PROTEIN-ENERGY WASTING

MP596 RELATIONSHIP BETWEEN TRENDS IN NEUTROPHIL AND LYMPHOCYTE COUNTS AND MORTALITY IN INCIDENT HEMODIALYSIS PATIENTS

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Introduction and Aims: Elevated white blood cell (WBC) count associates with an increased mortality risk in hemodialysis (HD) patients. The prognostic value of trends (increase or decrease) of neutrophil and lymphocyte count is unclear. We aimed to analyze the relationship of changes in neutrophil and lymphocyte count and mortality in HD patients.

Methods: Incident HD patients treated in RRI clinics who had their first in-center treatment between 1/2000 and 12/2010 and survived a minimum of 12 months were included. Slopes of neutrophil and lymphocyte counts (as proportions of WBC) were computed for each patient using linear regression of all available values between months 4 and 12 from the start of treatment. Patients were stratified based on (a) the average rate of change in neutrophil % (declined: <-7% points/yr; stable: 7 to 7% points/yr; increased: >7 points/yr) and (b) the average rate of change in lymphocyte % (declined: <-5.5% points/yr; stable: 5.5 to 5.5% points/yr; increased: >5.5 points/yr); which resulted in 9 groups. Survival was then analyzed in months 13 to 18 following HD initiation using a Cox hazards model adjusted for age, gender, race, ethnicity, diabetes, access type, BMI, albumin, systolic blood pressure, body temp, nPCR, eKt/V, interdialytic weight gain, urea distribution volume, and slope of neutrophils and lymphocytes.

Results: A total of 2809 patients were studied. The median (IQR) age at the start of HD was 62.9 (51.7-72.7) yrs, 55.1% were male, 44.7% were white and 46.5% of patients were black. The Cox Hazards model showed that simultaneous increases in neutrophil and lymphocyte counts (HR=12.3; 95% CI=1.3-113.5, P=0.03) or decrease of neutrophil and lymphocyte counts (HR=4.7; 95% CI=0.6-38.4, P=0.14) were associated with an increased risk of mortality as compared to reference group (stable neutrophil and stable lymphocyte). Declines in lymphocyte count and increases in neutrophil count were at increased death risk (HR=1.8; 95% CI=1.2-2.6, P=0.003) whereas increase in lymphocyte count with stable or decrease neutrophil count exert a protective effect on survival (HR=0.3, 95% CI=0.07-1.33, P=0.07 & HR=0.8, 95 % CI = 0.5-1.3, respectively).

Conclusions: Our results shows survival advantage for patients with stable neutrophil and lymphocyte counts. HD patients with high neutrophil count and low lymphocyte count are associated with increased mortality risk. This relationship may be partially explained by the presence of protein-energy malnutrition and acute inflammation. Further studies are required to understand the roles of neutrophil and lymphocyte counts, their temporal trends and the prognostic significance of these trends.

Introduction and Aims: The central nervous system is in part a regulator of innate immunity via the cholinergic anti-inflammatory pathway (CAP) which transmits signals in the vagus nerve that suppresses proinflammatory cytokine production by an α7 nicotinic acetylcholine receptor (α7nAChR) mechanism. In case of injury, inflammation or infection the effluent vagus nerve transmits an acetylcholine (ACh)-mediated signal to these receptors present on immune cells and thereby inhibits inflammation in the periphery. Dialysis patients have autonomic dysfunction with increased sympathetic and suppressed parasympathetic activity (vagus nerve function). In CKD patients elevated levels of inflammatory markers such as CRP, TNF, IL-6 are associated with poor outcome. Aim: to investigate deficiencies in CAP in CKD patients with hemodialysis and peritoneal dialysis treatment.

Methods: Twenty patients; twelve patients in chronic HD (7 male, 5 female; age range 26-84), eight patients in chronic PD (5 male, 3 female; age 47-84) and 8 healthy controls (5 male, 3 female; age 31-52) were analyzed for CRP, TNF, IL-1, IL-6 and IL-10 at baseline. Whole blood samples were stimulated ex vivo with two concentrations of LPS (10 and 100 ng/mL) to induce an inflammatory reaction. TNF, IL-1, IL-6 and IL-10 were measured at these concentrations and again in the presence of 45 and 90 µmol/L GTS-21, a cholinergic analogue with ACh-like effect.

Results: TNF and CRP were significantly increased at baseline in both HD- and PD patients compared with controls. After LPS stimulation TNF was increased in patients and controls but there was a robust decrease in both groups after addition of GTS-21 (see figure and scale). The IL-1 and IL-6 pattern were similar but the GTS-21 effect was not as pronounced. Interestingly IL-10 increased with GTS-21 in a dose-dependent manner in both patient groups but significantly only in PD patients.

Conclusions: We have shown that immune cells in dialysis patients are able to react in a functional way ex vivo similar to healthy subjects. This could be explained by the presence of α7nAChR in immune cells. The demonstration of an intact CAP in HD and PD patients, and the possibility to restore a similar CAP with GTS-21 stimulation, could be used to treat inflammation in these patients.

ROLE OF HFR CARTRIDGE IN THE REMOVAL OF MEDIATORS OF INFLAMMATION IN HEMODIALYSIS PATIENTS

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Introduction and Aims: HFR is a double chamber hemodialfiltration with reinfusion of ultrafiltrate (UF) regenerated through a resin cartridge. The resin component of the cartridge is able to adsorb several medium-high molecular weight solutes and, probably, pro-inflammatory cytokines. Aim of this study was to evaluate if a single HFR session was able to significantly reduce the pro-inflammatory activity of the ultrafiltrate by adsorbing both Interleukin-6 (IL-6) and p-cresol, a protein bound solute.

Methods: We selected 8 inflamed chronic HD patients, which underwent a single 240 minutes HFR session. We studied the change in both IL-6 and p-cresol circulating levels, by comparing pre- and post-HFR serum concentrations. In addition, we collected UF samples, pre- and post-cartridge at the start (after 15 minutes) and at the end (after 225 min), respectively, where we evaluated IL-6 and p-cresol concentrations. Finally, to evaluate the overall change in the inflammatory activity of the UF, we also incubated Peripheral Blood Mononuclear Cells (PBMC) from 8 healthy volunteers and UF aliquots (20%) collected pre-cartridge (at 15 min) and post-cartridge (at 225 min) of the HFR session and compared both IL-6 gene expression and production under basal condition (no UF addition) with those obtained after these 2 different stimulations.

Results: IL-6 serum levels slightly decreased after the treatment, without significant differences between pre- and post-HFR samples. On the contrary, p-cresol serum levels decreased significantly after the HFR single session (p<0.02). Both IL-6 and p-cresol increased sympathetic and suppressed parasympathetic activity (vagus nerve function). In CKD patients elevated levels of inflammatory markers such as CRP, TNF, IL-6 are associated with poor outcome. Aim: to investigate deficiencies in CAP in CKD patients with hemodialysis and peritoneal dialysis treatment.

Methods: Twenty patients; twelve patients in chronic HD (7 male, 5 female; age range 26-84), eight patients in chronic PD (5 male, 3 female; age 47-84) and 8 healthy controls (5 male, 3 female; age 31-52) were analyzed for CRP, TNF, IL-1, IL-6 and IL-10 at baseline. Whole blood samples were stimulated ex vivo with two concentrations of LPS (10 and 100 ng/mL) to induce an inflammatory reaction. TNF, IL-1, IL-6 and IL-10 were measured at these concentrations and again in the presence of 45 and 90 µmol/L GTS-21, a cholinergic analogue with ACh-like effect.

