluation of dry weight in PD patients.

Methods. Thirty continuous ambulatory PD patients of Isfahan University hospitals (16 males and 14 females) who had been referred for periodical examinations between April 2009 and June 2009 were evaluated. The normal body volume was selected as the inclusion criteria and identified by an examiner group consisted of a nephrologist, a general practitioner, and a PD nurse. The patients’ dry weights were calculated based on both experimental and BIA (using Maltron Bioscan 916) methods.

Results. Mean age of the patients was 55.6 ± 13.9 years and 53.3% were males. The mean dry weight in experimental method was 63.7 ± 13.8 Kg in comparison to 62.2 ± 14.1 Kg in BIA method; $P < 0.001$. Dry weight depended on gender ($P < 0.004$) and body mass index (BMI; $P < 0.05$) in univariate and multivariate analysis. No correlation observed between the patients age, blood pressure, diuretic consumption, previous hemodialysis history, or PD duration time regarding two methods.

Conclusion. We found a significant difference between experimental and BIA methods in dry weight calculation which was more significant in male patients with lower BMI level. More studies are needed to evaluate and compare the accuracy of BIA and experimental methods in dry weight calculation based on a gold standard.

P319

Similarities between Peritoneal Mesothelial Cells and Stem Cells

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Introduction. The introduction of peritoneal dialysis (PD) as a modality of renal replacement therapy has provoked much interest in the biology of the peritoneal mesothelial cell. The presence of pluripotent mesenchymal cells in the mesothelial monolayer as well as in the submesothelial connective tissue raises the possibility of using the peritoneal mesothelium in regenerative therapies. This perception of the problem is also based on observations made in humans as well as in laboratory animals showing bone, bone marrow, cartilaginous tissue, glomerular-like structures, and creation of artificial blood conducts resulting from pathological situations (mesothelioma, sclerosing peritonitis), or after in-vivo or ex-vivo experimental interventions. The main concept emerging from this information is that peritoneal mesothelial cells are endowed with such a degree of plasticity that, if placed in the appropriate micro-environment, they have a remarkable potential to generate other mesenchymal-derived cell lines. Therefore, intensive research is required to define the best environmental conditions to take advantage of this plasticity and make the peritoneal mesothelium an actual option to be applied in regenerative medicine.

Methods. To investigate the plasticity and nature of mesothelial cells, cell population from peritoneal dialysis fluid of patients were first screened for dominant marker determination by RT-PCR and immunofluorescence. Passage 4 cultured cells were isolated by FACS using CD 34, CD31, CD90, CD38, CD45, and HBME-1. Also, cytokeratin 18 and HLA 1, D, R, and Q markers were evaluated.

Results. Representative mesothelial cell cultures grown from peritoneal effluents of early stage on PD in 1th passage by phase-contrast microscopy showed different morphology of mesothelial cells (MCs) in culture. The photomicrographs show the intermediate phenotype (some cobblestone-like and some fibroblast-like phenotype). The 4th passage showed fibroblast cell-like appearance. Mesothelial cells in passages 1 and 4 were isolated by culture and FACS using HBME-1 marker. HBME-1 is a dominant marker of mesothelial cells. The majority of cells appeared this marker. Our data demonstrated CD34 positive cells represented 24.3% and CD31 and WT-1 positive cells represent only 1% to 3% of the mesothelial cell population. CD 90 positive

cells were insignificant. Dot plot and histogram curves were produced from gated cells from side scatter versus forward scatter curves. FITC and high-FL2 were selected as X and Y axes for dot plots and events versus FITC were selected for histograms. Also, the expression of CD38 and CD34 was detected by semi-quantitative RT-PCR.

Conclusion. This study could violate the previously assumed plasticity of mesothelial progenitor cells and may lead us to the definition of a new source of adult stem cell.

P320

Variability in Doppler Ultrasonographic Parameters Between Right and Left Kidneys

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Introduction. Among the numerous modalities applied for evaluation of the kidney diseases, Doppler ultrasonography (DU) provides information about the hemodynamic status of the kidneys. Meanwhile, the variability within DU parameters of right and left kidneys is a matter of controversy. We aimed to determine whether any difference exists between the DU indices of the right and left kidneys.

Methods. Retrospectively, we collected DU findings of 25 healthy potential renal transplant donors. All donors underwent the renal DU and multi-detector CT angiography before donor nephrectomy. DU indices included peak systolic volume (PSV), resistive index (RI), pulsatility index (PI), end-diastolic volume (EDV), and acceleration time (AT).

Results. The mean age of the donors was 28.1 ± 3.4 years. The mean PSV, RI, EDV, and AT for the right kidney were 30.69 ± 7.95 cm/s, 0.58 ± 0.04 , 12.31 ± 3.78 cm/s, and 54.64 ± 14.07 ms, respectively. For the left kidney, the mean PSV, RI, EDV and AT were 31.43 ± 11.51 cm/s, 0.60 ± 0.07 , 12.98 ± 5.35 cm/s, and 48.52 ± 14.79 ms respectively. Among the DU indices, PI of the right kidney was statistically different from that of the left kidney (1.03 ± 0.17 vs. 0.98 ± 0.18 , $P = 0.01$).

Conclusion. In conclusion, the present study revealed that the right kidney DU indices, except for PI, may not differ from those of the left kidney. We, therefore, recommend caution while interpreting any remarkable alterations in these measurements between the right and left kidneys.

P321

Educational Programs on Advancing Continuous Ambulatory Peritoneal Dialysis in Iran; a Single Center Study

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Introduction. After several years from the initiated stage of CAPD usage in Iran, the number of those using this method is still very low. In this study, we have tried to define the impact of educational programs on growing of CAPD in west Azarbaijan province of Iran between April 2003 and April 2005.

Methods. Questionnaires filled out for all 161 hemodialysis (HD) patients, nurses who work at HD units, and internal, nephrology and renal transplantation wards (105 nurses), before and after educational programs which consisted of three seminars and workshops every six months for nurses, and teaching by booklet and TV programs in dialysis wards for HD patients.

Results. A total of 58% of the patients were female, 54% were illiterate, 48% had not been visited by nephrologists before initiation of HD, 45% were unaware of CAPD existence, 73% were unaware of required facilities for CAPD, 78% were unaware of the treatment method, 78% were unaware of advantages and disadvantages of CAPD.

Conclusion. Unawareness about the existence, required facilities, treatment method and advantages and disadvantages of CAPD among patients and staff can be an important factor in the very slow development of CAPD in Iran.

P322

Carotid Intima-Media Thickness and its Related Factors in Children with End Stage Renal Disease

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Introduction. Cardiovascular morbidity and mortality are common in end stage renal disease (ESRD) patients. There is scarce data on carotid and bulb intima-media thickness (IMT-C and IMT-B) as an early marker of atherosclerosis and related factors in children on hemodialysis (HD) and peritoneal dialysis (PD). Since we had not enough information about our patients, this study was carried on all ESRD children (on hemodialysis and peritoneal dialysis) in a referral center.

Methods. Data of 16 ESRD children (younger than 18 years old) including 7 patients on PD and 9 patients

on HD was collected. All monthly routine lab tests as well as biochemical parameters including serum von Willebrand Factor (vWF), homocystein, apo-lipoprotein A, apo-lipoprotein B, and quantitative CRP were measured in fasting patients just before initiating dialysis. IMT-C and IMT-B were measured by gray scale ultrasound using 7.5 MHz probe.

Results. Significant difference among all following parameters in ESRD patients with normal laboratory values was showed: cholesterol, triglycerides, Apo A, Apo B, quantitative CRP, VWF, homocystein and IMT-C. However, we could not demonstrate any difference between IMT-B in case and control group. No significant correlation between IMT-C and following factors in ESRD patients was shown: n-PTH, serum alkaline phosphatase, ferritin and cholesterol. After applying linear regression analysis, only systolic blood pressure and serum alkaline phosphatase had significant correlation with IMT-C in ESRD children, p value <0.05.

Conclusion. Regarding the increased incidence of CVD in ESRD children longitudinal studies with large size samples are needed to clarify other factors that affect intima.

P323

The Relationship between Anemia and Kt/V Index in Continuous Ambulatory Peritoneal Dialysis and Hemodialysis Patients

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Introduction. Anemia in end stage renal disease (ESRD) can cause serious problems for the patients. So physicians use all rational options to detect the causes and, as far as possible, alleviate them. The present study is designed to clarify whether the type or adequacy of dialysis affect the incidence of anemia in patients.

Methods. We studied 57 patients; 37 on continuous ambulatory peritoneal dialysis (CAPD) and 20 on hemodialysis (HD). They had no laboratory evidence of iron deficiency or hyperparathyroidism and were totally treated with vit B12 and folic acid. The hemoglobin concentration under 11 mg/dl was considered as anemia. The adequacy of dialysis was evaluated by Kt/V index (>1.2 for HD and >1.7 per week for PD). We compared different factors in these two groups of patients including anemia, Kt/V and their relationship.

