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DIALYSIS CARDIOVASCULAR COMPLICATIONS 1

SP480 THE EFFECT OF CINACALCET ON ATHEROSCLEROTIC AND NON-ATHEROSCLEROTIC EVENTS IN HAEMODIALYSIS PATIENTS IN THE EVOLVE CLINICAL TRIAL

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Introduction and Aims: Premature cardiovascular disease limits the quality and length of life on long-term haemodialysis. The epidemiology of cardiovascular events in this context needs to be better defined and more effective management strategies developed. Adjudicated cardiovascular event data collected during the Evaluation of Cinacalcet HCl Therapy to Lower Cardiovascular Events (EVOLVE) Trial were used to define the frequency of fatal and non-fatal cardiovascular events attributable to atherosclerotic and non-atherosclerotic mechanisms. The risk factors for these events and the impact of assignment to treatment with cinacalcet or placebo were evaluated.
Methods: A multicenter, global, randomized, double-blind, placebo-controlled clinical trial assessing mortality and non-fatal cardiovascular events in 3883 patients on haemodialysis with secondary hyperparathyroidism (median parathyroid hormone concentration 693 pg/mL (10%, 90% range 363 to 1694 pg/mL). The post hoc outcome measures were fatal and non-fatal cardiovascular events reflecting atherosclerosis and non-atherosclerotic cardiovascular diseases.
Results: 1518 subjects experienced an adjudicated cardiovascular event, including 958 who experienced an event attributable to non-atherosclerotic disease. Of 1421 deaths during the trial, 768 (54%) were due to cardiovascular disease. Sudden death was the most frequent fatal cardiovascular event, accounting for 25% of overall mortality. Patients randomised to cinacalcet had a lower risk for time to first non-atherosclerotic cardiovascular event (hazard ratio 0.84, 95% CI 0.74, 0.96), whilst we were not able to able to detect a lower risk with cinacalcet treatment on time to atherosclerotic events (hazard ratio 0.88, 95% CI 0.76, 1.01).
Conclusions: Accepting the limitations of post-hoc analysis, the benefit of cinacalcet on cardiovascular disease in the context of haemodialysis may mainly result from attenuation of non-atherosclerotic processes. ClinicalTrials.gov number: NCT00345839

SP481 NONALCOHOLIC FATTY LIVER DISEASE (NAFLD) PROVEN BY TRANSIENT ELASTOGRAPHY IN HEMODIALYSIS PATIENS; IS IT A NEW RISK FACTOR FOR ADVERSE CARDIOVASCULAR EVENTS?

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Introduction and Aims: Cardiovascular diseases (CVD) are the leading cause of mortality in hemodialysis (HD) patients. In recent years, non-alcoholic fatty liver disease (NAFLD) has been recognized as a new risk factor for adverse CVD events in general population. The primary endpoint of the present study was to analyze the incidence of NAFLD in HD patients by using transient elastography (TE). The second endpoint of the present study was to investigate the association of NAFLD with intimae-media thickness (ITM) and plaque as surrogate measures of increased cardiovascular risk in HD patients.
Methods: The subjects were 72 HD patients (39 male and 33 female) mean age 69.8 ±10.1 years treated with chronic hemodialysis for at least 6 months. Fifty sex- and age-matched individuals without NAFLD and with normal liver and kidney function tests served as controls. NAFLD was detected by using TE (Fibroscan® Echosense, Paris, France). The cut-off value for defining liver steatosis was Controlled Attenuation Parameter (CAP) ≥238 $dB.m^{-1}$ and cut-off value for defining the presence of fibrosis was liver stiffness of >7 kPa. The diagnosis of NAFLD was defined according to the TE findings with the CAP ≥238 $dB.m^{-1}$. In all patients a carotid ultrasound was performed. The present study used the average of 10 electronic caliper ITM measurements from the wall of the distal 10 mm left and right common carotid arteries at a site free from any discrete plaque. A plaque was defined as a focal thickening of ≥ 1.2 mm in any of 12 carotid segments. These results were correlated with the presence of liver fibrosis/steatosis defined by TE findings.
Results: NAFLD was found in 52.8% of HD patients. HD patients with NAFLD showed more carotid atherosclerosis than HD patients without NAFLD and control subjects. HD-NAFLD patients had the mean ITM of1.1±0.1 mm and that was statistically significant higher than the mean ITM measurements founded in HD patients without NAFLD (1.1±0.1vs.0.9±0.1 mm; p<0.0001) and control subjects (1.1 ±0.1vs.0.8±0.1 mm; p<0.0001). Furthermore, HD-NAFLD patients had statistically significant higher prevalence of plaques in comparison with HD patients without NAFLD (71.1% vs. 32.4%; p<0.002) and controls (71.1% vs8%; p< 0.0001). In the next step we investigated the association among CAP and ITM measurements. There was a highly significant, positive, correlation between CAP and ITM measurements (r=0.777; p<0.0001).
Conclusions: We showed for the first time that HD patients have a high prevalence of NAFLD. HD patents with NAFLD show an advanced carotid atherosclerosis. Detection of NAFLD by TE should alet to the existence of an increased cardiovascular risk in HS patients.

SP482 ERYTHROPOIESIS-STIMULATING AGENTS AND THROMBOTIC EVENTS IN DIALYSIS PATIENTS

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Introduction and Aims: Erythropoiesis-stimulating agents (ESA) have been associated with a higher cardiovascular event and mortality rate. It is hypothesized that ESAs increase arterial blood pressure, alter endothelial function and result in pro-thrombotic changes, all contributing to a higher risk in thrombotic events. The ESA associated risk of arterial thrombotic events is mainly based on composite endpoints of anemia-correction trials targeting high hemoglobin levels. The risk of venous thrombosis associated with ESA has not been studied in dialysis patients yet. We therefore aimed to determine the association between ESA use and dose with ischemic stroke, myocardial infarction and venous thrombosis in clinical practice.
Methods: NECOSAD is a Dutch multicenter cohort study of incident dialysis patients who started dialysis between January 1997 and January 2007. Data on ESA use and dose, co-morbidities and laboratory parameters were routinely collected every 6 months. Fatal and non-fatal thrombotic events were collected by chart review of all dialysis patients from 6 participating centres. Unadjusted and adjusted time-dependent Cox regression analysis was performed to calculate hazard ratios (HR) with 95% confidence interval (CI) for ischemic stroke, myocardial infarction and venous thrombosis with updated information on ESA use and dose. Analyses were adjusted for age, sex, primary kidney disease, co-morbidities, dialysis modality, nutritional status, ferritin, residual renal function and albumin.
Results: A total of 755 patients reached baseline measurement at three months after start of dialysis. During follow-up, 58 patients with ischemic stroke, 110 patients with myocardial infarction and 13 patients with venous thrombosis were identified. Patients with ESA had a 2 times lower ischemic stroke rate than patients without ESA (unadjusted HR 0.50 (95% CI 0.26-0.95), adjusted HR 0.45 (95% CI 0.23-0.90)). ESA treated patients had an unadjusted HR of 1.19 (95% CI 0.64-2.22) and adjusted HR of 1.12 (95% CI 0.58-2.14) for myocardial infarction. No profound ESA dose response effect was shown for either ischemic stroke or myocardial infarction. Unadjusted HR for venous thrombosis was 0.41 (95% CI 0.11-1.50) for ESA treated patients compared to patients without ESA, but the low event rate made further adjustments impossible.
Conclusions: In our observational cohort of incident dialysis patients, reflecting everyday clinical practice, ESA was not associated with an excess of thrombotic events. Although in general the results of observational studies and anemia-correction trials suggest a harmful effect of ESA on mortality and composite cardiovascular endpoints, it seems not just caused by an excess of myocardial infarctions or ischemic strokes. Our results for myocardial infarction are in line with meta-analysis using single and not composite endpoints. For ischemic stroke our results might be explained by differences in patient population and ESA dosing practices, as our observational cohort reflects common practices in a general dialysis population. Further investigation is needed to enlighten the true mechanism of the ESA associated cardiovascular events and mortality.

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SP483 **OVERHYDRATION IS ASSOCIATED WITH ENDOTHELIAL DYSFUNCTION IN HEMODIALYSIS (HD) PATIENTS: ROLE OF PENTAXIN 3 (PTX3) AND ROS PRODUCTION BY NEUTROPHILS**

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Introduction and Aims: Overhydration in HD patients is associated with increased cardiovascular morbidity and mortality. Long PTX3, a marker of inflammatory responses, may be involved in endothelial dysfunction and is a predictor of mortality in HD patients. The aim of the study was to evaluate in vivo the association between Overhydration, pulmonary artery systolic pressure (PASP), endothelial dysfunction (flow-mediated dilation, FMD), PTX3 and ROS production in HD patients.
Methods: Sixty uremic patients (mean age 62.5 yrs; mean dialytic age 44.3 months) on stable HD treatment with synthetic membranes and 20 healthy subjects were enrolled. Neutrophils activation ($CD62L^+$) and PTX3 protein expression were evaluated by flow cytometry and ELISA. Intracellular ROS generation in neutrophils was measured by 2',7'Diclorodiidrofluorescein. PASP and FMD of brachial artery were assessed non-invasively using echocardiography and high-resolution ultrasound. The arterial stiffness was evaluated using cardio-ankle vascular index (CAVI).
Results: HD increased FMD from 4.23±1,8% (nv:7.5±2.1%; p<0.01) to 7.03±0.734%, (p<0.001). These changes returned to baseline by 24h (5.59±0.4%). FMD, observed pre and post-HD, were significantly (p=0.002) and inversely correlated with PASP values (pre-HD:27,7±2,4mmHg; post-HD 18,1±1,6mmHg). The change in FMD and PASP were associated with a significant increase (p=0.0001) in neutrophil activation, intracellular and circulating PTX3 expression and ROS generation. Pre/post-HD (Δ) FMD was inversely correlated with CAVI (p<0.002) and P and PTH serum levels (p<0.02). PTX3, P serum levels and PASP were independent predictors of altered FMD.
Conclusions: Overhydration in HD patients may contribute to endothelial dysfunction and vascular stiffness by increasing PTX3 and ROS production.