Results: TNF and CRP were significantly increased at baseline in both HD- and PD patients compared with controls. After LPS stimulation TNF was increased in patients and controls but there was a robust decrease in both groups after addition of GTS-21 (see figure and scale). The IL-1 and IL-6 pattern were similar but the GTS-21 effect was not as pronounced. Interestingly IL-10 increased with GTS-21 in a dose-dependent manner in both patient groups but significantly only in PD patients.

Conclusions: We have shown that immune cells in dialysis patients are able to react in a functional way ex vivo similar to healthy subjects. This could be explained by the presence of α7nAChR in immune cells. The demonstration of an intact CAP in HD and PD patients, and the possibility to restore a similar CAP with GTS-21 stimulation, could be used to treat inflammation in these patients.
UF concentrations decreased significantly after the passage through the cartridge, either at the start or at the end of HFR session (p<0.05). IL-6 gene expression was significantly higher in PBMC from healthy subjects incubated with 20% UF collected post-cartridge at 15 min than in both unstimulated (p<0.02) and PBMC cultured with 20% UF collected post-cartridge at 225 min (p<0.01). Similarly, IL-6 production by PBMC from healthy subjects resulted higher with UF pre-cartridge than with both UF post-cartridge (p<0.05) and no UF stimulation (p>0.01).

Conclusions: Our preliminary results suggest that HFR is a promising method that might reduce the burden of pro-inflammatory mediators circulating in HD patients. Moreover, a single session of HFR is also able to significantly reduce p-cresol serum levels. So, a role of HFR in limiting the cardiovascular risk of dialysis patients is conceivable.

**MP599 METHYLGLOXAL (MG) LEVELS ARE MARKEDLY HIGHER IN DIABETIC HEMODIALYSIS (HD) PATIENTS THAN NON-DIABETIC HD PATIENTS, WHICH MAY CONTRIBUTE TO INCREASED MORBIDITY AND MORTALITY IN DIABETICS**

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Introduction and Aims: The increased morbidity and mortality in diabetic hemodialysis (HD) patients, compared to other HD patients, may be related to higher OS and other CVD risk factors. MG, a very reactive advanced glycation endproduct (AGE), increases OS and CVD risk factors in early CKD. Sevelamer carbonate (SC) was recently shown to bind diet-derived AGEs in the GI tract, thereby reducing circulating and cellular risk factors for CVD, including OS and MG in Type 2 Diabetics with CKD Stage 2-4.

Methods: To determine if MG levels could be a contributing factor to increased mortality in diabetic/HD patients, compared to non-diabetic/HD patients, we examined sera for MG from a randomized, double-blind, placebo-controlled study of diabetic/HD and non-diabetic/HD patients, given SC at 2, 4.4, or 7.2 g/d for 3 wks.

Results: Baseline serum MG levels were 50% higher in diabetic/HD than in non-diabetic/HD patients. There was a dose-dependent decrease in MG (p<0.01) in diabetic/HD, but not in non-diabetic/HD patients, in whom MG was reduced only at 7.2 g/d. There was a dose-dependent decrease of serum phosphate, plasma total and LDL-cholesterol levels in all HD patients (p<0.01).

Conclusions: Sevelamer rapidly and effectively lowers serum MG levels in diabetic/HD patients. Since AGEs, such as MG, induce OS and CVD risk factors, Sevelamer carbonate at the currently recommended dose may prove effective in reducing mortality in diabetic/HD patients. Longer trials are needed to confirm these findings.

**MP600 BODY MASS INDEX AND RESISTENCE TO RECOMBINANT HUMAN ERYTHROPOIETIN THERAPY IN MAINTENANCE HEMODIALYSIS PATIENTS**

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Introduction and Aims: Inflammation and erythropoietin disturbances are hallmarks of both obesity and chronic kidney disease and are enhanced in hemodialysis (HD) patients who develop resistance to rhEPO therapy. The aim of this work was to contribute to a better understanding of the relationship between resistance to rhEPO therapy and body mass index (BMI) in HD patients. We studied systemic changes associated with resistance to rhEPO and with BMI, with particular interest on iron metabolism, on nutritional and inflammatory status.

Methods: We evaluated 191 HD patients under rhEPO therapy and 25 healthy controls in two groups: one consisting of patients with Body Mass Index (BMI) <25; and the other of patients with BMI ≥25. We studied systemic changes associated with resistance to rhEPO and with BMI, with particular interest on iron metabolism, on nutritional and inflammatory status.

Results: BMI was positively associated with resistance to rhEPO and with BMI, with particular interest on iron metabolism, on nutritional and inflammatory status. Subjects with BMI ≥25 had significantly lower BMI values and lymphocyte count, and lower adiponectin levels, associated with significant changes in iron metabolism (lower iron and iron binding indices and higher C-reactive protein [CRP]), IL-6, and albumin and adiponectin were measured.

Conclusions: In conclusion, this is the first study showing a direct association between BMI and resistance to rhEPO therapy.

**MP598 RESULTS OF SUSPENDING COMPLIANCE WITH BALKAN ENDEMIC NEPHROPATHY ON HEMODIALYSIS UNDERGOING VITAMIN C THERAPY-A PILOT STUDY**

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Introduction and Aims: End Stage Renal Disease (ESRD) represents a microinflammatory state accompanied by oxidative stress and an imbalance between pro- and antioxidants. Vitamin C is a highly effective antioxidant, acting to lessen oxidative stress. The aim of our study was to assess the Antioxidant Capacity of Water soluble substances (ACW) and the Antioxidant Capacity of Liposoluble substances (ACL) in patients with Balkan Endemic Nephropathy (BEN) on hemodialysis undergoing vitamin C therapy as compared to healthy controls.

Methods: Twenty-one patients with BEN on hemodialysis (HD), mean age 63.3±5.42 years, 6 M and 15 F, were enrolled into the study. All patients received 10 vials of vitamin C 750 mg/5 ml every 2 months. Eleven apparently healthy subjects, mean age: 63.73±5.21 years, 6 M and 5 F, served as controls. The photochemoluminescence assay was used to measure the antioxidant activity of plasma samples. The results are presented in equivalent concentration units of vitamin C (μmol/l) and in equivalent concentration units of Trolox (synthetic vitamin E) for lipid soluble antioxidants. Both concentrations are expressed in μmol/l. Statistical analysis (non-parametric Wilcoxon test) was performed using NCSS.

Results: Mean duration since BEN diagnosis was 9.2±3.5 years. Mean duration since HD initiation was: 4.9±2.3 years. Smoking status was negative in all patients. Hypertension was present in 15 patients (71.42%), cardiovascular disease in 10 patients, diabetes mellitus 6 patients, renal tuberculosis, 1 had upper urinary tract cancer, 1 genital cancer, and 1 autoimmune thyroid disease. The Antioxidant Capacity of Water soluble substances (ACW) in patients with BEN was 198.05±196.63 μmols/l; p=0.01, whereas the Antioxidant Capacity of Liposoluble substances (ACL) in patients with BEN was 33.9±22.99 μmol/l, p=0.05.