Results. Among patients on CAPD 10 were anemic

(27%), but in patients on HD 13 had anemia (65%) which showed considerable difference ($P = 0.005$). Adequacy of dialysis in CAPD was acceptable in 30 patients (81.1%), but target Kt/V index was achieved only in 10 HD patients (50%) which was showed better adequacy of CAPD in our patients ($P = 0.014$). No significant correlation was found between anemia occurrence and Kt/V index in both type of dialysis ($P > 0.05$).

Conclusion. Adequacy of dialysis was better in CAPD than HD patients and anemia was more common in the Later group. But discarding the type of dialysis, adequacy of dialysis does not affect anemia occurrence in each group.

P324

Practical Problems in Data Management and Modeling Time-Dependent

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Introduction. In clinical practice, individual data is routinely collected at frequent time points after entry to the study. These visits are not normally regular (e.g. every two months) and as it is not necessary to ask for all clinical data in each visit, any analyses which look at the effect of several covariates, e.g. on patient survival, suffers from missing observations. Besides, the management of patient records in counting process format is not yet implemented as a routine of any statistical software. In this study, after implementing variable time-box (using a time interval instead of a time point) and having ability to compute local mean (median, minimum, max) of measurements and also the survival time, not only the problem of missing observations was overcome but also time-dependent covariate survival analysis was carried out which has a higher power compared to analysis using individual aggregated (single record using overall mean) data.

Methods. Between 1995 and 2006, data on demographic, clinical and laboratory characteristics of 1472 peritoneal dialysis patients from all over Iran was collected through questionnaires. This data was entered and managed appropriately in "Hakim" (a Farsi database) and analyzed using STATA (9.0). A Cox proportional hazards model with time dependent covariate was used to study the effect of different covariates on patient survival. AIC

criterion was used to compare the appropriateness of the models.

Results. Cox regression model using time-dependent covariate showed that, for example, cholesterol and triglyceride levels (computed as means over each year of follow-up) were significantly ($P < 0.05$) affecting patient survival; however, when aggregated patient data used were not ($P > 0.05$). Also, for some risk factors like urine volume, even when overall mean was used, the effect on survival was significant ($P = 0.01$); but, when time-dependent analysis was carried out, the evidence was found to be stronger ($P = 0.003$). In addition, AIC of the time-dependent covariates models were smaller. **Conclusion.** Time-dependent survival analysis of the covariates was found to be more appropriate, and proved to be computationally easy when time-box technique was applied.

P325

Chronic Maintenance Peritoneal Dialysis Cost in IRAN

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Introduction. The purpose of this study was to assess the health service cost of peritoneal dialysis (PD) delivered at home in Iran in comparison with hemodialysis.

Methods. Cost and patient data were collected in 2006 and from April 1 to May 31, 2007, respectively. The reference year for the value of USD for different mentioned costs was 2006 (1 USD=9188 Iranian Rial, local currency, 9.2006). The itemized description of related expenses are as follows: 1-Building costs:10 square meters for each 10 dialysis patients in the unit (each 40 square meters of common space of hospital monthly rent 3million Rials) 2-Drugs:Twelve vials of erythropoetin 2000 U monthly & Two vials of Venofer each month 3-Physician & Nurse:Once a month visit by nephrologists, monthly salary of nurse is distributed according to 20 patients/nurse ratio 4-Paraclinic test: Routines monthly, Viral check (HBV, HCV, HIV) biannually, PET, PTH, albumin, iron store tests every 3 months 5-Imaging:Chest X-ray, KUB, kidney sonography once a year.

Results. The health care sector costs associated with catheterization and first educational period were 499.2 US\$ and 79.3 respectively. The cost of maintenance of CAPD per month was 1040.3 USD per month. Most of the total maintenance expenditure was made up of medical supplies (78.6%), with solutions as the major cost driver. Staff salaries represented 2.8% of the cost and capital costs were negligible. Monthly costs in the category of case level (USD): 1-Drugs (erythropoetin, calcitriol, parenteral iron, etc.): 162.6 (15.6%) 2-Lab investigation: 9(0.9%) 3-Imaging: 3.1(0.3%) 4-Dialysis-

related supplies (cap, clamps solution, drugs): 818.5(78.6%) 5-Equipments (medical and non-medical): 9.5(0.9%). Monthly costs in the category of unit level (USD): 1-Physician (PD maintenance visits): 7.5(0.7%) 2-Nurse (PD maintenance visits): 21.8(2.1%) 3-Building replacement costs: 8.2(0.8%) Monthly costs in the category of hospital level (USD): 1-Central administration: hospital, nursing administration, accounting, information services, capital equipment and depreciation, construction and redevelopment: 0.09(0.1%).

Conclusion. These findings are important as we know that the cost of maintenance of HD per month was 1025.3 USD per month which was estimated with the assumption of 3 shifts and full chairs which is not happening most of the time. This fact emphasizes on the fact that a major attempt should be made to increase peritoneal dialysis coverage as in many centers we cannot keep all chairs full for even 2 shifts, especially in some vast areas. In addition to the costs imposed on the health system sector, transportation to dialysis units imposes significant costs on society in terms of production losses due to the commute of patients and accompanying person. It is highly recommended to place initial focus on this strategy and reduction of cost of solutions to save resources.

P326

Spironolactone in Continuous Ambulatory Peritoneal Dialysis Patients Improves Cardiac Function

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Introduction. Cardiovascular disease is recognized as the predominant cause of death in patient with chronic kidney disease. Use of spironolactone in conjunction with an ACEI or ARB reduces the risk of cardiac mortality and morbidity in patients with normal or slightly decreased renal function. Since dialysis patients are prone to hyperkalemia, is a known side effect of spironolactone, this treatment has not been used in this population. We performed a study to assess whether low-dose spironolactone (3 x 25 mg/week) could be administered in Continuous Ambulatory Peritoneal Dialysis patients with moderate to severe heart failure to improve cardiovascular function without inducing hyperkalemia.

Methods. In a triple blinded, randomized, placebo

controlled study, we enrolled eighteen patients who were under peritoneal dialysis treatment with moderate to severe heart failure and left ventricle ejection fraction of not more than 45 percent and use of ACEI and serum potassium level less than 5.5 meq/l. One group of nine patients received 3 x 25mg/week of spironolactone and another group received placebo within six months. Echocardiography was also performed for both groups, at the beginning and the end of study, to assess ejection fraction. Serum potassium was measured every four weeks.

Results. The mean of Ejection Fraction increased more in spironolactone group during the time ($P = 0.002$) than in placebo group during the time ($P = 0.4$). There was no significant change in serum potassium between two group ($P > 0.05$) but there was a significant difference in mortality between two group ($P = 0.03$).

Conclusion. This study show that administration of spironolactone in continuous ambulatory peritoneal dialysis patients with severe heart failure, substantially improve their cardiac function and decreases mortality without development of severe hyperkalemia. Keywords: ejection fraction (EF), peritoneal dialysis, heart failure, end stage heart disease, spironolactone.

P327

Effect of L-Carnitine Administration on Serum Albumin Level in CAPD Patients

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Introduction. Malnutrition is a frequent complication among patients with chronic dialysis; on the other hand, inflammation in patients with chronic dialysis caused synthesis and release of CRP, homocysteine, and decrease albumin that may be considered an independent predictors for cardiovascular disease, the most important factors for mortality and morbidity in dialysis patients. Recent studies have suggested that L-carnitine have useful effect on serum albumin and inflammatory factors. They showed increased serum albumin in the dialysis patients. The aim of our study is to evaluate effect of oral L-carnitine on serum albumin, CRP, homocysteine, lipids profile, and hemoglobin in CAPD patients.

Methods. This was a double-blind, placebo-controlled, randomized clinical trial that was done in the Alzahra medical center of Isfahan. Forty-eight patients on chronic CAPD were randomly assigned to receive oral L-carnitine 750 mg/day or placebo for 9 months. Serum albumin was measured at baseline and after 3, 6, and 9 months; CRP, homocysteine, lipids profile, and hemoglobin were measured at baseline and after 9 months in the two groups.

Results. Mean serum albumin in the drug group

showed significant increase after 9 months (3.3 ± 0.51 to 3.7 ± 0.53 , P value = 0.003), while decrease in placebo group. Rate of positive CRP and homocystein level tests significantly was decreased in drug group; also HDL-Cholesterol increased significantly in drug group. In addition, during the study 50% of the patient's drug group showed hemoglobin level increases of more than 1 gr/dl.

Conclusions. It seems that oral L-carnitine administration has positive effect on serum albumin, inflammatory factors, lipids profile, and Hb level in CAPD patients..

P328

Serum Anti-Hepatitis B Surface Antigen in Patients under Regular Hemodialysis

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Introduction. Our aim was to evaluate the relationship between various biochemical, nutritional, and demographic factors and immune response to hepatitis B vaccine in maintenance hemodialysis (HD) patients.