SP484 **A NEW INSIGHT INTO THE MECHANISM OF ATHEROSCLEROSIS IN HEMODIALYSIS PATIENTS THROUGH THE EVALUATION OF SCAVENGER RECEPTOR EXPRESSIONS IN PERIPHERAL MONOCYTE**

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Introduction and Aims: Atherosclerosis is accelerated in hemodialysis (HD) patients and closely associated with their morbidity and mortality. The nature of atherosclerosis is considered as chronic sterile micro-inflammation. The class A and B scavenger receptors (SRs) in peripheral monocytes play a key role in promoting foam cell formation by binding and internalizing oxidized low-density lipoprotein (ox-LDL). In addition, macrophage-colony stimulating factor (M-CSF) might facilitate the atherosclerotic process by priming monocytes, predisposed toward SR over-expression.
Methods: Transcriptional levels of SR class A and class B (CD36) were simultaneously measured in peripheral monocytes by quantitative real-time RT-PCR, using the comparative threshold (Ct) [ΔΔCt] method. GAPDH was chosen as an endogenous reference gene. The fold difference between a patient gene ΔCt and the average of control gene ΔCts was used as an index of relative quantity of the gene ($2^{-\Delta\Delta Ct}$). Peripheral monocytes were isolated using magnetically-labeled Whole Blood CD14+ MicroBeads (Miltenyi Biotec). Plasma level of M-CSF was measured with an M-CSF ELISA kit (R&D Systems). Subjects included 52 chronic HD patients and 23 healthy controls. The HD patients were classified into 2 groups in presence or absence of prevalent cardiovascular disease (CVD). The statistical difference between the two subjects was analyzed by the Mann-Whitney U test.
Results: The relative expressions of SR-A and CD36 mRNA were significantly greater in monocytes from HD patients than in those from healthy controls (mean [95% CI of the mean]: 1.76 [2.27-3.26] versus 0.61 [0.88-1.40], P <0.0001; and 1.07 [1.60-2.20] versus 0.52 [0.88-1.32], P=0.0004, respectively). Each SR receptor expression was significantly higher in HD patients who were affected with CVD than in those who were not: SR-A, 1.78 [2.66-3.94] versus 1.30 [1.26-2.48], P=0.0013; and CD36, 1.21 [1.74-2.61] versus 0.55 [1.18-1.69], P=0.0089, respectively. Plasma concentration of M-CSF was approximately 6-fold higher in HD patients than in controls (1044 ± 266 versus 162 ± 47.5 pg/ml, P <0.0001). The concentrations were significantly correlated with both mRNA expressions of SR-A ($r2 = 0.139$, P = 0.0010) and CD36 ($r2 = 0.052$, P = 0.0478) in overall subjects (n = 75).
Conclusions: Our study indicates that highly elevated M-CSF concentration may prime peripheral monocytes, and thus may facilitate their uptake of ox-LDL through the over-expression of SRs. This collaboration between M-CSF and SRs could be one of the hidden mechanisms for atherosclerosis in HD patients. Prospective studies are warranted to ascertain the association between SR expression and incidence of CVD.

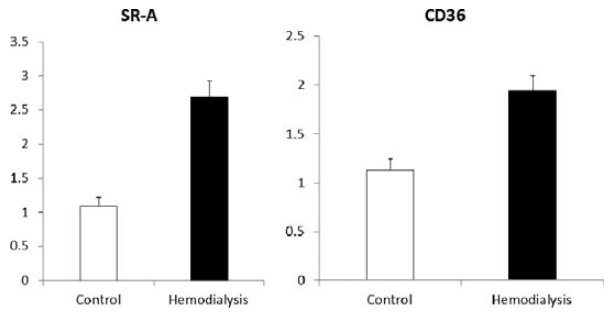


Figure1. Comparisons of the relative quantity of mRNA levels of SR-A and CD36 between patient and healthy samples (fold changes against the calibrator ΔCt)

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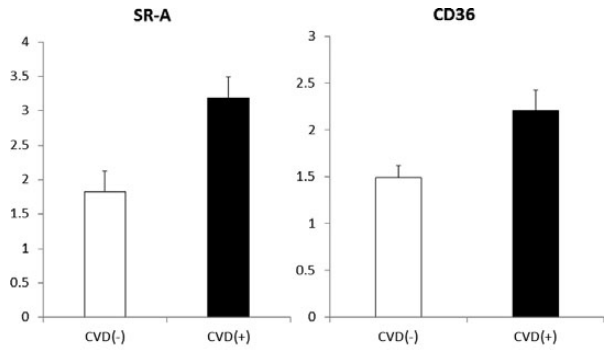


Figure2. Comparisons of the relative quantity of mRNA levels of SR-A and CD36 between HD patient who had CVD and those who did not (fold changes against the calibrator ΔCt)

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SP485 **ASSOCIATION BETWEEN COMMON CAROTID ARTERY INTIMA-MEDIA THICKNESS AND RADIAL ARTERY CALCIFICATION ASSESSED HISTOLOGICALLY IN END-STAGE RENAL DISEASE PATIENTS**

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Introduction and Aims: The objective of the study was to assess the correlates of common carotid artery intima-media thickness (CCA-IMT) and the relationship between the CCA-IMT and radial artery calcification in end-stage renal disease patients (ESRD) patients.
Methods: The study comprised 98 stage 5 chronic kidney disease patients (66 hemodialyzed and 32 predialysis). The examined parameters included CCA-IMT, BMI, fasting blood glucose, the incidence of diabetes and impaired fasting glucose (IFG), total calcium (Ca), phosphate (Pi), intact parathormone (iPTH), high sensitive C-reactive protein (hsCRP) and osteoprotegerin (OPG). In 59 patients (36 hemodialyzed and 13 predialysis), fragments of radial artery obtained during creation of hemodialysis access were stained for calcifications using von Kossa method and alizarin red.
Results: CCA-IMT did not differ between predialysis and hemodialyzed patients (p=0.9). Among studied parameters, fasting blood glucose (R=0.30; p=0.017), OPG (R=0,47; p=0.0003), age (R=0.65; p<0.0001) and serum creatinine (R=-0.25; p=0.046) were significantly correlated with CCA-IMT in simple analysis. Moreover, CCA-IMT was higher in patients with impaired fasting glucose or diabetes (0.98±0.13 vs 0.88 ±0.15 mm; p=0.007). In multiple regression, only age significantly predicted CCA-IMT (beta=0.51, p=0.0009). In histologically assessed subgroup, radial artery calcifications were detected in 34 patients (58%). Patients with calcifications presented higher CCA-IMT (0.98±0.13 versus 0.86±0.14 mm; p=0.006). The relation between CCA-IMT

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and histologically detected vascular calcification remained significant after adjustment for dialysis status, gender, Ca x Pi, iPTH, CRP and BMI (OR 2.24 per 0.1 mm increase in CCA-IMT; 95%CI 1.06-4.70; p=0.025) but not after adjustment for fasting blood glucose or age.
Conclusions: Small samples of radial artery obtained during routine creation of vascular access for hemodialysis may successfully serve as source of the material for histological assessment of vascular mineralization. In ESRD patients, CCA-IMT may serve as non-invasive method to assess risk for vascular calcification.

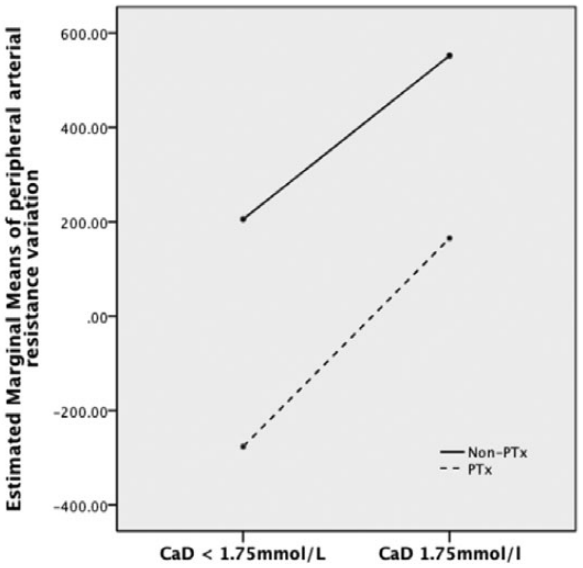
SP486 PARATHYROIDECTOMY MAY IMPAIR PHYSIOLOGIC SYSTEMIC VASOCONSTRICTION AFTER HEMODIALYSIS PROCEDURE

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Introduction and Aims: Parathyroid hormone (PTH) is implicated on endothelium-dependent vasodilation and coronary microvascular dysfunction. Parathyroidectomy (PTx) seems to improve cardiovascular outcomes and blood pressure control in patients with chronic kidney disease under hemodialysis (HD). However, the effects of PTx on hemodynamic changes during HD is still overlooked.
Methods: This was a prospective observational cohort to evaluate the effects of PTx on cardiovascular performance in patients under HD. Finger pulse contour analysis (Finometer monitor™) was used to access hemodynamic parameters immediately pre- and post-HD sessions.
Results: We studied 30 end-stage kidney disease (ESKD) patients on HD. Patients who had undergone PTx were matched by age, sex, dialysis vintage, serum hemoglobin, albumin and calcium (Ca) levels, ultrafiltration rate and hypotensive drugs use to patients who did not have PTx. Pre- and post-HD hemodynamic parameters, as well as biochemical variables are described in Table 1. There was no difference regarding Ca dialysate content (CaD) when comparing patients on PTx and non-PTx group (p=0.121). Cardiac index (CI) variation and peripheral arterial resistance (PAR) variation (post minus pre HD) were lower in PTx group. Two-way analysis of variance was applied to examine the influence of PTx status ("yes" vs. "no"), bicarbonate dialysate content ("" than 38 mEq/l) and CaD ("1.75" or "< 1.75" mmol/L) on PAR variation, which was the most prominent hemodynamic change observed. Both conditions, PTx and CaD, were associated to PAR behavior (p=0.024 and 0.039, respectively). There was no effect of bicarbonate content and there was no interaction among factors. Figure 1 illustrates this finding. Multiple stepwise regression analysis shows that PTx and CaD remained independently associated to PAR variation, even adjusted for ultrafiltration rate (adjusted r2=0.319, p=0.003 and 0.005, respectively).
Conclusions: Physiologic increase in PAR secondary to ultrafiltration seems to be impaired in patients who underwent PTx, which directly influences cardiac performance during HD procedure, by compensatory increase in cardiac output in order to sustain BP. On the other hand, CaD of 1.75 mmol/L was associated to better PAR behavior during dialysis. Further investigation to better elucidate the effect of PTx on vascular resistance is still pending.

SP486 Byochemical and hemodynamic characteristics of PTx and Non-PTx groups

Parameter	PTx	Non-PTx	p
Δ Systolic blood pressure (mmHg)	-13.8 ± 15	-10.2± 15	0.701
Δ Diastolic blood pressure (mmHg)	-2.7 ± 8.6	+ 2.0 ± 6.6	0.097
Serum calcium, mg/dl	9.0 ± 0.9	9.2 ± 0.7	0.598
Serum phosphate, mg/dl	5.4 ± 2.6	5.5 ± 1.0	0.929
Serum Parathyroid hormone, pg/ml	15 (7, 65)	564 (478, 727)	0.0006
Pre-HD stroke volume (ml)	84.5 ± 30.1	92.7 ± 26.2	0.449
Post-HD stroke volume (ml)	68.2 ± 34.3	64.4 ± 26.8	0.739
Δ HD stroke volume (ml)	-16.0 (-28.7, -4.6)	-23.5 (-37.1, -16.5)	0.182
Pre-HD CI (L/min/m²)	3.6 ± 0.6	4.1 ± 1.0	0.122
Post-HD CI (L/min/m²)	3.2 ± 0.9	3.2 ± 0.8	0.928
Δ CI (L/min/m²)	-0.40 (-0.62, -0.01)	-0.83 (-1.38, -0.40)	0.048
Pre-HD peripheral arterial resistance (dyn.s/cm5)	1227 ± 374	1302 ± 464	0.662
Post-HD peripheral arterial resistance (dyn.s/cm5)	1256 ± 328	1696 ± 700	0.072
Δ HD peripheral arterial resistance(dyn.s/cm5)	17.6 (-127.4, 243.2)	298.8 (174.7, 511.3)	0.012



SP486 Figure 1: Two-way ANOVA plot for the effect of parathyroidectomy (PTx) and calcium dialystate content (CaD) on peripheral arterial resistance variation during hemodialysis.