Conclusions: We conclude that vitamin C therapy in patients with BEN on HD therapy is well tolerated and might be an effective antioxidative therapy.

**MP598 TRANSFERIN, IRON, SOLUBLE TRANSFERIN RECEPTOR (sTIR), TRANSFERRIN SATURATION, HEPIDIN, C-REACTIVE PROTEIN (CRP), INTERLEUKIN 6 (IL-6), ALBUMIN AND ADIPOGENIN WERE MEASURED**

Results: Non-responder patients (n=16), as compared with responder patients (n=175), showed significantly lower BMI values and lymphocyte count, and lower adiponectin levels, associated with significant changes in iron metabolism (lower iron and iron binding indices and higher C-reactive protein [CRP]), IL-6, and albumin and adiponectin were measured.

Conclusions: Non-responder patients required higher rhEPO doses, as compared with the other patients; moreover, a higher number of non-responders patients were found in the underweight group of HD patients. Underweight patients also presented significantly lower levels of transferrin and higher levels of adiponectin, compared to overweight and obese patients; they showed also lower levels of iron, compared with normal weight patients. In HD patients, BMI correlated inversely and significantly with adiponectin (r=-0.397, p<0.001), rhEPO doses (r=-0.271, p=0.001) and K/T (r=-0.252, p=0.003).

Conclusions: In conclusion, underweight HD patients seem to be less protected, showing an enhanced functional iron deficiency, a higher degree of inflammation and resist to rhEPO therapy. BMI was positively associated with resistance to rhEPO in HD patients, while adiponectin seems to work as a fairly good indirect marker of adiposity for HD patients, except for underweight patients that paradoxically present higher levels of adiponectin.
significantly increases the Antioxidant Capacity of Water soluble substances (ACW) as compared to controls and could be used to counter oxidative stress in patients with ESRD.

**Introduction and Aims:** Patients with chronic kidney disease present selenium (Se) plasma deficiency. Se is an essential element with important biological functions and its best known biological role is attributed to its presence in antioxidant enzyme, glutathione peroxidase (GSH-Px). The Se content of foods depends on soil and some authors have suggested that Amazon soil has high concentrations of Se when compared to other regions in Brazil. The objective of this work was to compare the Se status of patients in hemodialysis from the Amazon with the Southeast in Brazil.

**Methods:** Thirty-eight patients from Southeast region (22 men and 16 women, 15% were diabetic, 53.3 ± 26.4 yrs) were compared to forty patients from de Amazon region (28 men and 12 women, 22.5 % diabetic, 63.5 ± 11.9 yrs). Se in plasma was determined through atomic absorption spectrophotometry with hydride generation (HITACHI®, Z 5000).

**Results:** The Se plasma levels of the HD patients from Southeast region were significantly lower (17.5 ± 11.9 μg/L) when compared to the patients from Amazon region (37.1 ± 15.8 μg/L) (p < 0.001). However, both patient groups presented Se plasma levels (normal values - 60-120 μg/L).

**Conclusions:** We concluded that patients from Amazon region present higher plasma Se levels when compared to the patients from Southeast Brazil and, this difference can be explained by high concentrations of Se in the soil in Amazon region. However, independently of the region, both groups present Se deficiency. Thus, more attention should be paid to the Se status in HD patients.
One year mortality of high BMI patients on hemodialysis correlates with different factors than one year mortality in normal and lower BMI ones.

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Introduction and Aims: It is known that survival on dialysis is better in patients with higher BMI. Less is known about the causes of this improved survival. The paper addresses this issue.

Methods: 600 patients (mean age 54.5+/−13.5 years, 332 men, 268 women) from 7 HD centers from Romania have been followed up for 1 year. Patients were on hemodialysis, for an average of 4+/−3.7 years. Data concerning dialysis quality, anemia, mineral and bone disorders, serum albumin, CRP, B.M.I., hemoglobin, and ferritin levels did not significantly differ but mean T.S.T. was significantly lower in group 1 (25.5% vs. 32.3%, p=0.047). The mean Ca, PO4, I.P.T.P and alkaline phosphatase values of underweight HD patients did not differ from the normal ones. The mean 25OH D levels were significantly lower than 17.9 (p=0.023), though mean time on dialysis therapy did not differ. Hemodialysis adequacy was similar in both groups. Median hemoglobin and ferritin levels did not significantly differ but mean T.S.T. was significantly lower in group 1 (20.8% vs. 14.4%) and was correlated only with the prevalence of Hepatitis B virus infection. Patients in group 3 (overweight) were older (36.5 vs. 52.8 years, p=0.0008) and lower mean Kt/V (11.3 vs. 14.7, p=0.0001). Lower mean T.S.T. was (28.6 vs. 32.3%, p<0.005), higher mean serum albumin levels (4.4 vs. 4.1, p=0.08) when compared to group 2. One year mortality rate was significantly lower when compared with group 2 (8.17 vs. 14.4%) and mortality was positively correlated with age (p=0.023), alkaline phosphatase levels (p=0.006), coronary artery disease (p=0.004), DM (p=0.030) and negatively with blood flow (Qb) (p=0.033).

Conclusions: Our study shows that one-year mortality is influenced by other factors in high BMI patients as compared to lower BMI ones, but even if obese patients have a better outcome, cardiovascular disease and diabetes are still significantly correlated with mortality.

ONE YEAR MORTALITY OF HIGH BMI PATIENTS ON HEMODIALYSIS CORRELATES WITH DIFFERENT FACTORS THAN ONE YEAR MORTALITY IN NORMAL AND LOWER BMI ONES.

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Introduction and Aims: Bicompatibility plays a key role in the pathogenesis of dialysis related vasculopathy responsible for the high mortality in CKD hemodialyzed patients. Beside membranes, acetate-based dialysis buffers seem to be one of the main actors in the pathogenesis of vasculopathy. Acetate, even in the low concentrations present in bicarbonate buffer, by stimulating inducible nitric oxide synthetase, alter the intracellular redox state responsible for endothelial cells biological activity resulting in apoptosis and inflammation related to activation of stress sensitive pathways, including NF-kB and others. For these reason new available dialysis buffers have been proposed, among those the citrate based dialysis buffers. Citrate by itself is provided with antiinflammatory as well as antioxidants properties. Aim of this study was to compare the effects of acetate- or citrate-based dialysis buffers on some biologic parameters, such as NF-kB activation and total antioxidant capacity (TAC), in human endothelial cells in culture.

Methods: Human endothelial cells were incubated using transwell devices, with the following dialysis buffers: acetate 38 mmol/Lt; acetate 4 mmol/Lt; bicarbonate 34+ acetate 4 mmol/Lt; citrate 1 mmol/Lt; acetate 38 mmol/Lt + citrate 1 mmol/Lt; acetate 4 mmol/Lt + citrate 1 mmol/Lt; bicarbonate 34+ acetate 4 mmol/Lt + citrate 1 mmol/Lt. LPS 10 µmol/ml was used as positive control. Cells were incubated at 37°C in humidified atmosphere for 1 and 4 hours. TAC levels were measured in the supernatants. Cell lysates were used for studying NF-kB nuclear translocation using western blot analysis.

Results: Results are expressed in the table as fold increase (FI) or decrease (FD) vs values obtained in basal unconditioned cells after 1 hour incubation. Superimposible results were obtained after 4 hours conditioning of human endothelial cells with different dialysis buffers. 1 p<0.001 vs basal condition, 6 p<0.05 acetate + citrate vs acetate alone.