Methods. A retro-prospective study was carried out on 68 patients undergoing maintenance hemodialysis. Patients were vaccinated against hepatitis B virus with an intramuscular hepatitis B vaccination schedule, 40 micrograms at 0, 1, and 6 months. We also selected 32 age-matched normal healthy individuals who had previously been vaccinated against hepatitis B to compare their antibody production with HD patients.

Results. The value of serum antibody level against hepatitis B surface antigen (HBs) in hemodialysis patients and healthy persons were 35 ± 55 (median = 5.5) and 135 ± 71 (median = 175) mIU/ml, respectively. There was a significant deference between mean serum antibody level against HBs antigen of hemodialysis patients and normal subjects ($P < 0.001$). No significant difference was detected between antibody production against HBs antigen in males and females or diabetic and non-diabetics. There were not any correlation between serum antibody level against HBs-Ag and serum albumin, body mass index, age, amount of hemodialysis, duration of dialysis, dialysis adequacy, serum ferritin level, serum lipids, serum parathormone, calcium, phosphorus, serum hemoglobin, and serum hematocrit level.

Conclusion. We did not find any factors related to serum antibody level against hepatitis B surface antigen in patients on regular hemodialysis.

P329

Five Year Survival Analysis of a Hemodialysis Center, a Retrospective Cohort Study

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Introduction. Hemodialysis is the major renal replacement therapy for end-stage renal disease patients. However these patients have a high mortality rate on hemodialysis, which has been reported up to 20% per year, with 5 year survival rates between 20 to 50% in different centers. The aim of this study was to evaluate the patient survival of chronic hemodialysis patients of Hasheminejad Kidney Center, as one of the largest dialysis centers in IRAN, and to evaluate its major risk factors.

Methods. Data from 342 patients, who had been under maintenance dialysis during the years 2004 to 2009, were extracted from the charts of patients. Demographic data, underlying diseases and monthly laboratory results were studied and patient survival rates and its correlation with the underlying risk factors were analyzed. Patients with age ≥ 65 years and/or with at least 1 chronic, comorbid disease (any physical disability, cardiovascular disease, cerebro-vascular disease, chronic infectious disease, malignancies and hepatic failure) were classified as high risk patients.

Results. Of the total 342 patients 193 were male (56.4%) and 149 female (43.6%). Mean age was 58.7 ± 16.7 years. At the end of study period 179 patients were alive, 108 patients were dead, 29 patients were transplanted, 24 patients were transferred to other centers and 2 improved and withdrawn from dialysis. Mean and median patient survival rates were 3.03 ± 2.81 and 2.33 years respectively. One, 2, 3, 4 and 5 year survival rates were 83%, 75%, 66%, 60% and 51% respectively. Patient survival was not different between diabetic and non-diabetic patients ($P = 0.33$), however it was lower in high risk compared to low risk patients ($P = 0.04$). There were significant positive correlations between patient survival and age ($P = 0.0001$, HR= 1.06), serum phosphorus ($P = 0.001$, HR= 1.56), serum LDL ($P = 0.04$, HR= 1.026), and serum iron ($P = 0.004$, HR= 1.005) and a significant negative correlation between patient survival and serum sodium ($P = 0.001$, HR= 0.68), serum cholesterol ($P = 0.003$, HR= 0.97) and serum protein levels ($P = 0.001$, HR= 0.46). No correlation was found between survival and hematocrit ($P = 0.31\%$), serum calcium ($P = 0.41\%$), and PTH levels ($P = 0.59\%$).

Conclusion. Our patient survival rates have been high and comparable to centers providing high quality care. Diabetic patients did not have a lower survival rate which is unexpected and may be due to low number of our patients compared to large registries. High risk patients had lower survival rates, as expected. Traditional risk factors affected the survival rates in our patients and serum cholesterol had a negative correlation with mortality which is concordant with reverse epidemiology hypothesis. National, registry based studies, according to our model are suggested.

P330

High Rate of Culture Negative Peritonitis, a Pitfall not Interfering with Prognosis of CAPD Patients

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Introduction. Culture negative peritonitis (CNP) is one of the major challenges in treatment of peritonitis in CAPD patients. It may lead to uncontrolled use of different broad-spectrum antibiotics and their unwanted side effects and future antimicrobials resistances and may interfere with prognosis. The aim of this study was to evaluate the prevalence of CNP in an incident group of PD patients from Iranian CAPD Registry, the possible risk factors for CNP and its effect on patient and technique survival rates.

Methods. Data from 26 PD centers including demographic, clinical and laboratory data of 1472 patients, which are monthly collected through questionnaires, were retrospectively analyzed. Peritonitis was defined as clinical suspicion based on any of the following symptoms or signs (cloudy PD solution, fibrin clots in PD solution, abdominal pain, nausea, vomiting, diarrhea, constipation, fever sensation, chills, abdominal tenderness, rebound tenderness, weakness and oral temperature ≥ 37.8 C degrees) together with peritoneal leukocyte count ≥ 100 /ml. Culture positive and culture negative peritonitis were defined according to the culture results reported by the PD centers.

Results. From 1472 patient who had been followed for 500 ± 402 days, 624 (42.4%) were male. Totally 660 episodes of peritonitis had been reported in 1472 patients, during 22517 months of follow-up, giving a peritonitis rate of 1 episodes per 34 months. These included 97 patients with CPP and 123 patients with CNP. Patients with multiple episodes of mixed CPP and CNP had been excluded from the study (79 cases). Gender distribution, mean age, frequency of different symptoms and signs at presentation and type of underlying disease were not different between CPP and CNP. Patient survival was not different between CPP and CNP (544.9 ± 393.2 days, vs. 644.9 ± 436.7 days, respectively, $P = 0.34$) but

technique survival was lower in CPP compared to CNP (554.8 ± 344.0 days, vs. 653.1 ± 414.2 days, respectively, $P = 0.001$, HR= -0.38). There were higher rates of active PD patient (33.3% vs. 19.6%), lower rates of PD drop out (20.3% vs. 40.2%), and higher rates of renal transplantation (18.7% vs. 7.2%) in CNP compared to CPP patients ($P = 0.001$). Total mortality rate was the same between the CPP and CNP groups (20.6% vs 17.9%, respectively, $P = 0.61$). The ratio of PD related death to PD un-related death was the same in CPP and CNP groups (5/25 [0.2] vs. 3/30 [0.1], respectively, $P = 0.29$).

Conclusion. In our study CNP had an extraordinarily high rate of 56%. This may be have been caused by poor methods of sampling and/or culture techniques, or a true different epidemiology with other countries. The similarity between demographic data, clinical manifestations and underlying diseases may show a real similarity of the 2 groups and emphasize on the possibility of false negative culture results, instead of the presence of high frequency of unusual germs. Culture negative peritonitis did not increase mortality and there was even a better technique survival in CNP patients. This may be explained by administration of longer duration of multiple and/or broad spectrum antibiotics, which may have well eradicated the infection. On the other hand a lower bacterial load may have resulted in CNP, with a better prognosis. Also lower technique survival rates in CPP patients may indicate uncertain culture results and invalid antibiograms. We conclude that culture negativity had no adverse effect on technique survival of patients same as other reports. We suggest in depth studies on culture sampling and technique methods of our PD centers in order to evaluate the current methods and improve the possible short-comings and defects.

P331

Efficacy of Hemodialysis in End Stage Renal Disease Patients and its Influencing Factors

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Introduction. Hemodialysis is one of the factors which strongly affects morbidity and mortality in patients under regular hemodialysis. Kt/v seems to be the best predictor of hemodialysis adequacy, but there are many equations to estimate kt/v which shows different results. The aim

of this study was to determine the hemodialysis adequacy in our center by 3 different formulas to compare their differences and evaluation of its correlation with the other variables like serum albumin, BMI, hemodialysis shift (morning versus afternoon), sex, age and initiation time of hemodialysis.

Methods. In a cross-sectional analytic study those ESRD patients between 19 to 84 years old who were at least 3 months on regular hemodialysis were included. Data about sex, age, hemodialysis period, number of dialysis per week, dialysis time, pre-dialysis serum albumin, pre and post dialysis BUN and weight, BMI and shift of hemodialysis were collected. Kt/v was estimated in 3 different ways by Daugirdas-II, Barth and Lowrie formulas. Kt/v \geq 1.2 and URR \geq 65% were considered adequate hemodialysis index. Data were analyzed by SPSS version 11, Chi-square and t-test.