SP487 THE EFFECTS OF A SINGLE DIALYSIS SESSION ON ATRIAL ELECTROMECHANICAL CONDUCTION TIMES AND FUNCTIONS

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Introduction and Aims: Atrial fibrillation (AF) is the most common arrhythmia in hemodialysis (HD) patients. The prevalence of AF is estimated about 7-23.4% in end stage renal disease (ESRD)patients which is 10-20 folds higher than in the general population. Abnormalities in atrial electromechanical delay (EMD) times and mechanical functions are considered as independent predictors of atrial fibrillation. However, to date, effects of a single hemodialysis (HD) session and acute volume-preload changes on atrial-EMD functions have not been investigated by Tissue Doppler Echocardiography (TDE). The aim of the present study was to evaluate atrial-EMD times and mechanical functions in HD patients.
Methods: Thirty-five non-diabetic, normotensive HD patients and 35 healthy control subjects were enrolled in the study. Patients with diabetes mellitus, hypertension (blood pressure ≥ 140/90 mm Hg), cardiac arrhythmia such as atrial flutter or fibrillation (current presence or a previous history), valvular heart diseases, heart failure, coronary artery disease, chronic obstructive pulmonary disease, a history of cardiac surgery or implanted device, sick sinus syndrome and active infectious disease were excluded from the study. Standard and TDE performed before mid-week dialysis session for hemodialysis group and on admission for control group.
Results: Age, sex, smoking status, heart rate, lipid profiles, glucose and thyroid stimulant hormone levels, systolic and diastolic blood pressure, and left ventricular (LV) end-systolic diameter were similar between two groups. Interatrial, left intratrial and right intraatrial EMD intervals were significantly longer in HD group compared to controls (32.2 ± 6.5 vs 17.4 ± 3.8, p<0.01; 22.8 ± 7.2 vs 11.6 ± 3.4, p=0.013; 14.4 ± 5.3 vs 7.2 ± 1.7, p=0.036; respectively). Both left and right intraatrial and interatrial EMD intervals significantly reduced on after HD session compared to before HD period (22.8 ± 7.2 vs 17.3 ± 8.3, p=0.013; 14.4 ± 5.3 vs 11.7 ± 4.8, p=0.036; and 32.2 ± 6.5 vs 26.1 ± 6.5, p<0.01, respectively). We found a correlation between UF volume and the difference of inter and left intraatrial EMD interval measurements before and after HD period. (Pearson correlation test, r=0.814, p<0.01; r=0.502, p=0.011; respectively). However, no such correlation found between right intra atrial EMD difference and UF volume. (Pearson correlation test, r=-0.318, p=0.290). LA-passive emptying volume, ultrafiltration volume, LV-E/E' ratio, and Vp were independent predictors of interatrial-EMD.
Conclusions: Results of the present study reflects not only negative effects of structural remodeling, which has been mentioned in previous studies in literature, but also negative effects of electrical remodeling. This study demonstrated that, LA passive emptying volume, LA volume before atrial systole, ultrafiltration volume, and LV E/E' ratio are independent predictors of interatrial EMD. Prolonged inter- and intra-atrial EMD intervals should be the underlying pathophysiological factors of increased rate of AF in patients undergoing HD. Further studies evaluating the value of our findings in predicting the occurrence of atrial fibrillation will be needed to establish the clinical significance of our results.

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SP488 ARTERIOVENOUS FISTULA CALCIFICATION IS AN INDEPENDENT STROKE PREDICTOR IN PREVALENT HEMODIALYSIS PATIENTS

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Introduction and Aims: Despite the high frequency of cardiovascular disease among patients with end stage renal disease, there are few studies on stroke and associated factors. Vascular Access calcification was recently shown to be an independent mortality predictor in dialysis patients. Herein, we investigated whether arteriovenous fistula calcification predicts incident stroke events in addition to established traditional and non-traditional risk factors.
Methods: 350 patients in our dialysis facility (155 ♀, mean age:56±13 years, mean hemodialysis vintage:57±30 months) were included in the study and followed up from 1 June 2010 until death, transplant, transfer out of our dialysis unit, or conclusion of the study on 31 May 2013. Cardiovascular history was defined as history of myocardial infarction, percutaneous coronary artery intervention, cardiac by-pass or valvular surgery, peripheral artery disease or stroke. Sclerostin levels were measured by ELISA (R&D Systems Inc., Minneapolis, MN). Arteriovenous fistula calcification was detected by nonenhanced computerized tomography. Cox proportional hazards regressions were used to look for confounding variables.
Results: Fifteen incident strokes (4.3%) occurred in a follow-up of 34±28 months (13 ischemic, 2 hemorrhagic stroke). Kaplan-Meier curves depicted increased stroke incidence in patients with serum sclerostin levels above median value at baseline (log-rank:chi-square=5.88, p=0.015) and with calcified arteriovenous fistulas (log-rank: chi-square=9.94, p=0.002). In a multivariable Cox regression, corrected for diabetes mellitus, positive cardiovascular history and serum sclerostin levels, increased age (HR:1.25 [95% confidence interval (CI), 1.09-1.56]; p=0.012), hemoglobin levels (HR:3.16 [95% CI, 1.81-4.39]; p=0.006), atrial fibrillation (HR:3.54 [95% CI, 2.19-5.35]; p=0.026) and presence of arteriovenous fistula calcification (HR: 2.12; [95% CI, 1.35-2.88]; p=0.002) were independent predictors of stroke occurrence.
Conclusions: The detection of arteriovenous fistula calcification in prevalent hemodialysis patients represents a useful method to identify patients at increased stroke risk.

SP489 A PROSPECTIVE COMPARISON BETWEEN THE PREDICTIVE POWER OF HS-CTNT AND NT PROBNP (ALONE OR IN COMBINATION) IN CHRONICALLY ASYMPTOMATICALLY HEMODIALYSIS PATIENTS

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Introduction and Aims: Although the new biomarker, high sensitivity cardiac T troponin (hs-cTnT) was related to mortality in some studies for predicting mortality in dialysis patients, its clinical utility is still unclear. Moreover, the prognostic value of the combination of N-terminal pro-B-type natriuretic peptide (NT-pro-BNP) and hs-cTnT levels has not been explored yet. The objective of this study was to determine the utility of hs-cTnT alone versus hs-cTnT in combination with NT-proBNP for predicting death in a stable hemodialysis cohort.
Methods: Prospective observational study including 98 chronic asymptomatic hemodialysis patients. The follow up period was 24 months. The cutt-off values for NTproBNP and hs-cTnT for overall mortality was calculated using receiver operating characteristic (ROC) analysis. Based on the cut_off values, the cohort was diveded into four groups. group 1- NTproBNP < 14275 pg/ml; hs-cTnT < 69.48 ng/l; group2 - NT proBNP 69.48 ng/l; group 3 - NT proBNP > 14275 pg/ml; hs-cTnT 14275 pg/ml, hs-cTnT > 69.48 ng/l. Survival for each group was determined using the Kaplan-Meier method and COX regression analysis.
Results: During the follow-up period, 16 patients died. According to the ROC curves analysis, the cutt-off point for hs-cTnT as a predictor of mortality was 69.43 ng/l (AUC = 0.618; p = 0.04) and for NTproBNP was 14275 pg/ml (AUC 0.722; p = 0.003). In univariate COX analysis, both hs-cTnT (HR = 3.34; p=0.016) and NT proBNP (HR = 5.94; p=0.01) were predictors of death. In the multivariable Cox proportional hazards model, only NT-pro-BNP levels above cut-off values remained independents predictor of all-cause mortality. The combined elevation of both biomarkers above cut-off values did not improve significantly the prognostic value compared with NT proBNP alone (HR 6.15 versus HR =4.78; p = 0.338).
Conclusions: NT-pro-BNP is a strong predictor of overall mortality in asymptomatic hemodialysis patients. The addition of hs-cTnT did not improve the prognostic accuracy compared with NTproBNP alone.

SP490 COMPARISON BETWEEN VASCULAR CALCIFICATION ON PLAIN RADIOGRAPH AND LESIONS ON CORONARY ANGIOGRAPHY IN DIALYSIS PATIENTS

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Introduction and Aims: Cardiovascular disease including coronary artery disease (CAD) is a main cause of morbidity and mortality in dialysis patients. It is difficult to decide coronary angiographic procedure because patients have several non-traditional risk factors but do not have typical symptoms in dialysis patients. The purpose of this study is to compare between vascular calcification (VC) scores on plain radiographs of chest, hands and pelvis, and feet and lateral lumbar spine and severity of lesions on coronary artery angiography in dialysis patients.
Methods: Fifty-five dialysis patients (24 peritoneal dialysis and 31 hemodialysis) who had performed coronary angiography and checked plain radiographs of chest, hands and pelvis, and feet and lateral lumbar spine within 1 year before or after coronary angiography were enrolled in this retrospective study. VC scores on plain radiographs were evaluated and all coronary angiographic findings were reviewed and estimated syntax score reflecting severity of coronary artery lesions by cardiologist.
Results: Forty one patients (74.5%) showed any one significant VC on plain radiography. Stent insertion procedure was done only in 29 patients (52.7%). Patients with significant VC on plain radiographs had higher syntax score (14.5 ± 2.4 *vs.* 5.1 ± 1.5, p=0.002), higher incidence rate of stent insertion (78.3% vs 21.7%), longer stent length (14.5 ± 2.4 mm *vs.* 5.1 ± 1.5 mm, p=0.002) and higher prevalence rate of diffuse and tubular coronary artery calcification (74.5% vs 25.5%, p=0.012) than patients without significant VC. Patients with abdominal aortic calcification (AAC) score > 5 had higher syntax score, higher prevalence rate of left anterior descending coronary artery stenosis > 70% (p=0.034) and higher prevalence rate of discrete coronary artery calcification (p=0.002) than patients AAC score < 5. Patients with medial artery calcification of feet had severe coronary artery calcification (p=0.004) than patients without medial artery calcification of feet.
Conclusions: Significant VC scores on plain radiographs are useful predictor of syntax score, severity and type of calcification on coronary artery angiography in dialysis patients.