Conclusions: Our results allow us to conclude that citrate-based dialysis buffers are more biocompatible than acetate-based ones and bicarbonate dialysis buffers containing low concentrations of acetate. Citrate per se exerts an antioxidative activity. The new citrate-based dialysis buffers is potentially useful to limit the bicompatibility reactions involved into the pathogenesis of long-term dialysis vasculopathy.

Acetate 38 mmol

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Association of changes in lean and fat tissue mass and patient clinical and laboratory parameters.

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Introduction and Aims: Protein-energy malnutrition has been shown to be a major risk factor for hemodialysis (HD) patient mortality. We aim to evaluate associations of lean and fat tissue mass and their changes with clinical / laboratory parameters.

Methods: The MONitoring Dialysis Outcomes (MONDO) consortium data (Usvyat, Blood Purification 2013) from FMC clinics in Europe were used for this analysis. Only patients in whom >=2 routine measurements of Lean/Fat Tissue Mass using Fresenius Medical Care BCM were performed within 365 days. Lean Tissue Index (LTI) was computed as ratio of Lean Tissue Mass to body surface area and Fat Tissue Index (FTI) was computed as a ratio of Fat Tissue Mass to body surface area. Changes in all variables were computed over 365 days using simple linear regression. Correlations were assessed using Spearman’s correlation coefficient.

Results: We studied 527 HD patients. The median (IQR) LTI and FTI at baseline were 34.9 kg (28.8-42.4) and 25.6 kg (18.7-33.3). Starting FTI was positively and significantly associated with albumin, creatinine, nPCR, and high density lipoprotein (HDL) cholesterol. FTI was negatively and significantly associated with albumin, creatinine, nPCR, and high density lipoprotein (HDL) cholesterol. LTI was positively and significantly associated with albumin, creatinine, nPCR, and high density lipoprotein (HDL) cholesterol.
and pre-dialysis systolic blood pressure. LTI was negatively and significantly correlated with age, CRP, nPCR, cholesterol, and LDL cholesterol (figure 1a). Increases in FTI were significantly associated with increases in cholesterol and triglycerides. Increases in LTI were associated with declines in triglycerides (figure 1b).

**Conclusions:** Baseline as well as changes in fat and lean tissue mass are associated with changes in multiple other clinical and laboratory parameters. Multivariate models are needed to understand factors most strongly associated with body composition; survival analysis to understand whether fat and tissue mass are independently associated with survival are also needed.

**MP609**

**PROCALCITONIN AS AN EARLY PREDICTOR OF ACUTE INFECTION IN HEMODIALYSIS PATIENTS**

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**Introduction and Aims:** Hemodialysis patients have a greater risk of infection than general population. The present study evaluates serum procalcitonin levels as an early predictor of infection in patients on hemodialysis.

**Methods:** A historical cohorts study was performed of 211 prevalent hemodialysis patients (median age 73 years (range 60-80), 58% males, 32% diabetes mellitus) covering the period 2005-2012. Regarding vascular access, 55% of the patients had an autologous fistulae, 31% a polytetrafluoroethylene graft and 14% a permanent catheter. All patients received 4 hour in three session per week of high-flux hemodialysis (25.6% online hemodiafiltration). Serum samples were thawed and patients were followed-up for a 40±25 months. Demographic and laboratory data (including inflammatory markers such as C-reactive protein [CRP], procalcitonin and albumin) were recorded at baseline. During follow-up, all infections were documented and analyzed.

**Results:** During follow-up, 112 patients (53.3%) suffered acute infection (25% vascular access infection, 25% respiratory, 22% skin, 12% gastrointestinal, 6% urinary, 8% others). CRP showed a positive correlation with procalcitonin (r=0.482, p<0.0001) and a negative correlation with serum albumin (r=−0.256, p=0.002). No association was found between procalcitonin and albumin. Procalcitonin was found to be the only independent predictive factor for infection at the first month in the uni and multivariate analysis, after adjustment for the rest of inflammatory parameters, sex and age. The receiver operating characteristic (ROC) values were 0.636 (95%CI 0.469-0.802, p<0.0001) and 0.684 (95%CI 0.515-0.728, p=0.0001) for procalcitonin and CRP, respectively. However, CRP was the best predictor of infection over global follow-up (p=0.003), after adjusting for all the studied factors. Linear regression analysis adjusted for age, sex, CRP, nPCR, cholesterol, and LDL cholesterol (figure 1a). Increases in LTI were negatively and significantly correlated with increases in triglycerides (figure 1b).

**Conclusions:** Procalcitonin is an early predictor of infection in the first 30 days in hemodialysis patients. Periodically monitored procalcitonin levels in patients at high risk of infection can give us the possibility of detecting subclinical infections, including asymptomatic vascular access infections, in order to initiate an early treatment.

**MP610**

**OVERHYDRATION BY BIOIMPEDANCE SPECTROSCOPY (BCM) IS RELATED TO INFLAMMATION AND MALNUTRITION**

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**Introduction and Aims:** Fluid overload is an important cardiovascular risk factor by itself and its effect on blood pressure. Furthermore, fluid overload involves an inflammatory condition and also influences on the morbimortality of patients on haemodialysis. Fluid overload can be easily measured by BCM (Body Composition Monitor, Fresenius Medical Care) helping us to control the hydration status of our patients. Demonstrate the association between hydration/nutrition parameters by BCM with clinical and analytical indicators related to morbimortality in dialysis.

**Methods:** We included 1316 patients with monthly BCM. Excluded hospitalized during the monitoring period and amputations on unpolar pacemakers. We followed our patients during 3 months after their first BCM and we recorded renal disease etiology, comorbidities, age, haemodialysis vintage, blood pressure, BCM parameters; analysis and treatment. The analysis was performed with the SPSS computer program, version 20.0. P<0.05 was considered to indicate statistically significant. We set them in two groups based on their relative overhydration: greater than 15% versus lower or equal to 15% (table 1). There were 921 patients (69.08%) with a ROH lower or equal to 15% in front to 395 patients (30.92%) with ROH higher 15%.

**Results:** Patients with a baseline ROH higher than 15% showed higher CRP, ERI and consumption of ESA, lower haemoglobin level, higher systolic blood pressure and higher consumption of antihypertensives. As well as lower serum albumin, and lean/fat tissue index (p<0.05 for all). Groups are not really different looking at age, ferritin and ISAT (p>0.05) seems to confirm that ferritin does not follow a clear pattern related to overhydration; it probably depends on the presence of confounding factors.

**Conclusions:** Overhydration is correlated with an increase of ERI and CRP, Likewise lower albumin, and lean and fat tissue index. Moreover, there is a clear connection between higher consumption of ESA together with hyperhydration. Hypervolemia described as relative overhydration higher 15% is related to a higher blood pressure and a higher consumption of hypertensive drugs. The correlation between parameters of biompiendence spectroscopy and markers of inflammation and malnutrition indicates that controlling fluid is the optimal strategy for reducing cardiovascular events in haemodialysis patients.