Results. A total of 41 patients were enrolled. Mean age of the patients was 54.78 ± 17.62 . Of the patients, 53.7% were men. Frequency of hemodialysis adequacy (kt/v \geq 1.2) was 56.1% by Daugirdas-II, 36.6% by Lowrie and 73.2% by Barth formulas, respectively, which shows significant fluctuations (contingency coefficient = 0.55, $P < 0.01$). Thirty-nine percent of the patients had URR \geq 65%; 80.5% had hemodialysis 3 times a week; 36.0% had low BMI. Hemodialysis mean time was 3.80 hours and 34.1% of the patients were in morning shift. There was significant relationship between hypoalbuminemia ($<3.5\text{g/dl}$) and hemodialysis inadequacy ($P = 0.009$). No relationship was found between age ($P = 0.12$), sex ($P = 0.16$), hemodialysis shift ($P = 0.39$), and BMI ($P = 0.86$) and hemodialysis adequacy.

Conclusion. Hemodialysis inadequacy is a frequent complication in hypoalbuminemic patients; correction of nutritional defect may help to improve the problem. Fluctuations between kt/v using different equations show importance of an agreement to use a single method.

P332

Effect of Hemodialysis Duration on Prevalence of Helicobacter Pylori Infection in Single Center Subjects

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Introduction. Hemodialysis (HD) patients frequently have gastrointestinal complications; however, it is unclear if *Helicobacter pylori* (*H. pylori*) is present in these patients. In this cross-sectional study, we investigated the effect of dialysis duration on the prevalence of *H. pylori* infection.

Methods. A total of 152 HD patients (75 males and 77

females with mean age of 54.2 ± 14.7 year; range, 19 to 84 years) were included, who were referred to our university HD center, and underwent testing for *H. pylori* antibody detection. Serum IgG against *H. pylori* was tested by ELISA method. Patients were categorized into two groups: short-term HD duration (< 1 year) and long-term HD duration (≥ 1 year).

Results. The overall prevalence of *H. pylori* antibody was 65.1% (99/152). There was no difference between *H. pylori* positive and *H. pylori* negative patients with respect to age (54.0 ± 14.0 vs 54.8 ± 15.7 , respectively, $P > 0.05$). The positivity rate was similar among men ($n = 53$, 53.5%) and women ($n = 46$, 46.5%; $P > 0.05$). The prevalence of *H. pylori* infection among the long-term and short-term HD duration was 83/112 (74.1%) and 15/39 (38.5%), respectively ($P < 0.05$).

Conclusion. The prevalence of *H. pylori* was found to be increased in patients with long-term HD compared to short-term HD. More researches are needed regarding the clinical consequences of *H. pylori* infection in HD patients.

P333

Effect of Zinc Deficiency on Red Blood Cell Osmotic Fragility in Hemodialysis

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Introduction. Zinc deficiency may aggravate the effect of oxidative stress on RBC (Red Blood Cell) in chronic uremia. In this study, there is an attempt to show the relationship between the plasma zinc level and RBC osmotic fragility in hemodialysis patients.

Methods. Thirty five patients with low level of serum zinc (serum zinc level < 70) participated in the trial. RBC osmotic fragility, Hb (hemoglobin), and BUN (blood urea nitrogen) were checked. The patients received zinc supplement (zinc sulfate; 250 mg/day). Plasma level of zinc, Hb, BUN, and osmotic fragility were rechecked after 6 weeks.

Results. The mean serum zinc concentration among the participants increased and it was statistically significant ($P < 0.05$). Erythrocytes at day 0 (59 ± 3.5) were significantly more fragile in hypotonic saline (NaCl 40%) than those at day 43 (38 ± 2.9 ; $P < 0.05$). No significant changes were noted in the level of Hb.

Conclusion. In this trial, oral zinc supplementation caused a significant rise in the plasma zinc level after 6 weeks. Although Hb concentration was not changed during the trial, the level of osmotic fragility in red cells reduced significantly.

P334

Association of Zinc Deficiency and Depression in the Patients with End-Stage Renal Disease on Hemodialysis

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Introduction. Depression is a common psychological symptom in patients with chronic dialysis. In the general population, low serum zinc level is associated with major depression. The current study surveys the possible relationship between the prevalence of depression and plasma level of zinc in the patients on hemodialysis.

Methods. A total of 135 patients with end stage renal disease (ESRD) on hemodialysis (HD) were enrolled in the study. To assess the severity of depression, we used Beck Depression Inventory (BDI). Fasting plasma samples were used to evaluate the zinc plasma level. The data was analyzed using SPSS 15.

Results. Mean age of the patients was 52.45 ± 15.33 years. Of them, 76% had some degrees of depression according to BDI (BDI > 14). Mean level of plasma zinc in the depressed patients was (67.46 ± 29.7) which was significantly lower than that in the others 85.26 ± 40.05 ($P < 0.05$).

Conclusion. Zinc deficiency may be a reversible cause of increased rate of depression in HD patients. This is the first study reporting the association of zinc in the presence of depression in HD; therefore, these findings need further investigations.

P335

The Early Versus Long Term Survival in Iranian CAPD Patients

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Introduction. There are few studies about early morbidity and mortality (less than 3 months) of peritoneal dialysis (PD) patients. The aim of this study was to present data on CAPD patients with short survival and compare them with those who were on PD for more than 3 years (long survival).

Methods. Data of PD Registry from 26 PD centers in Iran, between 1995 and 2006, were collected and analyzed using the STATA 9.0. Three groups of PD patients whom were studied are as follow: those who died (group I) or transferred to hemodialysis in less than 3 months (group II), and those with follow-up of more than three years (group III). Patients' characteristics, laboratory data, dialysis adequacy, and peritoneal transport data were compared. Multivariate proportional odds polychotomous logistic regression model was used to identify independent risk factors associated with the outcome.

Results. Total number of the patients was 223 (group I = 82, II = 48, III = 93). In univariate analysis, low level of base creatinine, cholesterol, albumin, urine volume, ultrafiltration volume, low level of education, and poor appetite were significantly different in group I comparing with group III ($P < 0.05$). Also, number of patient with diabetes, comorbid heart – lung – disease, negative selection and negative nurse assessment of patient (suitable for PD) were significantly higher in group I. In multivariate analysis, independent variables are diabetes, appetite, and nurse assessment of the patient ($P < 0.002$). In all patients with less than 3 months of PD (death – drop out), the natural course regarding reversal of renal function, number of Tx, and number of patients transferred to HD were almost the same. The causes of drop out in group II (comparing with group III) were peritonitis 25% (vs 61%), catheter malfunction 39% (vs 22%), membrane failure 2.8% (vs 11%), and patient desire 28% (vs 5.6%; $P = 0.033$).

Conclusion. Assessment of the candidates for medical and non-medical characteristics by an experienced nurse in this field to choose the most appropriate patients for PD is very important. Otherwise, high rate of less than 3-month mortality and early drop out would be expected in these patients.

P336

Mortality Due to Cardiovascular and Cerebrovascular Events of CAPD Patients in Iran

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Introduction. Cardiovascular and cerebrovascular events are the most common causes of mortality in CAPD patients. In this study, we compare the factors that potentially could affect on this process.

Methods. Between January 1995 and December 2006, from 26 PD centers, data on 1472 patients including

demographic, clinical and laboratory characteristics, which were monthly collected through questionnaires were entered in “Hakim” (a Farsi database) and analyzed using STATA (9.0). In the present study, we compare cardiovascular (CV) causes of mortality and deaths unrelated to CV causes of the patients on continuous ambulatory peritoneal dialysis (CAPD). At the end of study, cardiac (MI) and cerebrovascular (CVA) deaths occurred in 80 patients (average age, 58.5 years; 39 men). Deaths due to other causes and all alive patients were 1183 (average age, 45.7 years; 489 men).

Results. Uni-variate analysis of values for P, Alb, FBS, diastolic BP, Cr, n PCR, iPTH, and Hb shows that all were statistically different between the 2 groups. We also used Cox hazard analysis to examine values for Ca, P, Ca × P, intact parathyroid hormone (iPTH), and lipids. None of these values were independent contributory factors for incidence of cardiovascular mortality but age ($P < 0.01$), nurse evaluations scores (NES) of the patients before start of CAPD ($P < 0.04$), BMI ($P < 0.01$), CHF ($P < 0.003$), negative selection of the patients for CAPD ($P < 0.02$), and low serum albumin ($P < 0.02$) had all contributory effects on CV mortality.

Conclusion. In conclusion, CV causes of mortality are responsible for most death causes in CAPD patients. Some above-mentioned factors are statistically important related factors to death due to CV causes, but some conventionally risk factors such as hyperlipidemia had not statistically differ between the two groups.

P337

Factors Associated with Mortality in Peritoneal Dialysis Patients

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Introduction. Although chronic dialysis has reduced the mortality and morbidity of end stage renal disease (ESRD) patients due to uremia and its complications, the mortality rate of these patients is still very high. Cardiovascular complications are the principal cause of death in dialysis patients, accounting for approximately one half of all mortalities and the risk of death attributable to coronary heart disease in these patients is about 10-100 times higher than the general population. Other common causes of death in these patients are cerebrovascular events, infections and dialysis cessation. The aim of the present study was to evaluate the associated factors with mortality in our peritoneal dialysis patients.