SP491 CARDIAC VALVE CALCIFICATION PRESENCE IN OUR HEMODIALYSIS PATIENTS WITH DIFFERENT DAILY PRESCRIPTION OF CALCIUM CARBONATE

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Introduction and Aims: The aim of this study was to evaluate whether different daily doses of prescribed calcium carbonate (CaCO3) may have an impact on cardiac valve calcification presence in our hemodialysis (HD) patients.
Methods: In a cross-sectional study, baseline echocardiography was performed on 108 patients (66 male, mean age 54.6±16.7 years) on HD (mean duration of HD 98.7±64.6 months) to screen for calcification of the cardiac valves. The patients ware stratified according to the number of calcified valves in three groups: group I, those (n-36, 33.3%) without valvular calcification; group II, those (n-44, 40.8%) with one calcified valve (either mitral or aortic); group III, those (n-28, 25.9%) with calcification on both valves (mitral and aortic). The daily doses of prescribed CaCO3 taken as an average of the last 24 months evaluations were compared between the groups of patients.
Results: There was no significant difference in serum calcium, serum phosphate and serum parathyroid hormone levels between the different groups of patients. The patients without valvular calcification had significantly lower daily doses of prescribed CaCO3 (1.37±0.62g) in comparison with the groups of patients having one (2.33 ±0.59g) and patients with both calcified valves (2.65±0.72g). There were no significantly differences in the prescribed daily doses of CaCO3 between the groups of patients having one and patients with both calcified valves. Multivariate adjusted logistic regression analyses (with group of the patients without valvular calcification as the reference value) identified daily doses of prescribed CaCO3 as a factor independently and significantly associated with the cardiac valve calcification occurrence [OR=1.04, CI (1.008-1.077), p=0.02 for the group with one calcified valve / OR=1.2, CI (1.054-1.446), p=0.009 for the group with both calcified valves] in our HD patients.
Conclusions: This research showed significantly reduced cardiac valve calcification presence in our HD patients with lower daily prescription of CaCO3.

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SP492 E/é ESTIMATED BY TISSUE DOPPLER ECHOCARDIOGRAPHY AND RELATED FACTORS IN INCIDENT DIALYSIS PATIENTS

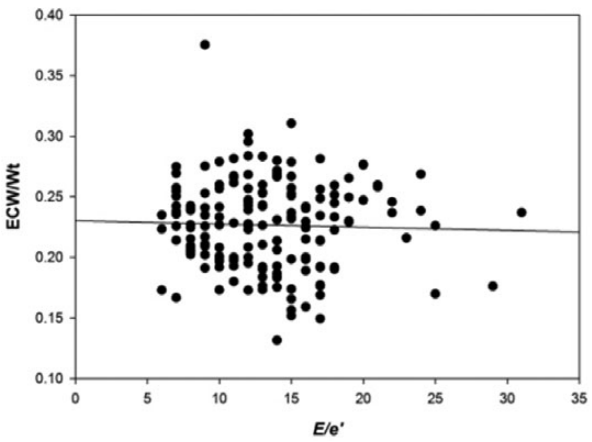
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Introduction and Aims: Diastolic dysfunction of left ventricle (LV) may be less recognized in dialysis patients. The ratio of early mitral flow velocity (E) to early mitral annulus velocity (é), called the E/é, has been introduced as a load-independent predictor of elevated LV filling pressure.
Methods: A total of 212 patients (M:F =103:109, age 56.4±14.6 yrs, diabetes 54.3%) commencing maintenance dialysis therapy who have no systolic dysfunction (ejection fraction >50%) were analyzed. We evaluated E/é measured by tissue Doppler and its association with potential risk factors including extracellular water/body weight (ECW/Wt) ratio estimated by a bio-impedance method.
Results: E/é was elevated more than 8 in 176 (83.0%) patients, suggesting impaired diastolic function. Patients were divided by tertiles of E/é; less than 11 (tertile 1), 11-14 (tertile 2), greater than 14 (tertile 3). Age, prevalence of diabetes, mean arterial pressure and LV mass index were gradually increased in tertile 2 and tertile 3 compared with tertile 1, whereas hemoglobin level was decreased. However, ECW/Wt ratios were not different among tertiles (table). There was no relationship between E/é and ECW/Wt (figure).
Conclusions: Diastolic LV dysfunction is common and related to aging, diabetes, blood pressure and LV hypertrophy in incident dialysis patients. E/é seems to be independent on volume state, suggesting that it can be used as a reliable index for evaluating diastolic LV dysfunction even in dialysis patients.

SP492 Patient characteristics by E/é tertiles (n=212)

	E/é <11(tertile 1)	11-14(tertile 2)	>14(tertile 3)	p-value
n	68	70	74	
Female (%)	45.6	47.1	60.8	0.132
Age (years)	52.4±14.9	54.9±15.3	61.5±11.9	<0.001
Diabetes (%)	38.2	51.4	71.6	<0.001
Mean arterial pressure (mmHg)	94±12	101±13	102±12	<0.001
LV mass index (g/m^2)	94±25	116±23	137±45	<0.001
Hemoglobin (g/dL)	9.4±1.6	9.0±1.6	8.5±1.7	<0.01
ECW/Wt	0.23±0.03	0.23±0.04	0.22±0.04	0.81



SP492

SP493 ASYMMETRIC DIMETHYLARGININ AS A RISK FACTOR FOR RADIAL ARTERY CALCIFICATION IN CHRONIC KIDNEY DISEASE PATIENTS

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Introduction and Aims: The aim of the study was to evaluate correlation between serum concentration of asymmetric dimethylarginin (ADMA) with proinflammatory cytokines, markers of bone turnover and to find relationship between ADMA and radial artery calcification assessed histologically in end-stage renal disease (ESRD) patients.
Methods: The study group consisted of 80 stage 5 chronic kidney disease patients (52 hemodialyzed and 28 predialysis). ADMA level was measured by ELISA method and additional prameters including serum concentration of creatinine, albumin, total calcium and phosphate, C-terminal fibroblast growth factor 23 (FGF-23), osteoprotegerin, osteopontin and osteocalcin, interleukins 6 and 18, tumor necrosis factor receptor II (TNF-R II) and matrix metalloproteinase 2 (MMP-2) were determined. In 46 patients (26 hemodialyzed and 20 predialysis), fragments of radial artery obtained during creation of hemodialysis access were stained for calcifications using von Kossa method and alizarin red and subjected to microscopic analysis.
Results: ADMA concentrations were significantly lower in predialysis patients (0.70 ±0.14 versus 0.89±0.22 µmol/l, p=0.001) and correlated with log(serum creatinine) (R=0.42; p=0.0002). After adjustment for dialysis status, ADMA concentration was significantly correlated with serum albumin (beta=-0.21; p=0.041), log(interleukin-18) (beta=0.22, p=0.037), log(TNF-R II) (beta=0.47; p<0.0001), log(serum phosphate) (beta=0.24; p=0.028), log(FGF-23) (beta=0.29; p=0.012), log(osteoprotegerin) (beta=0.23; p=0.03) and log(MMP-2) (beta=0.30; p=0.004). In multiple analysis, only dialysis status, log(TNF-R II) and log(MMP-2) remained independently associated with ADMA. Patients with calcifications in the radial artery displayed significantly higher ADMA concentrations (0.86+/-0.22 vs 0.72+/-0.16; p=0.022). This difference remained significant after adjustment for dialysis status, interleukin-6 concentration and calcium-phosphate product (odds ratio for calcification 1,71 (1,02-2,86) per 0.1 µmol/l increase in serum ADMA).
Conclusions: We postulate that ADMA may play a role in the pathogenesis of vascular calcifications in dialysis patients, demonstrating its association with radial artery calcification assessed histologically.

SP494 TOE/BRACHIAL INDEX (TBI) AS A NON INVASIVE TECHNIQUE FOR ASSESSMENT OF PERIPHERAL VASCULAR DISEASE IN ESRD PATIENTS ON REGULAR HEMODIALYSIS

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Introduction and Aims: Cardiovascular disease is common in End Stage Renal Disease (ESRD) patients and is responsible for more than 50% of their deaths. At the same time, renal disease, even at the earliest stages, is a cardiovascular risk factor. Among the different localization of cardiovascular diseases, peripheral arterial disease (PAD) affecting the lower limbs has a higher morbidity. Nevertheless, despite its importance, there are few reports of this pathology in ESRD patients. 1. To detect the prevalence of PAD in patients on maintenance hemodialysis. 2. To investigate vascular complications of lower extremities in patients on chronic hemodialysis by measuring the toe/brachial index (TBI). 3. To demonstrate whether measuring TBI, makes surveying PAD effective and useful in chronic hemodialysis patients in an outpatient setting.
Methods:A cross-sectional analysis of a prospective cohort of eighty ESRD patients on regular hemodialysis (42 males, mean age 50.9±9 years). 40 laboratory parameters potentially related to cardiovascular risk, the common carotid artery intima media thickness by carotid duplex and TBI by Doppler ultrasound were prospectively assessed. Patients with bilateral proximal arteriovenous fistula (AVF) have been excluded from the study. Etiology of ESRD was HTN in 26 patients (32.5%), DM in 19 patients (23.8%), Obstructive Uropathy in 14 patients (17.5%), Chronic GN in 6 patients (7%), Vesico-Ureteric Reflux in 6 patients (7%), Lupus nephritis in 7 patients (8.5%), Alport syndrome in 1 patient (2%), and idiopathic in 1 patient (2%).
Results: The cut off value of TBI was 0.6± 0.2 and was high in 26 (32.5%) patients. A univariate analysis showed that TBI had significant positive correlations with Age (p=0.001), Male gender (p=0.009), Hypertension (p=0.0495) and CCA-IMT > 1cm (p=0.0246). while it had a trend towards a negative correlation with serum phosphorus (p=0.0664). Also there were no significant correlations with serum cholesterol, triglycerides, LDL, intact PTH, the dialysis duration or the causes of ESRD other than hypertension. A multivariate analysis using those variables yielded a model with an r2 =0.46, showed that Age (t ratio 2.57, p =0.029), Male gender (r2=0.105, p=0.0119) and CCA-IMT (t ratio -2.14, p =0.0378) significantly and independently contributed to predict TBI. The contribution of serum phosphorus to the model was not statistically significant.
Conclusions: 1. High prevalence of Peripheral vascular disease in hemodialysis 26 (32.5%) patients. 2. The TBI is a non invasive technique replacing invasive arteriography in detection of PVD in hemodialysis patients. 3. TBI is considered better negative test than positive with its higher specificity (82 %) than sensitivity (73 %) and it can be used as a screening method of PAD.