**MP611**

**MODERN DIALYSIS MEMBRANES ELIMINATE 1 G AMINO ACIDS PER HOUR IN EXTENDED DIALYSIS - A CLINICAL CROSS-OVER STUDY COMPARING THE AV 1000S AND THE EMIC2 DIALYZER**

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**Introduction and Aims:** Acute kidney injury (AKI) in critically ill patients is associated with an activation of protein catabolism and a negative nitrogen balance. Renal replacement therapy aggravates this problem by eliminating a substantial amount of amino acids. As a result patients with AKI are at an increased risk to develop protein-energy wasting which can increase the likelihood of in-hospital death and complications. Aim of the study was to determine plasma levels of amino acid in critically ill patients before and after extended dialysis and to measure the total amount of amino acids in the spent dialysate.

**Methods:** Prospective, cross-over study comparing the EMiC2 dialyzer (1.8 m², FMC, Germany) and AV 1000S (1.8 m², FMC, Germany) in 5 critically ill patients with AKI. All patients were allocated to a 10 hour dialysis (blood/dialysate flow 150 ml/min) using the 90 l GENIUS® batch dialysis system (FMC, Germany) which allows access to the collected spent dialysate. Plasma amino acid levels were measured at the start, 5 hours into the dialysis as well as at the end of treatment.

**Results:** Despite an absence of pre- and post –dialysis plasma amino acid levels we found an impressive amount of amino acids in collect spent dialysate of 10 g /10 h treatment. The dialyzer clearance of both membranes ranged from 59.1 ml/min vs. 67.8 ml/min for tryptophan to 93.7 ml/min vs. 96.2 ml/min for arginine. There was a significant difference between the dialyzer clearances for Glycine (AV 1000S: 83.3 ml/min vs. EMiC2: 92 ml/min, p=0.02) and Serine (88.8 ml/min vs. 91.8 ml/min, p=0.02) and there was no significant difference in one other parameters. The total eliminated masses of the measured amino acids have equal values for both membranes (AV 1000S: 10.04g vs. EMiC2: 10.36g).

**MP612**
Conclusions: Our data indicate that the modern means of RRT eliminate amino acids to an extent that has not been met by our nutritional support standards. Especially the removal of glutamine, important for immune function and cell regeneration might have detrimental effects on the recovery of critically ill patients.

**Abstracts**

**MP611**

**EICOSAPENTAENOIC ACID DECREASES ADVANCED GLYCEHYDROLYTZ EN PRODUCTS RESULTING IN THE PREVENTION OF AUTONOMIC DYSFUNCTION IN JAPANESE NON-DIABETIC HAEMODIALYSIS PATIENTS**

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**Introduction and Aims:** Advanced glyclyhydrolite products (AGEs) are well known to accumulate in the autonomic system inducing its dysfunction in diabetic haemodialysis (HD) patients. Serum levels of AGEs were reported to elevate even in non-diabetic HD patients. On the other hand, many reports have documented beneficial effects of dietary intake of eicosapentaenoic acid (EPA), a major omega-3 fatty acid, on improving the autonomic dysfunction. The aim of the present study was to investigate the effects of EPA on AGEs and autonomic dysfunction in Japanese non-diabetic HD patients.

**Methods:** We recruited 41 stable Japanese non-diabetic HD patients (18 men and 23 women, 57.5±14.3 years) who had taken ordinary diet for chronic renal failure. Patients with coronary heart disease, malignancy or significant malnutrition, or those with regularly taking a fish oil supplement were excluded. We measured serum levels of EPA expressed as weight percentage of total lipids (%), pentosidine as a parameter of AGEs, glycoalbumin (GA) and glycated haemoglobin (HbA1c) after overnight fasting.

**Results:** Serum EPA ranged from 0.78 to 4.14 %, and its median was 1.70 %. There were no significant differences in GA and HbA1c between the two groups. The pentosidine was significantly lower, and HF was significantly higher in the high EPA group than in the low EPA group (P<0.05, respectively). There were no significant correlations between EPA and GA or HbA1c. The EPA was negatively correlated with pentosidine (r=-0.478, P<0.01) and positively correlated with HF (r=0.493, P<0.05). Pentosidine was negatively correlated with weight (r=-0.608, P<0.001).

**Conclusions:** Eicosapentaenoic acid decreased serum AGEs and enhanced parasympathetic activity, resulting in the prevention of autonomic dysfunction in Japanese non-diabetic HD patients.

**MP612**

**LONG TERM MAINTENANCE OF ORAL NUTRITIONAL SUPPLEMENTATION IMPROVES NUTRITIONAL PARAMETERS AND DECREASES MORTALITY IN HEMODIALYSIS PATIENTS**

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**Introduction and Aims:** Protein-energy wasting (PEW) is common in patients with chronic kidney disease (CKD) and is one of the major factors adversely affecting their prognosis. Clinical guidelines and reviews support the use of enteral nutrition in patients with renal failure. The aim of this study was to evaluate short (6 months) and long term (18 months) effects of ONS in maintenance hemodialysis (MHD) patients with malnutrition.

**Methods:** Patients with serum albumin concentration <4 g/dl and SGA B group were included in the study. Patients who accepted to use the ONS (Nutrena®, Abbott Nutrition) were defined as the study group the individuals who refused to use the ONS served as the control group. All patients’ clinical, laboratory data, anthropometric measurements (BW, body mass index (BMI), intradialytic weight gain (IDWG), the triceps skin-fold thickness (TSFT) ) were analysed. For bioelectrical analysis (BIA), a Body Composition Analyser (Tanita BC-420MA) was used. All patients were followed-up at least 18 months and according to the duration of using ONS divided in to three groups: Group 1 (n=29) patients who refused using ONS for 18 months, patients in Group 2 (n: 11) used ONS for 6 months then gave up and Group 3 (n:18) patients used ONS for at least one year.

**Results:** According to initial assessment, there were no significant between three groups in demographic and clinical characteristics. In 6, month evaluation, albumin levels, BW, BMI, TSFT and BIA (fat free mass and muscle mass) values significantly increased in group 2 and 3 and significantly declined in Group 1 (p<0.001 for all). The 6, months serum albumin level levels were 3.50 ± 0.31, 3.67 ± 0.22, and 3.71 ± 0.24 g/dl (p= 0.0 4 in group 1, 2 and 3 respectively). After cessation of nutritional support there was a significant deterioration of albumin levels in group 2 but anthropometric measurements remained stable while albumin levels remained as the highest in group 3 (p<0.01). Mortality rates were 31% in Group 1, 54% in Group 2 and 0% in Group 3 (p<0.001). A logistic regression analysis revealed that albumin levels <3.7 g/dl was main predictor of mortality in 18 months of follow up period (p<0.012).

**Abstracts**

**MP613**

**CONCLUSIONS OF A KINETIC STUDY OF THE EFFECTS OF THE INTRADIALYTIC PARENTERAL NUTRITION ON THE AMINOACID POOL**

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**Introduction and Aims:** Malnutrition in dialysis patients could be offset by means of intradialytic parenteral nutrition (IDPN), provided it proves itself to be capable of improving the aminoacid (AA) pool, notwithstanding the possibility of dialysis clearance.

**Methods:** We conducted a short-term kinetic study in 10 malnourished patients, on thrice-weekly low-flux HD, 240 mins/session (Bologna Malpighi and Trento Hospitals, Italy). After an HD session without IDPN (baseline), the patients received an IDPN solution with 20 AAs (all-in-one bag, Nutrispecialid, B Braun-Arterm, Italy: 625 ml, AA 35.8 g, 740 kcal) over a one-month period. At baseline, after 2 and 4 weeks, pre- and post-HD plasma and dialysate AA concentrations were measured. Dialyse samples were collected with the spilling technique. The AA mass balance was then calculated.