Methods. In this study, 57 patients (28 males and 29 females) with mean age of 54.25 ± 19.03 year undergoing chronic ambulatory peritoneal dialysis (CAPD) were evaluated at our center since 2003. We followed all these

patients up to the cessation of peritoneal dialysis or up to the end of the study (September 2008).

Results. During the study, 10 patients underwent renal transplantation, 15 patients were switched to hemodialysis, and 18 patients died due to cardiovascular disease (12/18), cerebrovascular disease (2/18), sepsis (2/18), hepatic failure (1/18) and suicide (1/18). Higher mortality was associated with higher erythrocyte sedimentation rate (ESR), elevated C-reactive protein (CRP) level and lower hemoglobin concentration ($P < 0.0001$). There were no association between mortality and other factors such as gender, BMI, etiology of ESRD, peritoneal equilibration test (PET) value, weekly Kt/V and creatinine clearance, white blood cell (WBC) count and serum albumin, calcium, phosphate, ferritin, triglyceride, cholesterol, low density lipoprotein (LDL), high density lipoprotein (HDL), uric acid and parathyroid hormone (PTH) levels ($P > 0.05$).

Conclusion. Cardiovascular disease was the primary cause of mortality in our CAPD patients and the associated factors with mortality were ESR, CRP level and hemoglobin concentration.

P338

Antioxidant Treatment Prevents Renal Damage in DOCA-Salt Hypertension

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Introduction. Hypertension is a major cardiovascular risk factor and a contributor to ESRD. This study examined whether the antioxidant treatment with vitamin E or vitamin C, could modify renal damage and high blood pressure in DOCA-salt hypertension.

Methods. One week after uninephrectomy, rats in the DOCA-salt group were treated 5 times a week with DOCA suspended in oil, which was administered subcutaneously for 4 weeks (25 mg/kg). 1% NaCl and 0.2% KCl were added to their tap water for drinking. Sham rats received oil, 5 times a week, subcutaneously. In the two other groups, vitamin E (200 mg/kg/day/gavage) or vitamin C (200 mg/kg/day/gavage) were co-administered with DOCA-salt for 4 weeks. Systolic blood pressure (SBP) was measured by the tail-cuff method. Levels of renal antioxidants, renal damage indices, and histological changes were studied in all groups.

Results. DOCA-salt treated rats exhibited marked increase in blood pressure compared to that in sham group (183.57 ± 6.24 vs 109.28 ± 2.97 mmHg). Levels of urinary NAG and protein excretion significantly increased. Histological changes and decreased renal GSH and FRAP were demonstrated in DOCA-salt treatment. Treatment with vitamin C or vitamin E for 4 weeks significantly preserved renal antioxidant levels and prevented renal damage and elevation of blood

pressure in the DOCA–salt treatment.

Conclusion. Antioxidant therapy decreased renal damage in DOCA–salt treated rats. Thus, this data suggests a role for oxidative stress in the development of nephropathy in DOCA–salt hypertension.

P339

Is Serum Leptin Level Related to the Presence of Previous Peritonitis in Peritoneal Dialysis Patients

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Introduction. Leptin is a 16000-Daltons molecule that is produced from fat cells and removed by kidneys. It suppresses appetite and accumulates in renal failure and dialysis patients and therefore, causes malnutrition and increased morbidity and mortality in these patients. Leptin level may increase in peritonitis in continuous ambulatory peritoneal dialysis (CAPD) patients. There are few studies about leptin and its relation to the past peritonitis in CAPD patients. We performed a study on serum leptin level in CAPD patients and evaluated its relation to the presence of previous peritonitis.

Methods. In a cross-sectional study, 76 CAPD patients from Al-Zahra hospital who were at least 3 months on peritoneal dialysis, were enrolled in the study. Fasting blood samples were taken for serum leptin. Other information including peritonitis in the year before the study, and duration of chronic kidney disease was collected from the patients' files. Data was analyzed by independent *t* test and univariate general linear model.

Results. Between October 2007 and February 2008, 75 patients completed the study. Mean age of the patients was 53 ± 14 years. The most common cause of end-stage renal disease (ESRD) in these patients was diabetes mellitus (48%). The mean of serum leptin level was 22 ± 23) µg/l. Using univariate general linear model, a significant negative correlation was observed between serum leptin level and the presence of history of peritonitis in the year before the study (*P* = 0.004). Using univariate general linear model, there was a positive relation between leptin level and duration of CKD (*P* = 0.01), and duration of hemodialysis (*P* = 0.043), but not with duration of peritoneal dialysis (*P* > 0.05).

Conclusion. We found that serum leptin level in CAPD patients with previous peritonitis might be higher than patients without previous peritonitis and the increased level of leptin did not remove or decrease after resolution of peritonitis. Also, duration of renal failure had a positive effect on serum leptin level.

P340

Does Intraperitoneal Heparin Administration Prevent Peritonitis in Peritoneal Dialysis Patients?

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Introduction. Patients on long-term treatment by peritoneal dialysis suffer from increasing the risk of peritonitis and loss of ultrafiltration as a result of persistent inflammation, which may be triggered by bioincompatible dialysis fluid. Heparin has anti-inflammatory and anticoagulant properties. To find a method to increase patient and peritoneum survival and decrease peritonitis rate, we assessed the effect of intraperitoneal unfractionated heparin on prevention of peritonitis, ultrafiltration rate (UFR), and KT/V.

Methods. This is a randomized, placebo-controlled, clinical trial study that was done in Al-Zahra hospital in Isfahan, between 2008 and 2009. Eighty continuous ambulatory peritoneal dialysis (CAPD) patients were randomly allocated into two groups. First group received distilled water for injection (placebo) and second group received 5000 IU heparin into peritoneal dialysis inflow solution daily. The study lasted 9 months divided into two periods (each four months), with one month wash-out period between them. Patients were evaluated for peritonitis, ultrafiltration rate, and KT/V. Chi-square and *t* student tests were used for data analysis.

Results. A total of 70 patients finished the study, 35 in each group. The most common cause of renal failure was diabetes mellitus (40% in each group). The incidence of peritonitis in heparin and control group was 1 episode per 28 and 9.5 patients/month of peritoneal dialysis treatment respectively, *P* < 0.001. The difference of mean of UF rate before and at the end of study between the two groups was significant and in heparin group increased, *P* = 0.001. In addition, KT/V increased in heparin group but this increase did not reach the statistically significant difference between the two groups.

Conclusion. Administration of intraperitoneal heparin in CAPD patients in comparison to placebo decreased the incidence of peritonitis and increased the UFR. Thus, heparin used for anticoagulation may have beneficial effects on peritoneum and antimicrobial effects in CAPD patients.

P341

The Relationship between Serum Leptin and Residual Renal Function in Peritoneal Dialysis Patients

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Introduction. Leptin is a 16-kD molecule from cytokine family. Administration of leptin results in a significant decrease in food intake. Leptin increase in renal failure patients. It causes anorexia in dialysis patients and increases morbidity and mortality. There are few studies about leptin level in peritoneal dialysis patients and its relation to residual renal function. We evaluated the relationship between serum leptin level and residual renal function in continuous ambulatory peritoneal dialysis patients (CAPD) in Al-Zahra hospital in Isfahan.

Methods. In a cross-sectional study, 76 CAPD patients, who were at least 3 months on peritoneal dialysis, were enrolled in the study. Fasting blood samples were taken for serum leptin. Other information about peritonitis in the year before the study and duration of chronic kidney disease were collected from patients' files. Residual renal function (renal creatinine clearance more than 6 ml/min) and KT/V (urea clearance for 1 week), were also evaluated by PD adequacy software. All data was analyzed by independent *t* test and univariate general linear model.

Results. Between October 2007 and February 2008, 75 patients completed the study. Mean age of the patients was 53 ± 14 years. Mean serum leptin was 22 ± 23 μ g/l. There was a significant difference in leptin level between sexes (13 ± 16 and 33 ± 27 in men and women, respectively; $P = .001$). Using univariate general linear model, serum leptin had a significant positive relation with residual renal Cr clearance ($P = 0.007$); that is, in patients with Cr Clearance of 6 ml/min or more, serum leptin level was higher than those with Cr clearance < 6 ml/min. Leptin level did not have significant relation with KT/V.

Conclusion. This study showed that serum leptin level was related to residual renal function independent of other variations in CAPD patients.

P342

Compliance Assessment in Hemodialysis Patients on Drugs Regimen and its Relationship with Demographic Factors

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Introduction. Compliance is important in hemodialysis patients because of the chronic nature of renal disease and their complex drug regimens. The present study was carried out to assess the compliance status in such patients on drug regimen and to determine the demographic factors that may cause or contribute in medical non-compliance.

Methods. This cross-sectional study was carried out on

185 hemodialysis patients with mean age of 51.1 ± 15.5 years (range, 18 to 70 years) in 3 hemodialysis centers in 2009. The compliance with antihypertensive drugs and phosphate-binders were evaluated using morisky questionnaire and measurement of predialysis blood pressure and serum level of phosphorus, respectively. Demographic data (age, sex, marriage status, job, job condition) were collected by interview with patients.