SP495 PULSE PRESSURE AND CARDIOVASCULAR CALCIFICATION IN HEMODIALYSIS PATIENTS

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Introduction and Aims: Cardiovascular calcifications are an important risk factor for cardiovascular events in patients on dialysis. Pulse pressure also appears to be a stronger independent predictor of morbidity and mortality than other blood pressure (BP) parameters such as systolic, diastolic, and mean arterial BP among hemodialysis patients. The use of simple and inexpensive methods to evaluate cardiovascular calcifications is preferred. The aim of this study was to evaluate the relationship of pulse pressure parameter with aortic and mitral valve calcification, and abdominal aortic calcification in HD patients.
Methods: We performed a cross-sectional study in 85 stable patients treated with HD for more than 6 months. Patients were 49.9 ± 12.4 years of age, 58% males, 17% diabetics and the mean dialysis vintage was 51.5 ± 28.7 months. Demographic and biochemical data were examined. Blood pressure was measured with the patient in the seated position using a mercury sphygmomanometer. The mean of three consecutive readings, taken 1 min apart, was recorded. Plain X-ray images of lateral lumbar spine from all subjects were studied for calculation of semiquantitative vascular calcification scores as described by Kauppila. The severity of the anterior and posterior aortic wall calcification were graded individually on a 0-3 scale for each lumbar segment and the results were summarized to develop a score (range 0-24). Echocardiograms were examined for absence or presence of calcification of the mitral and aortic valve.
Results: Mean pulse pressure of study population was 55.72 ± 14.32 mmHg. Fifty nine patients (69.4%) were identified with aortic abdominal calcification, and the mean Kauppila score was 4.91 ± 4.05. Sixty patients (70.5%) had at least one valve calcified, while thirty three patients (38.8%) had both valves calcified. Univariate analysis revealed that every 1 mmHg increase in pulse pressure was associated with increased risk for cardiovascular calcification p=0.020. In multivariate analysis, after adjustment for age, gender, diabetes mellitus, cholesterol and triglyceride serum levels, the association also remained strong, where every increase of 1 mm Hg in pulse pressure was associated with increased risk for cardiovascular calcification p=0.038.
Conclusions: Pulse pressure may identify hemodialysis patients with subclinical cardiovascular calcification who need further evaluation. We must highly suspect the presence of cardiovascular calcification in hemodialysis patients with high pulse pressure.

SP496 HDL PROTEINS AS PREDICTORS OF CARDIOVASCULAR RISK AND MORTALITY IN DIABETIC PATIENTS ON HEMODIALYSIS

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Introduction and Aims: The protein composition of HDLs is altered in several chronic diseases with elevated cardiovascular morbidity and mortality. Here we investigated if two proteins found enriched in HDLs of end-stage renal disease patients, serum amyloid A (SAA) and surfactant-protein B (SP-B), can predict cardiovascular events and mortality in the German Diabetes and Dialysis study (4D study).
Methods: We developed an easy applicable, laboratory assay based on an ELISA principle to measure the amount of HDL-associated SAA and SP-B without the need for a preliminary isolation of HDLs. In a post-hoc analysis of 1152 patients with type II diabetes on hemodialysis, which were randomly assigned to atorvastatin treatment (20 mg/day) or placebo, we assessed the association of SAA(HDL) and SP-B(HDL) with cardiovascular outcomes in adjusted multivariate regression models. We further investigated if SAA (HDL) or SP-B(HDL) concentrations affect the efficacy of statin treatment.
Results: High concentrations of SAA(HDL) were significantly associated with increased risk of cardiac events (hazard ratio per 1-SD increase in SAA(HDL) levels: 1.09; 95% CI: 1.01-1.19; P =0 0.035) in the 4D cohort, whereas SP-B(HDL) was a significant predictor of overall mortality (hazard ratio per 1-SD increase in SP-B(HDL) levels: 1.10; 95% CI: 1.02-1.19; P = 0.013). Importantly, both associations were independent of HDL cholesterol levels. SAA(HDL) also modified the effect of atorvastatin treatment on the incident rate of cardiac events in the second and third SAA(HDL) quartile.
Conclusions: In diabetic patients on hemodialysis, SAA(HDL) and SP-B(HDL) were significant predictors for cardiac outcomes and death. Our findings indicate that specific disease-associated proteins may serve as novel biomarkers to predict cardioprotective effects of HDLs and could provide a meaningful stratification model to identify individuals who benefit from therapeutic interventions. Our newly established assay may be applicable to evaluate further HDL-associated proteins for predicting clinical events in several high-risk populations.

SP497 SEVELAMER DECREASES SERUM URIC ACID LEVELS AND IMPROVES ARTERIAL STIFFNESS IN HEMODIALYSIS PATIENTS

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Introduction and Aims: When concerning about phosphate binders, sevelamer has a unique effect as a resine that can acts as a prebiothic. Avoiding calcium intake and through pleiotropic effects, there might be a differential influence of phosphate binders (PB) (sevelamer and calcium based PB) in terms of cardiovascular risk profile. The aim of this study was to evaluate the effects of phosphorus binders on serum uric acid, HbA1c and lipid profile levels and the progression of arterial stiffness.
Methods: A total of 151 patients (mean age: 53.0 ± 14.4 years; mean duration of dialysis: 9.5 ± 1.2 years) undergoing maintenance hemodialysis and using the same phosphorus binders under three years follow-up were enrolled into the study. Patients were divided into two groups according to usage of PB as sevelamer based PB (group 1; n: 99) and calcium based PB (group 2; n.52). Biochemical parameters as fasting plasma glucose (FPG), hemoglobin A1c (HbA1c), calcium, phosphorus, bicarbonate, C-reactive protein (CRP), lipid profile (total cholesterol [C], HDL-C, TGs, LDL-C [low-density lipoprotein C; computed from Friedewald's formula]), uric acid and urea reduction rate (URR) were assessed from monthly clinical visits in three year follow up period. Arterial stiffness determined at the initial and at the end of the 3rd year by aortic pulse wave velocity (PWV) (Sphygmo-Cor).
Results: Serum calcium, phosphorus, parathyroid hormone, CRP and URR levels were similar in two groups. Serum LDL-C levels were significantly lower in group 1 ($p<0.005$). When compared to initial results; mean üric acid levels were significantly decreased in group 1 where remained stable in group 2 during three years follow up period (group 1: -1.4 ± 0.1 mg/dl vs group 2: 0.1 ± 0.2 mg/dl p:0.000). 22.4% of patients in group 1 and 3.8% of patients in group 2 showed a reduction more than 2 mg/dl in mean üric acid levels. Fasting plasma glucose ($p:0.001$) and HbA1c ($p<0.005$) levels remained significantly lower in group 1 patients with type-2 diabetes mellitus than group 2 patients. Although PWv values were similar in both groups at the initiation of the study, a significant reduction in group 1 and a significant increase in group 2 were detected at the 3rd year of the study (6.2 cm/sec to 4.7 cm/sec in group 1; 6.7 cm/sec to 7.4 cm/sec in group 2) ($p<0.005$).
Conclusions: Despite similar phosphorus levels and dialysis adequency, sevelamer improves the cardiovascular risk by pleiotropic effects through lowing uric acid, LDL-C and HbA1c concentrations and avoiding the excess calcium intake Thus, sevelamer improves the cardiovascular risk profile of hemodialysis patients and prevents the progression of arterial stiffness when compared to calcium based phosphate binders.

SP498 EPICARDIAL ADIPOSE TISSUE THICKNESS AND SERUM COENZYME Q10 LEVELS IN HEMODIALYSIS PATIENTS

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Introduction and Aims: Accelerated atherosclerosis is the major cause of mortality in patients on chronic hemodialysis (HD). Epicardial adipose tissue (EAT) thickness is a new risk factor in cardiovascular disease. The aim of this study was to evaluate the relation between serum coenzyme Q10 levels (CoQ10) which is a potent physiologic antioxidant and EAT thickness in HD patients.
Methods: Seventy one chronic HD patients and 65 age- and sex- matched healthy individuals were included in the study. Plasma coenzyme Q10 levels were performed by High-performance liquid chromatography (HPLC) measurements. EAT was measured by transthoracic echocardiograpy performed with a VIVID 7 instrument.
Results: Serum CoQ10 levels (1.36 ± 0.43 vs 2.53 ± 0.55, $p<0.001$) were significantly lower in HD patients compared to controls. EAT thickness was significantly higher in HD patients compared to healthy controls (6.53 ± 1.01 vs. 5.79 ± 1.06 mm respectively, $p<0.001$). Correlation analysis showed serum CoQ10 levels were inversely correlated with EAT ($r = - 0.337$, $p=0.006$). Multiple linear regression analysis was used to define independent determinants of EAT in HD patients. According to linear regression analysis, age, BMI, total cholesterol and CoQ10 levels were found to be independent predictors of EAT ($r^2=0.211$, adjusted $r^2=0.172$, $p=0.002$).
Conclusions: This study demonstrated that EAT thickness was significantly higher among HD patients compared to healthy controls. In addition; this study was the first to demonstrate an inverse correlation between EFT and serum CoQ10 levels in this patient population.

SP499 PATTERNS OF CHANGE IN CENTRAL AORTIC PULSE WAVEFORM PROFILE DURING A MID-WEEK DIALYSIS SESSION

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Introduction and Aims: Prospective cohort studies have demonstrated that arterial wave reflections are independent predictors of mortality in hemodialysis patients. This study aimed to investigate potential differences in the pattern of intradialytic change of central arterial pressure waveform parameters across hemodialysis patients and to identify demographic, biochemical and dialysis-related factors potentially affecting the type of intradialytic response.

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Methods: A total of 70 patients receiving maintenance hemodialysis were evaluated before and after the mid-week dialysis session. Radial artery applanation tonometry was performed with the use of the Sphygmocor device in order to determine central aortic pressures and heart rate-adjusted augmentation index (AIx(75)), as measure of wave reflections.
Results: Three different patterns of intradialytic change in central arterial pressure waveform profile were evident: a) AIx(75) was positive pre-dialysis and increased afterward in 13/70 patients (Group A); b) AIx(75) was positive pre-dialysis and decreased afterward, but remained positive post-dialysis in 49/70 patients (Group B); c) AIx(75) was positive pre-dialysis and became negative post-dialysis in 8/70 patients (Group C). Patients with intradialytic rise in AIx(75) (Group A) tended to be older, had higher dialysis vintage and received higher number of antihypertensive agents than patients who restored a normalized central arterial pressure waveform post-dialysis (Group C). Further, patients in Group A experienced increase instead of decrease in central aortic systolic BP during dialysis (4.0±0.6 vs -21.4±11.3 mmHg, P<0.001) and had lower intradialytic weight loss (-1.4±1.2 vs -2.1±1.2, P<0.05) than those who achieved a negative AIx(75) post-dialysis (Group C).
Conclusions: This study shows the presence of diverse patterns of change in central arterial pressure waveform profile during a mid-week dialysis session. Future prospective studies are required in order to clarify whether intradialytic rise in AIx(75) levels is associated with heightened risk of mortality.