**Results:** Even with a low-flux dializer (alpha-polysulphone) and with no IDPN infusion, an AA loss in the dialysate did occur, increasing with the IDPN infusion (3.9 ±0.3 gr/session with no IDPN versus 7.7±0.5 with IDPN, p=0.00043), up to almost 26% of the infused AA mass. Nevertheless, the AA mass balance proved positive to the patients (+21.06±0.95 gr of AA/session). After a one-month period with IDPN, the pre-dialysis concentration of each AA infused had indeed increased as compared with the baseline, with a mean overall increase of 36.8%. We did not report any severe glucose imbalances.

**Conclusions:** Over a one-month period, which is for certainly insufficient to induce any clinically perceivable changes in nutritional status, a homogeneous increase in plasma concentration of all the infused AA was documented, supporting the hypothesis that the use of IDPN for longer periods may actually translate into an increase in protein synthesis.
Conclusions: Our findings indicate that consuming ONS improves albumin and nutritional measures in MHD patients. We also suggest regular, constant and long-term use of ONS to decrease high mortality risk in malnourished patients.

MP615 PENTOSIDINE, A NOVEL MARKER OF ESA RESISTANCE, PREDICTS MORTALITY IN HEMODIALYSIS PATIENTS
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Introduction and Aims: Pentosidine (PEN) is one of advanced glycation end products (AGEs) and widely known as a marker of oxidative stress (Kidney Int. 1998). PEN levels are high in patients with renal dysfunction including diabetic nephropathy. Especially in hemodialysis patients PEN is also reported to be useful in predicting cardiac disease and carpal tunnel syndrome, therefore the evaluation of PEN is considered beneficial also in this population. No report exists with regard to the relationship between anemia and PEN. In this study, we studied the relationship among anemia, PEN, and mortality in hemodialysis patients.

Methods: We conducted an observational study of 100 patients, who underwent hemodialysis at our clinic in December, 2011. Routine laboratory data and plasma PEN levels were obtained. In addition, we calculated the erythropoiesis-stimulating agent (ESA) index (ESAI) to evaluate ESA resistance. We conducted a univariate analysis with ESAI as a dependent variable. Thereafter, we performed multivariate analysis to examine the independent association between PEN and ESAI. After dividing patients into 2 groups by the median value of PEN or ESA, the survival rate was compared between the groups by the Log-rank method. Finally, hazard ratio was estimated by cox proportional hazards model.

Results: The median value of PEN was 0.30 μg/ml [range; 0.090-0.893], obviously higher than that in healthy subjects. PEN was significantly associated with higher ESAI (r=0.327), higher ferritin, lower Hb and lower Kt/V, while having no significant association with age, hemodialysis vintage, Alb, or CRP. In addition, in a multivariate analysis, PEN was found to be a positive determinant of ESAI independent of factors reported to be associated with ESAI resistance. Eleven patients out of 100 died during the observation period of 1 year. The life time was significantly longer in the low PEN group (p<0.05 log-rank), with a hazard ratio of 4.39 (95% CI 1.10-29.09). The results were identical when using ESAI as a stratifying factor (figure).

Conclusions: Given that PEN is a marker of oxidative stress, our data suggest that oxidative stress plays some role in the pathogenesis of ESA resistance. Moreover, PEN is a useful indicator to evaluate a risk stratifier to ESAI in predicting mortality in hemodialysis patients.

MP616 DETERIORATION OF REACTIVE OXYGEN SPECIES-NITRIC OXIDE BALANCE AND RADICAL CHAIN REACTION SYSTEM IN HEMODIALYSIS PATIENTS
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Introduction and Aims: Recent studies are continuously revealing oxidative stress related cellular responses such as gene expressions or signal transductions, while interactions between reactive oxygen or nitrogen species themselves are less clear, because of their high reactivity. In the current study, we investigated multiple free radical dynamics of hemodialysis (HD) patients using a novel electron paramagnetic resonance (EPR) technique.

Methods: Multiple free radical dynamics, namely hydroxyl radical, superoxide radical, alkoxyl radical, alkyperoxyl radical, alkyl radical, and singlet oxygen, were investigated measuring the scavenging activities of these reactive oxygen species (ROS) using a newly developed EPR spin-trapping reagent 5-(2,2-dimethyl-1,3-propoxycyclophosphoryl)-5-methyl-1-pyrroline N-oxide (CYPMO). Nitric oxide (NO) metabolites and inflammatory cytokines were also measured. These methods were applied to a cohort of HD patients (n=15) and a healthy control subjects (n=16).

Results: Superoxide scavenging activities of HD patients significantly increased compared to that of the healthy controls (18.2±2.9 and 12.5±3.2 SOD equivalent Unit/mL, mean±SE, respectively), whereas no significant differences were observed among the other ROS. In the healthy control group, superoxide scavenging activity showed strong positive correlation with serum NOX concentration (r=0.814) and moderate positive correlation with those of alkoxyl and hydroxyl radicals (r=0.690 and 0.626, respectively), while these relations were disappeared in the HD group. In HD patients, scavenging activity of hydroxyl radical were negatively correlated with that of singlet oxygen, whereas this relationship was not observed in the control group. No correlations between measured ROS and TNF-a, IL-6, adiponectin and hs-CRP were observed.

Conclusions: These results indicate that NO act as a comportment of radical scavenging system in healthy subjects while this role is eliminated in HD patients. Despite the increased superoxide scavenging activity, ROS/NO balance deteriorates in HD patients. Also, radical chain reaction systems including singlet oxygen, hydroxyl and alkoxyl radical, are altered in HD patients.
**ORAL ESSENTIAL AMINO ACID SUPPLEMENTATION IN MAINTENANCE HEMODIALYSIS PATIENTS**

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**Introduction and Aims:** The nutritional status in maintenance hemodialysis (MHD) patients is a predictor of prognosis. Malnutrition is associated with cardiac co-morbidity, inflammation and poor survival in this population. Serum albumin is a well-known marker of nutrition in MHD patients. The aim of this study was to evaluate the six months' nutritional effect of essential amino acid (EAA) supplementation on MHD patients.

**Methods:** Patients with serum albumin concentration <4 g/dl were included in the study. Patients whose serum albumin level <3.5 g/dl were defined as the study group (EAA Group) and was given EAA supplementation for 6 months. Control group (CON group) did not take any EAA supplementation. All patients' clinical, laboratory data, bioelectrical impedance (BIE) measurements (BIA) were analysed. For bioelectrical impedance (BIE), a Body Composition Analyzer (Tanita BC-420MA) was used. Short Form Health Survey (SF-36), was administered to all patients at the initiation and at the 6 months' evaluation.

**Results:** Eighty two eligible patients participated in the study, 36 in the EAA group and 46 in the CON group. No significant difference was found between two groups in demographical and clinical characteristics. As shown in [Figure 1], although at baseline, serum albumin of the EAA group was significantly lower than the CON group (p<0.001), at the end of the study, EAA group's serum albumin level was significantly increased whereas in the control group serum albumin level did not differ from baseline values (p>0.68). At baseline and the end of the study, BIE parameters and SF-36 score were similar between two groups.