Results. Non-compliance was 50.7% and 66.5% with antihypertensive drugs and phosphate-binders, respectively. High burden of drugs and unpleasant adverse drug reactions were two important factors for non-compliance with antihypertensive and phosphate-binders, respectively. There was no relationship between demographic factors and drug compliance, although compliance in young patients was better than older patients.

Conclusion. Our findings suggest that it is necessary to improve the compliance status in hemodialysis patients especially in younger ones, and increase the knowledge of the patients about the importance of their drugs and their compliance.

P343

Prevalence of Malnutrition in Dialysis Patients Referring to Teaching Ghaem Hospital of Mashhad

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Introduction. Protein-energy malnutrition is common in hemodialysis patients and are associated with increased morbidity and mortality. The aim of this study is evaluating malnutrition prevalence in hemodialysis patients referring Ghaem hospital of Mashhad.

Methods. Twenty (20-82 yrs) patients were enrolled in the study following written consenting. Anthropometrics, biochemical tests, body composition analysis, 24-hour food record, and NRS-2002 method were performed to assess malnutrition in this group of patients. Body composition analysis was done by portable bio Impedance analyzer (Body stat 1500MDD). The nutritional content of the patients food record charts were calculated using computerized food tables in Salek Teb software. The data is analyzed using SPSS 13 for windows (SPSS Science, Apache Software Foundation, Chicago, IL, USA).

Results. Mean age of the patients was 45.5 years. Mean weight, BMI, fat percentage, fat mass, lean mass, water percentage, total protein, albumin, pre-albumin, HS-CRS, ferritin, iron, transferrin iron binding capacity, urea, creatinine, uric acid, cholesterol, calcium, phosphate, ALP, and percent protein intake were $56.6 \text{ kg} \pm 8.3$, $21.1 \pm 2.8 \text{ kg/m}^2$, $18\% \pm 10.6$, $10.0 \text{ kg} \pm 6.1$, 44.6 kg , 68.6%

± 10.2 , $6.7 \text{ g/dl} \pm 0.79$, $4.4 \pm 0.48 \text{ g/dl}$, $30.5 \pm 9.1 \text{ g/dl}$, 5.3 mg/l (range, 2.9 to 15.5), $384.2 \pm 356.1 \text{ } \mu\text{g/l}$, $117.2 \pm 49.4 \text{ } \mu\text{g/dl}$, $301.2 \pm 61.2 \text{ mg/dl}$, $154.1 \pm 42.3 \text{ mg/dl}$, $7.5 \pm 1.7 \text{ } \mu\text{g/dl}$, $5.8 \pm 0.9 \text{ } \mu\text{g/dl}$, $146.1 \pm 29.6 \text{ mg/dl}$, $7.9 \pm 2.1 \text{ mg/dl}$, $6.6 \pm 2.2 \text{ } \mu\text{g/dl}$, 290.8 ± 208.8 , and $13.7\% \pm 4.2$, respectively. Basal metabolism rate was 1417.4 kcal per day and energy intake was 1162.8 kcal per day. Required estimated energy was 2253 kcal per day. Malnutrition prevalence by NRS-2002 method was 46.15%.

Conclusion. The result from this study shows that malnutrition is prevalent in this group of vulnerable patients.

P344

Central Venous Catheter Malposition in a Patient with End Stage Renal Disease; A Case Report

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Introduction. Central venous catheterization is a common method of vascular access for temporal or long-term hemodialysis which sometimes comes with serious complication.

Case Report. A 30-year old female with end stage renal disease was transferred to the emergency room while a malpositioned central venous catheter (CVC) was placed in her right jugular vein for hemodialysis. The patient had dyspnea, right sided chest pain and neck pain at the time of admission. Chest x-ray showed malposition of the CVC and fluoroscopy after dye injection showed distribution of the dye into the pleural cavity. The catheter was pulled out in the emergency room and it begins to bleed from the site of insertion and the patient fell into hypovolemic shock. Intubation and chest tube placement were performed immediately and she was sent to the operation room. An extended mid sternotomy incision was made and the source of bleeding was found at the posterior portion of the right subclavian vein and right internal jugular vein and was successfully repaired. The patient was sent to the intensive care unit and was discharged after 10 days.

Conclusion. Central venous catheter malposition is a serious complication in patients with end stage renal disease going under hemodialysis and the malpositioned catheter should be removed with great observation.

P345

Effect of Transmembrane Pressure on Middle Molecules Excretion in Bicarbonate Base Hemodialysis

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Introduction. The middle molecules with their molecular weight between 300 to 15000Da accumulate in dialyzed patients. One of the outcomes of gathering these molecules in the body is dialysis-related amyloidosis (DRA). Thus, it is important to use methods that are efficient in removing middle molecules. Except the size of the pores, the transmembrane pressure (TMP) is the important factor in removing these molecules. In this study, we explained the effect of ultrafiltration increase on the clearance of middle molecules in hemodialysis patients.

Methods. In this before-after study, 40 hemodialysis persons were enrolled. At the first stage, the members were dialyzed with ultrafiltration equal to the difference of their present weight and their dry weight and at the 2nd stage, the ultrafiltration increased 2 liters. The clearance of each solute was finally measured in both stages.

Results. In the first stage, the amount of reduction in predialysis serum beta 2 microglobuline level was 3.5% ($P = 0.05$). In the second stage, this rate was 14.4% ($P = 0.001$). Excretion of the small molecules (Cr, P, and BUN) in the second stage of hemodialysis in comparison with the first stage of dialysis (conventional method) did not show a meaningful change.

Conclusion. In some studies, removing middle molecules by low flux filters (filters with fine holes), has almost been reported to be zero. Basically, two mechanisms have important role in clearance of molecules in dialysis; diffusion and convection or ultrafiltration. Convection or ultrafiltration is the main mechanism in removing middle molecules. In all of the previously performed studies, low flux dialysis membrane had been used in a standard way, and these studies did not pay attention to ultrafiltration increase; but, in this research we improve the role of convection in excretion of middle molecules by ultrafiltration increase through adding TMP. All pores of the low flux membranes are not uniform and unisize. This manufacturing problem associated with rising hydrostatic pressure through increase TMP help us to remove beta 2 microglobuline with convection. The results show that we can increase the amount of excretion of middle molecules and dialysis capability with increasing the TMP during bicarbonate base hemodialysis through low flux membranes.

P346

Effects of HMG-COA Reductase Inhibitors on Serum LDL-Cholesterol, Interleukin-6, and HS-CRP Level in End Stage Renal Disease Patients

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Introduction. Integrated inflammation with increasing the inflammatory mediators level such as CRP and serum interleukin 6 (IL-6) is very common in ESRD (end stage renal disease) patients. These events as well as elevated LDL-C can increase the risk of cardiovascular diseases. Patients' survival can be increased by decreasing the inflammation using statins. Therefore, this study was conducted to evaluate the statin effect on serum LDL-C, IL-6, and HS-CRP level.

Methods. This double blinded, randomized, clinical trial was performed on 95 hemodialysis patients. The patients were divided into three groups. Group 1, 2, and 3 took atorvastatin (10mg/day), Simvastatin (20 mg/day), and lovastatin (40 mg/day) for two months. Serum LDL-C, HS-CRP, and IL-6 level were measured before and after treatment using enzymatic calorimetry, flometry, and ELISA methods, respectively. Data was analyzed by paired *t* test and ANOVA.

Results. The mean age was 49.8 ± 12.3 years in atorvastatin, 47.2 ± 9.4 years in simvastatin, and 51.6 ± 14.2 years in lovastatin groups. Serum increase of HS-CRP, IL-6, and LDL-C level was seen in 63.3%, 43.1%, and 26.3% of hemodialysis patients, respectively at the beginning of treatment. Firstly, the mean serum HS-CRP level was 24.4 mg/L, 13.6 mg/L, and 14.6 mg/L in groups 1, 2, and 3 which changed to 14.2 mg/L, 10.2 mg/L, and 6.1mg/L at the end of treatment, respectively. Therefore, these three medicines could decrease the serum HS-CRP level. This finding was significant in atorvastatin ($P < 0.001$) and lovastatin ($P < 0.02$) groups. On the other hand, mean serum IL-6 level was 2.14pg/l, 1.76pg/l, and 1.73pg/l, respectively at the beginning of treatment and 2.06mg/l, 2.22pg/ml, and 2.18pg/ml at the end of treatment, respectively. Decreasing serum IL-6 level by atorvastatin and its increase by simvastatin and lovastatin were not significant. LDL-C level at the beginning of treatment was 90.9, 89.5 and 67.9mg/dl, respectively that after treatment changed to 78, 68.7, and 62.7 mg/dl, respectively.