SP500 CLINICAL CHARACTERISTICS OF PATIENTS WITH INTRADIALYTIC HYPERTENSION

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Introduction and Aims: Intradialytic hypertension with a prevalence of 15% among hemodialysis patients is with unknown pathophysiology, demographic, laboratory and clinical characteristic of patients, and it's influence on long - lasting clinical effects (cardiovascular morbidity and mortality, rate of hospitalization). So, the aim of the study is to present the clinical, laboratory and demographic characteristics of patients with intradialytic hypertension in our dialysis center.
Methods: Of total 110 hemodialysis patients, 17 patients (15,45%) were intradialytic hypertensive - started at a systolic pressure greater than 140 mm Hg or had an increase in systolic pressure more than 10 mm Hg during the session, and 17 patients were normotensive or had a drop in blood pressure during the dialysis. HD were performed 3 times per week with a duration of 4-5 hours, on machines with controlled ultrafiltration and high flux syntetic membrane (polyetersulfon) sterilized with gamma rays. It was used dialysate with standard electrolytes content (Na+ 138 mmol/L, K+ 2,0 mmol/L, Ca++ 1,5 mmol/L, Mg +1,0 mmol/L, CH3COO- 3,0 mmol/L, Cl -110 mmol/l, HCO3- 35 mmol/L). Analysed demographic and clinical characteristics were: gender, age, BMI, dialysis vintage, vascular acces, cardiovascular comorbidity (cardiomyopathy, ischemic cardiac disease, peripheral artery disease, heart valve disease), number and type of antihypertensive drugs, a weekly dose of erythropoesis - stimulating agent, standard monthly, three and six months laboratory analyzes, and sp Kt/V and PCR. Statistical analysis was performed with SPSS 17.0.
Results: In the both groups were more men (IDH group 88,23%, control group 64,07%). IDH group was older (59,00+/- 7,64 versus 49.00+/- 13,91, p= 0,314) and with lower BMI (p = 0,246) compared to control group. Significantly lower serum sodium and higher sodium gradient had IDH patients (135,75+/-2,03 versus 137,33 +/-1,97, p= 0,042; 2,25+/-1,98 versus 0,66+/-1,44, p=0,0267, respestively). In other laboratory analysis there was no statistically significant differences between two groups. IDH group had significantly higher interdialysis weight gain and less effective ultrafiltration individually at each dialysis session compared to the control group (2,23 +/-0,866 versus 2,37+/-0,69, p=0,011; 3,87+/-1,26 versus 3,56+/-1.18, p=0,025, respectively). The systolic and mean arterial pressure after the HD were statistically higher in IDH group, receiving multiple antihypertensive drugs and have more cardiovascular diseases compared to patients without intradialytic hypertension.
Conclusions: Older, lower BMI, border hyponatremia, higher sodium gradient, smaller ultrafiltration rate, higher cardiovascular morbidity and more use of antihypertensive drugs are the clinical characteristics of patients with intradialytic hypertension.

SP501 THE EFFECT OF L-CARNITINE ON CARDIAC FUNCITION IN HEMODIALYSIS PATIENTS DIAGNOSED WITH CARNITINE DEFFICIENCY

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Introduction and Aims: Plasma concentration of free carinitine (FC) decreases significantly in hemodialysis (HD) patients, and cardiovascular disease is the most frequent cause of death among HD patients. It is well known that the administration of levocarnitine (LC) can improve cardiac systolic dysfunction, but some studies have been unable to show the benefit of the administration of LC. Studies have reported that the features associated with an improvement of systolic function would seem to the presence of baseline abnormality and treatment of 3 months or longer. This study was designed to determine the difference in improvement of cardiac systolic function in HD patients administered LC according to the degree of plasma FC concentration.
Methods: Over a 6-month period from December 2012 to June 2013, a daily dose of levocarnitine chloride (1800mg/day in the first 3 months, 300mg/day in the second 3 months) was administered orally to 134 patients on HD who were diagnosed with carnitine deficiency (Plasma concentration of FC < 30μmol/L). At the end of the 6 months, 20 patients were excluded from the analysis (due to death, hospitalization, cancer, or withdrawal), and the patients were divided into 3 groups according to the concentration of plasma FC: group1: FC<30umol/L, N=14; group2: 30<FC<72,N=22; group3: 72<FC,N=78.
Results: In groups 2 and 3, the plasma concentration of FC increased significantly after the administration of LC, but group 1 showed no significant increase. In groups 2 and 3, PEP/ET decreased significantly, but only in group 3 was LVMI significantly improved. The plasma level of FGF-23 did not change significantly in any of the groups after treatment (Table 1). MBP before HD and increase of body weight between HD sessions did not change significantly in any group (Date not shown).
Conclusions: The reduction of PEP/ET in groups 2 and 3 suggests that the administration of LC improved cardiac systolic function of HD patients diagnosed with carnitine deficiency according to the plasma FC concentration. We speculate that the improvement of cardiac systolic function leads to the reduction of LVMI with a higher degree of plasma FC concentration. Furthermore, this benefit regarding LVMI is not affected by the plasma concentration of FGF-23 that was recently identified as a biomarker of left ventricular hypertrophy.

SP501 Parameters

	Group 1	Group 2	Group 3
N	14	22	78
FC(pre)	23.5±3.2	22.0±3.7	20.5±4.6
FC(post)	22.7±4.2	48.8±12.3**	113.2±44.6**
LVMI(pre)	136.6±32.6	149.6±49.4	152.2±39.5
LVMI(post)	136.3±51.3	154.7±49.1	132.6±37.5**
PEP/ET(pre)	0.307±0.97	0.343±0.07	0.334±0.15
PEP/ET(post)	0.298±0.90	0.295±0.08*	0.264±0.07**
FGF-23(pre)	1766±2108	3496±5102	1704±2548
FGF-23(post)	1827±2749	2170±3554	1757±3737

*:P<0.05**:P<0.01

SP502 CORONARY CALCIFICATION DOES NOT AFFECT THE SYSTOLIC FUNCTION OF THE LEFT VENTRICLE IN CHRONIC HEMODIALYSIS

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Introduction and Aims: Cardiovascular disease is the first leading cause of death in hemodialysis patients. In this population, cardiovascular calcifications occur at an earlier age and are growing faster than in the general population.
Methods: Forty-nine patients on chronic hemodialysis, 26 men and 23 women, mean age 56.4 years, with an mean hemodialysis duration of 85 months, underwent screening for coronary calcifications (CC) by an ultra -fast 64 multislice cardioscanner, and an evaluation of the systolic ejection fraction of the left ventricle (LVEF) by transthoracic echocardiography after dialysis.
Results: CC were detected in 69.4 % of the cases with a preferential localization in the anterior interventicular artery (69.4 %). CC were associated with conventional cardiovascular risk factors (age, male sex, systolic blood pressure, diabetes, history of ischemic heart disease). The average of coronary calcium score was 331.1, and 522.2 in the 10 patients treated for ischemic heart disease (p = 0.09). Comparing groups with and without CC, there is no significant difference in LVEF (60.5% vs 65.9 %, p = 0.135).
Conclusions: Our study shows that CC in dialysis does not affect LV systolic function even if they share several cardiovascular factors with coronary atherosclerosis. Indeed, the pathogenesis of CC in dialysis is complex and multifactorial and is essentially reflected by calcic deposition in intima or mediacalcosis that are often asymptomatic. In advanced cases, the CC may be the bed of atheromatous lesions that may lead to ischemic lesions where the value of early detection. Our study confirms the high prevalence of CC patients receiving hemodialysis. Although there is no relationship between CC and LVEF in our series, the CC remains a major predictor of cardiovascular morbidity and mortality in dialysis patients.

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SP503 ABDOMINAL AORTA CALCIFICATION ON PLAIN RADIOGRAPH STRONGLY SUGGESTS CORONARY ARTERY CALCIFICATION IN HEMODIALYSIS PATIENTS

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Introduction and Aims: The reference standard in the detection of cardiovascular calcifications is the CT-based coronary artery calcium (CAC) score. The KDIGO recommended that a lateral abdominal radiograph be used to detect the presence or absence of vascular calcification. Plain radiographs may provide readily available information on coronary artery calcification. Therefore, we investigate the association between abdominal aorta calcification (AAC) on plain abdominal radiograph and CAC score determined by CT.
Methods: A total of 84 chronic hemodialysis patients (42 men; 55.1 ± 11.1 years) who underwent abdominal radiography and CAC scoring at CT were included in this retrospective analysis. Lateral lumbar radiography of the abdominal aorta was used to evaluate the overall AAC score, which is related to the severity of calcific deposits at lumbar vertebral segments L1-L4. The extent of AAC on chest radiography was evaluated independently by two blinded observers using a semi-quantitative eight-point scale (0-3). Amount of AAC determined on radiography was correlated with CAC and ROC analyses performed to characterise the diagnostic performance of AAC grading.
Results: Mean CAC as determined by MDCT score was 410 (range 0-4,254) and mean AAC score was 3.6 (range 0-13). AAC and CAC scores were higher in patients with cardiovascular disease than in patients without cardiovascular disease. CAC score was found to have significant positive correlations with AAC (r = 0.34; P = 0.01). Cut-off between AAC grades 0-6 and ≥7 had a sensitivity of 50.0%, specificity of 86.1%, PPV of 66.7 % and NPV of 75.6% for the correct identification of CAC scores greater than 100. ROC analyses revealed an area under the curve (AUC) of 0.79 (95 % CI 0.53-0.84).
Conclusions: This study demonstrated that semi-quantitative AAC grading on plain abdominal radiography appears reliable and positively associated with CAC scoring. AAC depicted on plain radiograph has a high specificity for ruling out CAC scores greater than 100.

SP504 EPA ETHYL ESTER INCREASES EPA/AA RATIO AND DECREASES CARBOXYLMETHYL LYSINE IN DIALYSIS PATIENTS

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Introduction and Aims: N-3 polyunsaturated fatty acids, such as eicosapentaenoic acid (EPA), are known to lower the risk of cardiovascular event. Low serum EPA/arachidonic acid (AA) ratio in hemodialysis patients may be involved in cardiovascular event which is the most common cause of death in HD patients. We conducted the cross-over study (UMIN000008381) to investigate the effect of EPA ethyl ester on fatty acid profile and advanced glycation end products in maintenance hemodialysis patients.
Methods: We enrolled 59 hemodialysis patients (M: F=34:25) with low EPA/AA ratio (≤0.4). Mean age was 67.0 ± 12 (SD) years old and HD vintage was 8.14 ±7.35 years. The primary causes of renal failure were 25 chronic glomerulonephritis, 8 nephrosclerosis, 20 diabetes mellitus and 6 others. Patients were randomly divided into two groups, and patients of each group received EPA ester for 3 months alternatively with one month of wash-out period between the cross-over studies. We measured fatty acid profile, EPA/AA ratio and Nε-(Carboxymethyl) lysine (CML) level at 4 points (0, 3, 4, 7 months).
Results: The level of EPA/AA ratio significantly increased in EPA ester given patients (0.303±0.164 vs 1.144±0.382, P<0.0001), but did not change in control patients. On the contrary, CML level significantly decreased in EPA ester treated patients (0.956±0.042 vs 0.825±0.022, P<0.0024), Lipid profiles improved after the administration of EPA ester, but serum phosphate levels did not change. Side effects due to EPA ester were not observed throughout the study periods.
Conclusions: EPA ester lowered advanced glycation end products levels associated with the improved EPA/AA ratio in hemodialysis patients. EPA ester might be a useful drug to prevent atherosclerotic events in maintenance hemodialysis patients.