**Conclusions:** This study suggests that oral EAA supplementation may represent a valid alternative to achieve the target albumin levels and may also allow for an improvement in nutritional status for MHD patients.

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**NUTRITIONAL EVALUATION OF ONLINE HDF PATIENTS: RELATIONSHIP BETWEEN CLINICAL, ANTHROPOMETRIC, BIOCHEMICAL AND BODY COMPOSITION IN IDENTIFYING PROTEIN ENERGY LOSS (PEW) AND PREFERENTIAL NUTRITIONAL INTERVENTION**

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**Introduction and Aims:** There is no simple and objective method available for assessing nutritional status and identifying malnutrition in chronic kidney disease. Objective: Combination of some of the currently tools (clinical, biochemical, anthropometric and body composition monitoring by bioelectrical impedance (BCM), malnutrition-inflammation score (MIS)) to assess the nutritional status of our patients in online hemodiafiltration (HDF), determine the prevalence of protein energy waste (PEW) and identify those patients at most risk of malnutrition and requiring preferential nutritional intervention.

**Methods:** Cross-sectional study of 91 patients (64 men) in on line HDF for 43 ± 47 months and 60 ± 14 years old. We determined nutritional status by clinical evaluation, anthropometric (biceps and triceps skinfold thickness, abdominal perimeter, MCA (muscle circumference arm), blood tests (Albumin, Prealbumin, Total Cholesterol, Total Protein, Creatinine, PCr), and BCM Fresenius 17. Patients were classified in those with/without PEW, and compared with a patient classification in adequate or inadequate nutritional status according to BCM and with data obtained with the MIS score.

**Results:** Average Charlson index was 5.2±2.1, K/UV e 2.94±0.82, Diabetes Mellitus 36.5%. The average dry weight was 65.9 ± 12.9 kg with an estimated BMI of 24 ± 4.1, being 20.2 ± 2.5 (OR = 0.68 and p = 0.001) in the PEW group. 73.3% of the patients with albumin < 37 g/l (OR = 7.7 and p = 0.001) and 93.3% with prealbumin < 30 mg/dl (OR = 18.24 and p = 0.006) had a PEW. Mean MCA in the PEW group 19.7 ± 2.2 cm (OR = 0.41 and p <0.001). Regarding BCM FTI < p10 was significantly lower in the PEW group (OR = 0.8 and p = 0.003), while no differences were detected in LTI (OR = 0.41 and p <0.001). Regarding BCM FTI < p10 was significantly lower in the PEW group (OR = 0.8 and p = 0.003), while no differences were detected in LTI (OR = 0.41 and p <0.001). Regarding BCM FTI < p10 was significantly lower in the PEW group (OR = 0.8 and p = 0.003), while no differences were detected in LTI (OR = 0.41 and p <0.001). In each dialysis population spearman analyses showed no significant correlation between cadmium levels with inflammatory and oxidative stress parameters.

**Conclusions:** This is the first study which analyse the association between serum cadmium levels, inflammation and oxidative stress in dialysis population by including both HD and PD modalities. Our results suggest that cadmium concentration has no trigger effect on inflammation and oxidative stress in both dialysis population.
combining these three elements, 12.1% of our patients requiring preferential nutritional intervention.

**Conclusions:** Currently, there exists no simple and objective method for the determination of nutritional status and for the assessment of nutritional risk. Combining BCM, nutrition scores and biochemical, and anthropometric parameters to calculate PEW allows a global nutritional assessment to prioritize nutritional intervention.

**Introduction and Aims:** Nutritional risk is one of the strongest predictors of morbidity and mortality in maintenance HD patients. However, a standard method for the assessment of the nutritional status in HD patients does not exist. The Onodera's Prognostic Nutritional Index (OPNI) is composed of serum albumin and total lymphocyte count within the equation. A simpler tool may involve common measures and can be applied rapidly in a large number of patients. Validation of OPNI has been applied for patients with end-stage liver disease, active tuberculosis, and gastrointestinal malignancy.

**Methods:** We examined the OPNI scores of 140 maintenance hemodialysis patients (59.8 ± 12.9 years, 64 males and 76 females) and conducted follow-up of these patients for 140 months. The OPNI will be calculated based on the serum albumin and total lymphocyte count, using the following equation: OPNI = 10 x serum albumin (g/dL) + 0.005 x total lymphocyte count (/mL). Predictors of all-cause death were examined using life table and Cox proportional analyses.

**Results:** The average OPNI was 43.8 ± 6.5, and was negatively correlated with age. 18 patients died during the 120-month follow-up period. OPNI presented normal distribution. Life table analysis revealed that patients with a OPNI < 40 (n = 31) had a significantly lower survival rate, compared to those with OPNI ≥ 40 (n = 109) (Wilcoxon test, P = 0.044). Multivariate Cox proportional hazards analyses demonstrated that OPNI was a significant predictor of mortality [hazard ratio (HR) 6.491, 95% confidence interval (CI) 1.985–21.233, P = 0.002], after adjustment for age, gender, presence of diabetes and body weight.

**Conclusions:** These results suggest that OPNI is a significant predictor of mortality in Korean hemodialysis patients. The simple OPNI method is a clinically useful marker for the assessment of nutritional status in Korean hemodialysis patients.

**Introduction and Aims:** Malnutrition is common in patients with end stage renal failure undergoing dialysis and often goes unobserved. It is well established that a low serum albumin can be a marker of malnutrition in these patients and is associated with poorer outcomes, particularly excess hospitalization and mortality. The aim of this study is to evaluate difference in albumin levels between different ethnicities resident in 2 multiethnic countries.

**Methods:** As part of the monthly routine data were collected from patients on HD on age, gender, nationality, presence or absence of diabetes, dialysis dose and serum albumin (according to BCP in UK, BCG in UAE) for the month of August. Albumin levels were considered low if they were < 35 g/L in UAE or < 30 g/L in UK. The data were analyzed by Chi Squared, Bonferroni and ANOVA where appropriate and logistic regression undertaken using the variables, gender, age and the presence of diabetes. P<0.05 was taken as statistically significant.

**Results:** 586 HD patients treated in the UAE and 2234 in UK were considered. Demographics, presence of diabetes, k/TV and albumin levels in August 2012 are shown below. Of the UAE nationals 19.3% had a low albumin compared to 13.5% in UAE residents of other nationalities, 13.1% in UK Caucasians and 10.2% in UK residents of other ethnicities. In respect to Caucasian British, logistic regression (figure)
suggested that the odds ratio of low albumin for UAE nationals was 1.58 (95% CI 1.104 – 2.274; p<0.013), for UAE non-nationals was 1.03 (95% CI 0.74-1.44; p=NS) and for UK residents of other ethnicities was 0.72 (95% CI 0.55-1.03; p=0.07). While gender, presence of diabetes are included in the logistic regression the OR of a low albumin among the different ethnicities became not statistically different from the reference. The inclusion of dialysis dose in the model did not affect the results.

**Conclusions:** Difference in albumin levels among different ethnicities are mainly related to difference in age, the proportion of females and diabetics.