Conclusion. Results indicated that serum CRP and LDL-C level could be decreased by statins. While atorvastatin was more effective than lovastatin, simvastatin did not have effect on HS-CRP. But, simvastatin was the most effective drug on LDL-C. These drugs had not any effect on serum IL-6 level. Therefore, atorvastatin is

recommended for inflammation treatment and lowering LDL in ESRD patients.

P347

Evaluation of Hemodialysis Adequacy by Urea Kinetic Modeling (URR and KT/V)

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Introduction. A central issue in the management of patients undergoing maintenance hemodialysis is the assessment of adequacy of dialysis. Simply, evaluating the blood urea nitrogen (BUN) is insufficient because a low BUN can reflect inadequate nutrition. In 2007, the mean delivered single pool KT/V of adult in-center dialysis patients in the United States was approximately above 1.5. By comparison, a survey of dialysis practices in the years 1998 to 2000 in five European countries found that the mean delivered Kt/V varied from 1.28 to 1.50.

Methods. In this observational study, we have evaluated 35 patients' files, between 2006 and 2008, in Al-Zahra hospital hemodialysis center. Our information sheets contained age, gender, underlying diseases, monthly URR and KT/V according to the Daugirdas II formula, calcium, phosphorus, parathyroid hormone (PTH), fasting blood sugar (FBS), hemoglobin, albumin, cholesterol, triglyceride, HDL, and LDL. Then, this information was expressed for frequency and descriptive parameters and analyzed by SPSS version 15.0 software.

Results. There were 19 (54.3%) males and 16 (45.7%) females; their age ranged from 10 to 78 years. Diabetes was the most common known cause of ESRD in 8 (22.9%) followed by hypertension in 4 (11.4%); other etiologies were detected in 14 (40.0%) patients and in 9 (25.7%), the etiology was unknown. As it can be seen, the average URR and KT/V of our patients are in the recommended range.

Conclusion. We conclude that our hemodialysis patients are under the worldwide recommended desired dialysis program. But, quality control and improvement of our services should always be our consideration.

P348

Demographic Characters and Medical Care Quality of Peritoneal Dialysis Patients

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Introduction. Peritoneal dialysis (PD) patients are exposed to multiple risk factors which increase their morbidity and mortality. Exposure to increased amount of glucose, hyperglycemia, hyperlipidemia, infection related and unrelated to PD procedure, hypercalcemia, hyperphosphatemia, and hyperparathyroidism are some of these risk factors.

Methods. In an observational study, we evaluated files of 85 patients during the last three years. Our information sheets contained age, gender, underlying diseases, mode of PD selection, KT/V, creatinine clearance, nPCR, first and last calcium, phosphorus, parathyroid hormone (PTH), iron (Fe), total iron binding capacity (TIBC), fasting blood sugar (FBS), hemoglobin, albumin, HDL, LDL, cholesterol, and triglyceride. This information was then analyzed using paired *t* test and SPSS version 15.0 software.

Results. There were 45 (52.9%) males and 40 (47.1%) females; their age ranged from 23 to 89 years (mean age, 57.5 ± 15.6 years). Diabetes was the commonest cause of ESRD seen in 40 (47.1%) followed by hypertension in 22 (25.9%) and other etiologies in 23 (27.1%) patients. A total of 63 patients (74.1%) selected PD as their primary mode of renal replacement therapy (positive selection), but 22 patients (25.9%) was forced to be in PD program (negative selection). Mean KT/V was 2.19 ± 0.67 (range, 0.89 to 4.41) until June 2009. The values for total cholesterol, LDL-cholesterol, and calcium were significantly different between the first and last evaluations.

Conclusion. We conclude that the PD patients are very vulnerable and should be closely observed and laboratory follow-up should be done to ensure adequate PD and nutrition with least complications.

P349

Comparing Demographic Characteristics and Laboratory Test Differences between Patients Who Have Selected Peritoneal Dialysis Positively vs. Negatively

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Introduction. Most patients can be treated by either hemodialysis (HD) or peritoneal dialysis (PD). The choice of dialysis modality is in part influenced by nonmedical factors, including patient preference and ability to perform PD procedure, the location of the ambulatory facility, and the availability of a training program for PD. Patients undergoing HD are far more than those being maintained on PD. At the end of 2004, for example, 89% and 11% of the dialysis patients worldwide were undergoing hemodialysis and peritoneal dialysis, respectively. Some patients select PD as their

first choice (positive selection, PS), and others do it because of HD complications or loss of all access sites (negative selection, NS).

Methods. In this study, we have compared baseline demographic characteristics and laboratory data and last PD adequacy tests in 85 continuous ambulatory PD patients in Al-Zahra PD center divided according to their mode of selection (PS vs. NS) until June 2009, using independent-samples *t* test for parametric and chi-square test for nonparametric samples by SPSS version 15.0 software.

Results. A total of 63 patients (74.1%) had positive and 22 patients (25.9%) had negative PD selection. There was not statistically significant difference between the 2 groups regarding gender, etiology of renal failure, and dialysis sessions per day. However, PS patients were younger and had better total weekly creatinine clearance, mostly due to better preserved native kidney function, and higher fasting blood glucose level than NS ones.

Conclusion. We conclude that with better education of the dialysis patient population before starting dialysis, we may have younger patients in PD and preserve their residual native kidney function for a longer time which may have considerable impact on their morbidity and mortality.

P350

Bone Mineral Density (BMD) in Kidney Transplant Recipients and Patients on Hemodialysis with Healthy Individuals

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Introduction. In this study, we measured BMD in 3 groups: long term hemodialysis patients, kidney transplant recipients with duration of more than one year, and healthy individuals.

Methods. We determined the BMD at the lumbar spine (L3,L4) and femoral bone (neck region) in 48 men and 36 women who were on long term hemodialysis, and a group of kidney transplant recipients including 42 men and 22 women in whom the duration of transplantation was more than one year. Also, it was measured in 76 healthy men and 51 healthy women. These groups were compared with each others. Factors potentially associated with alterations of the BMD were studied in each group.

Results. The frequency of osteoporosis in the lumbar region and femoral neck was higher in the kidney transplant recipients than healthy population (19.7% versus 3.8%; $P = 0.02$; Odds ratio = 5, and 11.2% versus 2.8%; $P = 0.03$; Odds ratio = 4, respectively). But, no significant difference was noted between these measures and those in patients on long term hemodialysis (20.3%

and 19.7%, respectively). In transplantation group, multivariate analysis showed that there was a significant negative correlation between the lumbar and femoral BMD with cumulative prednisolone dose ($r = -0.48$, $P = 0.002$) and also between lumbar BM and duration of cyclosporine consumption ($r = -0.31$, $P = 0.02$). BMI and age had no correlation with BMD.

Conclusion. Osteoporosis is more frequent in patients on dialysis and kidney transplant recipients than in general population. However, there is no difference in frequency of osteoporosis between transplant and hemodialysis patients. Higher cumulative prednisolone dose and cyclosporine consumption result in decreased BMD among kidney transplant recipients.

P351

Effect of Omega-3 Supplementation on Plasma Level of Homocysteine in Hemodialysis Patients

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Introduction. Elevated total homocysteine (tHcy) levels are common among end-stage renal disease (ESRD) patients on chronic dialysis with increasing the risk of cardiovascular disease. There is some controversial study about the effect of Omega-3 (fish oil) on plasma homocysteine level in dialysis patients. The aim of the present study was to further evaluate the effect of Omega-3 supplementation on plasma homocysteine levels in hemodialysis patients.

Methods. In a clinical trial, 100 voluntary patients on chronic hemodialysis were selected and divided into 2 groups randomly. Group 1: Omega 3 group: these patients received omega 3, as a capsule three gram/d for two months; group 2: these patients were on placebo. CBC, routine laboratory test, and total homocysteine level were measured before and after two months in both groups. Statistical analysis was performed using SPSS 16 and ANOVA test. A P value was set to be significant at 0.05.

Results. Only 44 patients from each group completed the study. There was no statistically significant difference between the 2 groups regarding the age, gender, and duration on dialysis. Routine laboratory tests were also not significantly different at the end of the study between the 2 groups. There was significant reduction of serum homocysteine level in omega 3 treated group after two months ($P = 0.03$). Hb level was also not significantly elevated in omega 3 group ($P > 0.05$).

Conclusion. In conclusion, it seems that Omega 3 fatty

acid is a safe and effective nutrient that may have a beneficial effect in reduction of morbidity and also mortality of the dialysis patients with reduction of homocysteine level.

P352

High Serum Ferritin without Iron Supplementation

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Introduction. Certain conditions may result in dysregulation of ferritin, the main intracellular iron storage protein. On the other hand, ferritin may have other effects in addition to its role in storing intracellular iron. Iron administration is to be withheld for ferritin values > 800 ng/ml.