SP505 FACTORS ASSOCIATED WITH ANNUAL CHANGE IN PULSE WAVE VELOCITY IN DIALYSIS PATIENTS: RESULTS OF 1 YEAR FOLLOW-UP

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Introduction and Aims: Pulse wave velocity(PWV) is a non-invasive, simple method to evaluate the arterial stiffness. Both peritoneal and hemodialysis patients have increased risk for cardiovascular diseases and many studies are showing that increased arterial stiffness is associated with increased cardiovascular risk. In this study, we aimed to evaluate the relationship of biochemical parameters and demographic characteristics between annual change of PWV.
Methods: Eighty-one patients(46 hemodialysis(HD) - 35 peritoneal dialysis(PD)) included to the study. Baseline and first year measurement of PWV was made with SphygmoCor system(Atcor Medical, Australia). Hydration status was determined with Body Composition Monitor (BCM, Fresenius Medical Care, Germany). One year average of biochemical parameters were obtained and compared in baseline and first year, then the annual change in PWV is calculated and correlations between clinical and biochemical parameters are examined.
Results: The baseline demographics,clinical and biochemical parameters are presented in Table 1 and 2. Baseline PWV was higher in diabetic patients, than glomerular diseases (p=0,04) and was correlated with baseline BUN (p=0,001, r=0,378) positively and with calcium (p<0,001, r=-0,420), PTH (p=0,006, r=-0,302, Kt/v (p<0,001, r= -0,399) negatively. We can not show any relationship between PWV and hydration status at follow up. In peritoneal dialysis patients PWV was correlated positively with BUN at baseline (p=0,003, r=0,482). In hemodialysis patients PWV was correlated with BUN (p= 0,039, r=0,305) positively and with calcium (p<0,001, r= -0,519), PTH (p=0,036, r=-0,310) and Kt/v (p=0,007, r=-0,391) negatively. At follow-up 53% patients in HD(n=24) and 44% patients in PD(n=15) had an increase in PWV. In total population 49% of patients(n=39) had an increase in PWV and hypertension (p = 0,048) and calcium containing phosphate binder use (p = 0,038) were associated with an annual increase in PWV. Increase in PTH was an independent risk factor for whole study group(p=0,01, OR=1,002, CI 95%=1,001-1,004). Longer dialysis vintage(p=0,03 OR=1,029 CI 95%=1,003-1,056) and higher LDL cholesterol(p=0,01 OR=1,053 CI 95% =1,012-1,094) were independent risk factors for peritoneal dialysis patients that increase PWV, but higher albumine levels were protective from increasing PWV in this group (p=0,017 OR=0,006 CI 95%= 0,000-0,398). After logistic regression we show that increase in PTH is the only independent risk factor for hemodialysis patients increasing PWV(p=0,016, OR=1,004, CI 95%=1,001-1,008).
Conclusions: We can not show the expected increase in PWV, this could be explained that our dialysis populatian is younger than usual, but we show that especially patients with higher PTH levels or using calcium containing phosphate binders are under increased risk for cardiovascular diseases and these patient's treatment should be cautiously regulated.

SP505 Table 1: Demographic features of patients

Age (years, mean±SD)	53±13
Gender(F/M)	44/37
Diabetes Mellitus(+/-)	15/66 (18%)
Hypertension(+/-)	63±18 (87%)
Cerebrovascular Disease (+/-)	7/74 (9%)
Dialysis Vintage (months, mean±SD)	67±65
Smoking History(+/-)	28/53(34%)
Cardiovascular Disease(+/-)	26/55(32%)
Phophate Binder use(Ca containing or not)	58/23(71%)

SP505 Table 2: Baseline and first year PWV and biochemical parameters

Parameter	Baseline	First Year	p
PWV	9,59±3,56	9,54±3,25	0,798
Overhydration (L)	0,18±1,7	0,04±1,7	0,775
BUN(mg/dL)	55±14	58±14	0,009
Albümine (g/dL)	3,8±0,38	3,8±0,34	0,651
C-Reactive Protein (mg/dL)	9,6±9	10±10	0,273
Kt/V	1,94±0,4	1,95±0,46	0,782
PTH(pg/mL)	429±293	491±437	0,035
Calcium(mg/dL)	8,6±0,5	8,8±1,1	0,01
Phosphorus(mg/dL)	5,1±0,9	5,3±0,9	0,065
LDL (mg/dL)	113±41	104±48	0,016

SP506 IMPROVEMENT OF THE PHYSICAL ABILITY AND HEMODIALYSIS EFFICIENCY DUE TO TRANSCUTANEOUS ELECTRICAL MUSCLE STIMULATION OF LOWER EXTREMITIES

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Introduction and Aims: Transcutaneous Electrical Muscle Stimulation (TEMS) is widely used in cardiology, pulmonology and neurological rehabilitation practice in order to improve the physical performance and adaptation in patients who unable to carry out the necessary intensity of rehabilitation exercises. Large cohort of hemodialysis patients are also unable to carry out even minimal exercise because of the underlying disease severity and comorbid conditions. TEMS can be among a few possible rehabilitative interventions for these patients. In hemodialysis practice TEMS has been previously used to prevent intradialytic hypotension, as well as to enhance dialysis efficiency. The aim of this study was to evaluate the TEMS capability in improvement of the hemodialysis efficiency and physical ability.
Methods: 24 hemodialysis patients were randomized to TEMS treatment group or control group (CG). The TEMS group underwent the procedures of muscle stimulation of the lower extremities during hemodialysis sessions for 4 weeks, 3 times per week and 3 TEMS treatments each session for 30 minutes each procedure, while the CG remained on previous dialysis regimen. The blood tests before and after hemodialysis and six-minute walk test (6MWT) were performed at the start of the protocol. The Borg scale was used for assessment of breathlessness and fatigue before and after the test. We repeated this evaluation procedure after completion of the TEMS protocol.
Results: The TEMS procedures were well tolerated and the level of compliance was high. No changes in spKt/V or URR were observed, but there were statistically significant shifts in the levels of serum creatinine and urea: creatinine increased by 0,03 ±0,05 mmol/l in the CG and decreased by 0,05±0,06 mmol/l in the TEMS (p=0.001 for size effect); urea increased by 1,22±6,2 mmol/l in the CG and decreased by 3,1±2,6 mmol/l in TEMS group (p=0.042 for size effect). While there were no changes in phosphate level in the whole groups, the individual changes in phosphate level were directly linked to baseline phosphate in treatment group (R2=0,56; p<0,05) but not in control group. It means that patients with elevated phosphate level showed significant reduction of phosphate while patient with near-normal level - did not. The TEMS procedures were well tolerated and the level of compliance was high. The distance walked in the 6MWT in the TEMS group increased from 431±113 to 455±99 m and decreased from 445±114 to 441±101 m in the CG (p=0.03 for size effect). There was a reduction of the disadaptative symptoms after 6MWT in TEMS group: dyspnea decreased from 3,7±1,1 to 2,9±1,4 points (p=0.01) and fatigue decreased from 4,3±2 to 2,5±1,6 points (p=0.001) according to the Borg scale; in the CG there were no significant changes in these parameters.
Conclusions: The decreasing of predialysis serum creatinine, urea and phosphate levels after a month of using TEMS can serve as an indicator of improving the efficiency of dialysis therapy at the long term and also as a marker of the enhancing metabolic processes. Intradialytic TEMS can improve functional capacity and physical ability of the hemodialysis patients and it can be a possible alternative of the physical exercise program for patients who cannot tolerate the exercises in the extent necessary.

SP507 INFLUENCE OF DIFFERENT IONIZED CALCIUM CONCENTRATION IN DIALYSIS FLUIDS ON THE TOTAL SERUM CALCIUM OF DIALYSIS PATIENTS

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Introduction and Aims: A series of clinical examinations have shown that the risk of mortality for dialysis patients increases not only with age, but also with the complete time spent under dialysis treatment. There seems to be a correlation between the mortality and the increasing calcification of blood vessels and the soft tissues of the patients. This increasing calcification of vessels and tissues is apparently related to disorders of the calcium and phosphate homeostasis. In contrast to some years ago, when most patients were treated with a concentration of ionized calcium in the dialysis fluid of 1,75 mmol/l, nowadays the patients are more and more treated with a lower concentration of ionized calcium in the dialysis fluid in order to reduce the risk of vascular calcification. To explore what effect the therapy with a lower concentration of ionized calcium in the dialysis fluid would have on the total calcium in the dialysis patients serum, 156 dialysis sessions of 78 patients were examined.
Methods: During every one of these dialysis sessions, the serum calcium, the serum pH value and the serum phosphate level were determined before, after 120 minutes, at the end of the dialysis session and 15 minutes after the end of the dialysis session.
Results: From these 156 dialysis sessions only 6 were carried out with a nominal concentration of ionized calcium of 1,75 mmol/l in the dialysis fluid. 60 dialysis sessions were carried out with a nominal ionized calcium concentration of 1,50 mmol/l and 47 dialysis sessions were made with a nominal ionized calcium concentration of 1,25 mmol/l. In contrast to the nominal calcium concentration indicated on the concentrate canister, the measured ionized calcium concentration in the finished dialysis fluid is always lower (nominal calcium concentration of 1,5 mmol/l, measured values between 1,25 and 1,27 mmol/l.)Thus, for 43 of the dialysis sessions, the real measured concentration of ionized calcium was indicated instead of the nominal calcium concentration. Those values were in the range from 1,09 to 1,40 mmol/l. While the serum phosphate concentration level in all sessions dropped by around 55%, the serum calcium concentration level of 100 sessions remained widely constant, with a deviation of 0,09 mmol/l, which corresponds to the standard measurement error. Only for 56 dialysis sessions a decrease of the serum calcium concentration above the deviation of 0,09 mmol/l was observed, in average of 0,06 mmol/l. The calcium phosphate product calculated for those dialysis sessions and its changes were thus due nearly exclusively to the changes in the phosphate concentration. For nearly all dialysis sessions an increase of the pH values was measured, therefore no relation between the serum calcium concentration and the pH value could be observed. The comparison of the frequency distribution of the pre-dialysis calcium concentration with the frequency distribution of the post-dialysis concentration shows again that most serum calcium concentration levels remained constant during the dialysis treatment, while only a few increased or dropped.
Conclusions: The performed measurements show that the total calcium concentration in the serum is influenced only marginally, if at all, by changes in the ionized calcium concentration in the dialysis liquid. At least not in the used concentration ranges. Specially if it considered that only 56 dialysis sessions show a concentration change higher than the measurement error of 0,09 mmol/l. These results support the model of the Exchangeable Calcium Pool described in literature.