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**THE FEATURES OF ENDOTOXEMIA IN PATIENTS WITH CKD 5D AGAINST CHRONIC INFLAMMATION AND VIRAL HEPATITIS C BACKGROUND**

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**Introduction and Aims:** The patients with end-stage renal failure (ESRF) on hemodialysis (HD) are characterized by high morbidity on chronic hepatitis C (CHC). By-turn, CHC infection negatively affects both on system conditions of patients with CKD 5D or on dialysis efficiency, and on patient’s quality of life as whole. Study objectives: characterizing of endotoxemia among the patients on hemodialysis infected by hepatitis C virus.

**Methods:** Toximetric analysis of endotoxic parameters with determination of molecule sizes and toxin particles (<10 nm, 10-200 nm, and >200 nm), damaging activity potentials (toxicity), prevalent accumulation sites in bloodstream on different plasma fractions (albumin, globulin, cell membranes, in free circulation), and same involvement in forming of toxin-inducing autoimmune and cytotoxic reactions was executed among 43 patients with CKD 5D (25 with CHC in replication stage, basic group; 18 without CHC, comparing group). Autoleucocytes of patients was used as biological target for damaging activity assessment of endotoxins with different toxicimetric characteristics.

**Results:** In patients of basic and control groups was noted the substantial increase of indexes of cytotoxic (55.3±2.10% and 54.2±3.55%, respectively; p<0.05) and autoimmune (56.70±3.83% and 51.89±2.28%, respectively; p<0.05) activity of endotoxins in plasma whole blood. It was determined the high cytotoxic activity (CA) level of toxin-carrying plasma fractions and free-circulation endotoxin fraction, representing the serious stage of endotoxemia, characterized by uniform distribution of endotoxins in all plasma fractions of patients from basic and comparative groups (p<0.05). In patients with CKD 5D was noted the lower level of CA globulin-associated (41.60±3.95%) and albumin-associated (47.59±2.97%) endotoxins with molecule sizes less than 10 nm (p<0.05). The level of CA endotoxins with particle sizes 10-200 HM (p<0.05) was higher as compared with patients of control group. Toxin-induced autoimmune activity (AA) of all toxin-carrying fractions was raised and conformed to moderate or serious grade of endotoxemia manifestations. In patients with CKD 5D and CHC the level of AA free-circulating endotoxins was 57.40±1.96% and was significantly (p<0.05) higher as in control group (46.56±3.13%). Maximal level AA was noted for free-circulating endotoxins with particle sizes 10-20 nm.

**Conclusions:** Clinical and laboratorial manifestations of endotoxemia in patients with CKD 5D and CHC have some distinctive features as compared with patients with CKD 5D, but without CHC. Toximetric parameters of endotoxemia during CKD 5D and CHC was characterized with lower level of cytotoxic activity globulin-associated endotoxins with molecule sizes less than 10 HM (p<0.05), and higher level of autoimmune activity globulin-associated endotoxins with particle sizes 10-20 nm or molecule sizes less than 10 nm (p<0.05).

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**BIOMARKERS TO APPRAISE PROTEIN-ENERGY WASTING AND ASSOCIATION OF INFLAMMATION IN MAINTENANCE HEMODIALYSIS PATIENTS**

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**Introduction and Aims:** Protein-energy wasting (PEW) contribute significantly to the increased cardiovascular mortality among dialysis patients. However, there is no isolated marker capable of assessing the nutritional status of hemodialysis patients. We investigated several parameters to appraise PEW and association of inflammation in maintenance hemodialysis patients.

**Methods:** Sixty patients were enrolled in this cross-sectional study. The nutritional status of the patients was divided three groups according to subjective global assessment (SGA) 1) Severe malnutrition (SGA 1 to 3), 2) Mild to moderate malnutrition (SGA 4 to 5), 3) Well nutrition (SGA 6 to 7). We also simultaneously checked inflammatory markers, nutritional markers, and performed an anthropometric measurements.

**Results:** All patients, sixteen patients (26.7%) were malnourished. PEW-positive patients had a difference in body mass index, % usual body weight, % standard body weight, geriatric nutritional risk index, skinfolds, fat mass, air circumference, cardiovascular disease, albumin, high-sensitivity C-reactive protein (hsCRP), transferrin, ferritin, hemoglobin, hematocrit compared with PEW-negative patients. hsCRP levels were significantly higher in the malnourished group than that of well-malnourished group. Compared with patients without PEW, the presence of PEW was associated with incrementally higher cardiovascular disease (p<0.05).

**Conclusions:** Serum hsCRP is a strong predictor of malnutrition and inflammation in hemodialysis population. The sensitivity can be increased by associating serum albumin with other nutritional and anthropometry markers to correctly evaluate the nutritional status of hemodialysis patients. Also, SGA is a simple and inexpensive method in clinical practice for detection in the patients with PEW.
Introduction and Aims: It is possible to observe improvement in the general state of patients receiving maintenance hemodialysis, including decreased joint symptoms, decreased pruritus, and better appetite, by using a high-efficiency, high-flux dialysis membrane. We aimed to determine the effects of the use of a high-flux dialysis membrane on improvement in the nutritional status of dialysis patients.

Methods: Two months before the replacement with a high-efficiency, high-flux dialysis membrane and one, three, and six months after the replacement, the subjective global assessment (SGA), biochemical markers, and a Body Composition Analyzer (Inbody720, Biospace Co., Korea) were used to assess the nutritional status and determine hemodialysis adequacy, along with a biochemical test, in 25 stable patients receiving dialysis three times a week.

Results: The patient group in this study consisted of 10 men and 15 women, the average age of which was 60±20 (38-86) years. They had received dialysis for 41.5±4.2 (3182) months, and their renal diseases included 9 cases of diabetes, 7 cases of chronic glomerulonephritis, and 5 cases of hypertension. Of all the patients, 3 got better results from SGA, 12 the same results, and 10 worse results, in the follow-up period.

There was no significant increase or decrease after the replacement with a high-flux dialysis membrane in Hb, Hct, serum albumin, total cholesterol, LDL cholesterol, HDL cholesterol, BUN, or normalized protein catabolic rate (nPCR).

Conclusion: Resistance training was associated with increased muscle strength and improved neuromuscular function in patients undergoing dialysis. The improved neuromuscular function may be a result of improved synchronisation in activated motor units and the data are important in the interpretation of the increased muscle strength. The neuromuscular improvement in the early phase of the muscle contraction was shown in parallel with increased RFD, which may have important clinical implications for daily physical function.

Introduction and Aims: Patients with end stage renal diseases (ESRD) suffer from sleep disturbances. Some studies have shown in vascular access, skin condition, and prealbumin levels, total lymphocyte count and consumption of meat-offal-cheese-egg and fruit. Gastrointestinal problems more frequently appear in older than the patients with the good quality of sleep (44.0±13.0 vs. 37.4±11.8, p<0.01).

Results: The good quality of sleep consumed significantly more meat-offal-cheese-egg (p<0.01) and fruit (p<0.05) compared with the poor quality of sleep. The patients with the good quality of sleep consumed significantly more meat-offal-cheese-egg (p<0.01) and fruit (p<0.05) compared with the poor quality of sleep. The patients with the good quality of sleep consumed significantly more meat-offal-cheese-egg (p<0.01) and fruit (p<0.05) compared with the poor quality of sleep. The patients with the good quality of sleep consumed significantly more meat-offal-cheese-egg (p<0.01) and fruit (p<0.05) compared with the poor quality of sleep.

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