Methods. In an observational and comparative study, we enrolled 80 patients on maintenance hemodialysis who had serum ferritin > 500 for more than 6 months. These patients were divided into two groups based on iron supplementation status. Group 1: hemodialysis patients who did not receive iron therapy (oral & parenteral) for at least one year and had serum ferritin more than 500 ng/ml and group 2: other dialysis patients who received iron therapy as iron sucrose (venofer) and had serum ferritin > 500 . Age, gender, duration on dialysis, routine laboratory tests, serum ferritin, lipids levels, transferrin saturation, and nutritional status were evaluated. Statistical analysis was performed using SPSS version 12 and P value was set at 0.05.

Results. In group 1, about 62.2% of the patients with serum higher ferritin (> 500 ng/ml) were not on iron supplementation. Mean age of these patients was 58.65 ± 15.49 years with male to female ratio of 1.4 to 1. Mean duration on dialysis was 50.56 ± 37.42 months. Mean Hb and Hct were 10.71 ± 2.24 and 34.07 ± 6.59 , respectively. In group 2, mean age of the patients was 55.50 ± 14.99 years with M to F ratio of 1.2 to 1. Mean dialysis duration was 42.42 ± 38.36 months with main Hb and Hct 10.86 ± 1.38 g/dl and 34.53 ± 4.33 %. There was no significant difference regarding the age, duration on dialysis, Hb & Hct, transferrin saturation, serum albumin, and Hs-CRP between the 2 groups. Serum triglyceride was significantly higher in group 1 patients. Serum alkaline phosphatase was also insignificantly higher in non iron treated patients.

Conclusion. In conclusion, most of the dialysis patients with higher serum ferritin were not on iron therapy for at least one year. We could not find any significant correlation between higher serum ferritin and demographic and other laboratory results in this study.

P353

Evaluation of the Effect of Omega-3 Supplementation on Inflammatory Markers in Hemodialysis Patients

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Introduction. Omega-3 fatty acids play an important modulatory role in the immune and inflammatory responses, the progression of arteriosclerosis, vascular reactivity and BP control, cell membrane function, and gene expression. On the basis of the laboratory data and preliminary clinical findings, there are reasons to suggest that omega-3 supplementation may offer benefits to dialysis patients. The aim of the present study was to further evaluate the effect of Omega 3 on inflammation markers of dialysis patients.

Methods. In a clinical trial, 40 volunteer patients on chronic hemodialysis were selected. Routine laboratory tests, TNF- α , and hs-CRP were measured before the study by standard methods. Omega 3 (Zahravi, Iran) was began (a capsule 3 g/day) and continued for two months. At the end of study, laboratory tests including TNF- α and hs-CRP were measured again. Statistical analysis was performed using SPSS16 and *t* test and *P* value was set at 0.05.

Results. Only 37 patients completed the study. Mean age of patients was 48.8 ± 24.8 years. Mean dialysis duration was 43.10 ± 39.24 months. Mean Hb was 10.89 ± 2.05 g/dl before the study that increased to 11.2 ± 2.185 after 2 months. Mean TNF- α level was 6.91 ± 15.25 pg/ml before the study that reduced to 2.35 ± 8.02 pg/ml at the end of study ($P = 0.03$). Routine laboratory test and hs-CRP did not significantly differ with omega 3 supplementation after two months ($P > 0.05$).

Conclusion. In conclusion, it seems that omega3 fatty acid has many beneficial effects on ESRD patients on maintenance dialysis especially via reduction of inflammation markers in them.

P354

Comparison of Single-Pool Kt/V and Surface-Area-Normalized Kt/V in Patients under Hemodialysis

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Introduction. Urea pharmacokinetic equation systems have contributed to better understanding of the treatment dose among hemodialysis patients. The normalized

treatment ratio, Kt/V assumes that smaller patients with low volume of urea distribution (V) require proportionately less total treatment (Kt) than bigger patients. Our aim was to compare estimates of dialysis adequacy obtained by single-pool Kt/V (spKt/V) and Surface-Area-Normalized Kt/V (SAN-Kt/V) formulas, and to identify the similarities and differences between these estimates.

Methods. Study was carried out on 46 patients. A stable dialysis schedule was maintained during the study. SpKt/V and SAN-Kt/V were calculated from urea estimations using the following formulas: $spKt/V = -\ln(R - 0.008 \times t) + (4 - 3.5 \times R) \times UF/W$, where R is the Ct/Co, t is the duration of the HD session, UF is the ultrafiltration volume, and W is the body weight after the HD session. $SAN-Kt/V = spKt/V$ multiplied by $Vant/(3.271 \times Vant^{2/3})$; in females, multiplied again by 0.91). Dialysis dose with the Kt was also measured in each session.

Results. A total of 46 patients with mean age of 45.84 ± 17.29 were included. Of them, 25 (54.34%) were male and 21(45.62%) were female. With a prescribed mean Kt of 44.13 ± 2.66 lit, Sp Kt/v and SAN-Kt/v were more than 1.2 in 50% and 43.5% of the patients, respectively. According to sex, despite statistically equal prescribed Kt (mean Kt was 44.11 ± 2.6 lit and 44.12 ± 2.7 lit in male and female patients), Sp Kt/v was significantly higher in females (1.27 ± 0.23 vs 1.06 ± 0.25 ; $P = 0.006$). Surprisingly, SAN-Kt/v in both groups was not significant (in males: 1.10 ± 0.24 and in females: $1.07 \pm .23$; $P = 0.667$). Body surface area of the dialyzed subject and Sp Kt/v showed negative correlation ($r = -0.583$, $P < 0.001$).

Conclusion. With an equal prescribed dialysis dose, delivered Kt/v by single-pool Kt/v in females is significantly higher than males but by SAN Kt/v, the results are somehow equal which could be due to BSA normalization.

P355

Comparison of Clinical Efficacy and Safety of Beta-Poietin with Neorecormone in Patients on Maintenance Hemodialysis

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Introduction. The principal treatment for anemia due to chronic renal failure is synthetic erythropoietin. Beta-Poietin is a generic formulation of beta-erythropoietin. In this study efficacy and safety of this medication is compared with the reference brand, Neorecormone by a clinical trial.

Methods. In this trial, 30 patients on maintenance hemodialysis were divided randomly to 2 groups and received Beta-Poetin or Neorecormone for 3 months according to standard dosage regimens. Based on individual patient's response the doses of the drugs were adjusted monthly to reach the hemoglobin increment level of 1 g/dl/month. The level of reticulocyte, CBC, hemoglobin, creatinine, and some other parameters were measured every 2 weeks. Moreover, any complain of the patients and possible side effects were looked for.

Results. Beta-Poetin and Neorecormone increased the Hb level (2.2 ± 0.26 versus 1.89 ± 0.5 mg/dl/month at the 3rd month) and there was not significant difference between two groups ($P = 0.28$). During the treatment period patients on Beta-Poetin did not show any special adverse effect more than the patients on the reference drug, Neorecormone.

Conclusion. Equal efficacy and safety of Beta-Poetin compared to Neorecormone, less number of injections compared to Eprex, lower cost, and easier administration makes this generic medication a good substitute of the similar brand medications.

P356

Rescue of Malfunctioning Peritoneal Dialysis Catheters Using Laparoscopic Procedure Under Local Anaesthesia

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Introduction. Malfunction of peritoneal dialysis catheter is one of the most common causes of deprivation of the patients from peritoneal dialysis (PD). Diagnostic

laparoscopy before removal of the catheter may help to rescue it. The purpose of the present study is to investigate findings and management outcomes of laparoscopic procedures for malfunctioning PD catheters.

Methods. A data base of 343 laparoscopic procedures for PD catheters between April 2004 and September 2009 was reviewed. There were 50 laparoscopic rescue procedures for 42 consecutive patients. Findings of catheter malfunction, type of rescue technique, catheter survival, and success rate was evaluated. Rescue procedure was performed using a 2-to 4- port laparoscopic approach. Overall catheter survival probability was estimated using the method of Kaplan and Meier.

Results. The mean patient age was 52.4 ± 14.8 years and 50% of the cases were female. All procedures except of 1 procedure, were performed under local anesthesia and conscious sedation. Seven patients underwent secondary and 1 patient underwent tertiary laparoscopic procedure. The most frequent laparoscopic findings were 14 intestinal entrapments, 10 omental wrappings, 7 intraluminal fibrin clots, 5 tip migrations, and 3 adhesions to fallopian tube. The most frequent rescue techniques were 19 repositioning, 8 adhesiolysis, and 7 extracorporeal clot extrusion. One and two year overall catheter survival was 53%. Success rate of the laparoscopic procedure under local anesthesia for diagnosis of catheters problem was 96%. The success rate of catheter patency for 30 days after rescue procedure was 52.8%, and it was the same for 1 and 2 years after the procedure.

Conclusion. Rescue of malfunctioning PD catheters using laparoscopic procedure under local anesthesia is simple and feasible. It is especially effective for patients with end stage renal disease who often are not good candidates for general anesthesia. We recommend this approach for all malfunctioning PD catheter before depriving patients from PD.