SP508 LEG QUADRICEPS NEUROMUSCULAR ELECTROSTIMULATION: NEW THERAPEUTICAL PHYSICAL TRAINING OPTION IN HAEMODILAYSIS PATIENTS

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Introduction and Aims: Haemodialysis (HD) patients are characterized by great muscle wasting, decreased physical function and poor quality of life. Recently, neuromuscular electrostimulation (EMS) results in great interest as adjunctive treatment of regular exercise in HD patients. Until date, scarce studies about the exclusive role of EMS in HD patients have been published. The objectives were to analize the effect of an intradialysis quadriceps EMS training program in muscular strength, functional capacity and quality of life as well as efficacy, safety and tolerability in our HD patients.
Methods: A 12 weeks single-center prospective study. HD patients were assigned into EMS training program (EMS) or control group (C). An adaptative EMS program was performed using the Compex® Theta 500i device in both quadriceps muscles in the first two hours of HD session. C group received standard HD care. Analized data: 1.- Muscular data: Transversal Quadriceps Muscular Area (TQMA), Maximum Length Quadriceps Strength (MLQS) and Hand-grip dominant arm (HG). 2.-Functional capacity tests:"Sit to stand to sit" (STS10) and "six-minutes walking test"(6MWT).3.- Health questionnaire: EuroQol-5D (EQ-5D). 4.-Satisfaction degree using a visual analogic scale (VAS), subjective rating scale (SRS) and own symptoms EMS questionnaire (SEQ) were completed.
Results: 38 patients included: 54% men. Mean age 69.7 years and 32.1 months on HD.23 were on EMS and 15 on C group. In contrast with C group, EMS group significally (*p<0,05) improves in MLQS* (10.2 ± 6.7 vs 13.1 ± 8.1 kg), STS10* (41 ± 18.7 vs 32.8 ± 14.1 sec), 6MWT* (12%, 280.5 vs 312.4 m) and EQ-5D global score * (52.5 vs 65.7%) at the end of the study. No significant differences were observed for TQMA. However, lower leg SEQ score* (8.5 vs 5.8 sympt/pac) in the EMS group was observed, mainly due to relevant muscular pain* (2.8 vs 1.2), cramps* (1.6 vs 1.1), numbness* (1.5 vs 1.1) or pricks* (1.6 vs 1.1). In the EMS group, 44% and 72% refered better wellness sensation and physical condition in the SRS, respectly. The VAS satisfaction degree was 7.8 points for the EMS group. No side-effects. No relevant changes in biochemical data, haemoglobin levels or dialysis adequacy were observed.
Conclusions: 1.-The intradialytic neuromuscular electrostimulation of both quadriceps improved muscular strength, functional capacity and quality of life in our HD patients. 2.- Neuromuscular electrostimulation was safe, effective and well tolerated in our HD patients. 3.-With the obtained results, neuromuscular electrostimulation constitutes a novel therapeutic alternative to improve the deteriorated physical condition and quality of life of these patients. 4.-However, it could be an effective alternative to those patients in whom the intradialytic exercise program is physically difficult or is contraindicated.

SP509 ATRIAL ELECTROMECHANICAL DELAY TIMES AND ATRIAL FIBRILLATION IN HEMODIALYSIS PATIENT: A PROSPECTIVE STUDY

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Introduction and Aims: Atrial electromechanical delay (EMD) times were found to be independent predictors of atrial fibrillation (AF) in general population. However, in the literature, there has been no prospective study investigating the relationship between atrial EMD times and AF in hemodialysis (HD) patients. The aim of study was to evaluate atrial-EMD times and their relations with AF in HD patients.
Methods: Sixty-two HD patients were enrolled and followed for 1 year in this prospective study. At the beginning of the study rhythm holter and control ECGs (every month and/or when patients have palpitation) were performed to determine AF. Standard and Tissue Doppler Echocardiography (TDE) performed before mid-week dialysis session for HD patients. Data were expressed as mean ± SD. The *normal* distribution of all *variables* was tested using the Kolmogorov-Smirnov Test. Dichotomous variables were compared using the *chi-square* test. Statistical differences between parametric data of two groups were analyzed using the Student's *t*-test. The

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Mann-Whitney U test was used to determine differences between non-parametric data. Linear associations between continuous variables were assessed using the Spearman correlation test. Binary regression analyses were undertaken to determine independent associations among AF and other variables. Age, serum uric acid, triglyceride, phosphorus, CRP, interatrial and left intraatrial-EMD intervals were entered into the regression model as independent variables and AF was entered as a dependent variable. The backward elimination method was preferred in the stepwise regression analysis and p>0.1 used as a criterion for elimination in this model. p< 0.05 was considered significant for all tests.
Results: Non of the HD patients had AF which was checked with the rhythm holter and routine ECG recordings at the beginning of the study. Interatrial and left intraatrial-EMD intervals were significantly longer in HD patients with AF compared to HD patients without AF (Table 1). Furthermore, there has been positive correlations between advanced age, C-reactive protein (CRP), interatrial and left intraatrial-EMD intervals and AF (r: 0.394 p: 0.002, r: 0.261 p: 0.04, r: 0.245 p: 0.05, r: 0.274 p: 0.031, respectively) and negative correlations between serum uric acid, phosphorus and triglyceride and AF (r: -0.294 p: 0.020, r: -0.282 p: 0.027, r: -0.301 p: 0.018, respectively) in HD patients. In the binary logistic regression analysis, advanced age, CRP, serum uric acid and phosphorus but not EMD intervals were found to be independent predictors of AF in this population.
Conclusions: This prospective study demonstrated the negative effects of increased age, inflammation (increased CRP) and malnutrition (decreased phosphorus and uric acid levels) on AF in HD patients. Future large scaled prospective studies are needed to determine the exact roles of prolonged inter and intraatrial-EMD intervals on atrial fibrillation in this population.

SP509

Parameters	Absence of AF (n = 53)	Presence of AF (n = 9)	P value
Age (years)	58.56±16.59	78.0±11.33	0.002
Female/Male	26/27	3/6	0.483
BMI (kg/m^2)	23.76±1.97	25.0±1.72	0.074
Dialysis Vintage (Months)	68±46	49±37	0.269
SBP (mmHg)	125±20	132±17	0.236
DBP (mmHg)	77±11	78±7	0.729
Glucose (mg/dL)	112±47	106±34	0.912
Predialysis Potassium (mEq/L)	5.1±0.6	4.6±0.8	0.070
Postdialysis Potassium (mEq/L)	3.3±0.4	3.1±0.3	0.270
LDL- cholesterol (mg/dL)	85±30	91±25	0.503
Triglyceride (mg/dL)	213±131	116±77	0.019
Calcium (mg/dL)	8.1±0.9	8.1±0.7	0.912
Phosphorus (mg/dL)	5.6±1.6	4.3±1.3	0.028
Uric acid (mg/dL)	6.4±1.2	5.3±1.2	0.021
CRP (mg/dL)	1.1±1.3	2.9±2.8	0.041
Left Intraatrial Time (msn)	14.4±9.8	21.0±10.0	0.032
Right Intraatrial Time (msn)	12.7±10.0	15.0±6.4	0.116
Interatrial time (msn)	26.8±14.8	36.0±14.0	0.050

SP510 HEMODIAFILTRATION DOES NOT HAVE ADDITIONAL BENEFITS OVER HEMODIALYSIS ON ARTERIAL STIFFNESS, WAVE REFLECTIONS AND CENTRAL AORTIC PRESSURES

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Introduction and Aims: Previous studies evaluating impact of dialysis on arterial function never explored any potential effect of dialytic modality on arterial stiffness. This study includes comparative evaluation of hemodiafiltration versus hemodialysis on arterial cushioning function during first and second weekly dialysis sessions.
Methods: Twenty-four patients receiving hemodiafiltration and another 24 age- and sex-matched controls receiving hemodialysis were included. All patients were evaluated before and after first and second weekly dialysis sessions. Applanation tonometry of peripheral arteries was applied to determine aortic and brachial pulse wave velocity (PWV), as measures of arterial stiffness. Heart rate-adjusted augmentation index (AIx (75)) was calculated as measure of wave reflections.
Results: Hemodiafiltration and hemodialysis reduced AIx(75), but not aortic and brachial PWV in both dialysis sessions. Intradialytic reductions in AIx(75) did not differ between hemodiafiltration and hemodialysis in first (-9.5±1.6 vs -7.8±1.6%, p=0.679) and mid-week dialysis (-4.9±1.1 vs -4.5±1.2%, p=0.842). Changes in aortic and brachial PWV were similar in both dialytic modalities. Intradialytic reduction in AIx(75) was significantly higher during first than mid-week dialysis in hemodiafiltration and hemodialysis groups. In multivariate linear regression, predictors of intradialytic reduction in AIx(75) were changes in body weight (β=0.208, p<0.05), central aortic systolic BP (β=0.275, p<0.01) and ejection duration (β=0.547, p<0.001), but not dialytic modality (β=0.136, p=0.383).
Conclusions: This study showed that hemodiafiltration has similar effects with hemodialysis on wave reflections and stiffness. Degree of volume withdrawal is main determinant of intradialytic reduction in AIx(75) irrespective to dialytic modality.

SP511 PITAVASTATIN INCREASES HDL2 CHOLESTEROL LEVELS IN CHRONIC HEMODIALYSIS PATIENTS.

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Introduction and Aims: Chronic hemodialysis (HD) patients usually have lower plasma high-density lipoprotein (HDL)-cholesterol (C) and higher triglyceride (TG) levels than healthy subjects. Low HDL-C levels are associated with an increased risk of death in chronic HD patients. The aim of this study is to investigate the clinical characteristics and serum HDL subfractions of chronic HD patients, and investigate the effects of pitavastatin on HDL subfractions in chronic HD patients.
Methods: Protocol (1) We established a single precipitation method for the measurement of HDL2 and HDL3 [J Lipid Res.49:1130-1136, 2008]. Using this simple assay, we examined HDL subfractions in forty-five HD patients and ten healthy controls. Protocol (2) Eleven chronic HD patients were treated with pitavastatin at 1 mg/day for 4 weeks. Plasma levels of TG, low-density lipoprotein (LDL)-C, small dense LDL-C (sd-LDL-C), HDL-C, HDL2-C, HDL3-C were assayed.
Results: (1) LDL-C was significantly lower in the HD patients than in the healthy controls (85.9±31.5 vs. 110.2±39.7mg/dl, P<0.05). Sd-LDL-C was significantly lower in the HD patients than in the healthy controls (16.8±7.0 vs. 29.8±17.3mg/dl, P<0.01). HDL-C was significantly lower in the HD patients than in the controls (44.5±15.0 vs. 57.6±17.5mg/dl, P<0.05). HDL-C was significantly lower before HD than after HD (44.5±15.0 vs. 54.0±16.2mg/dl, P<0.01). HDL-apolipoprotein AI (apoAI) was significantly lower in the HD patients than in the controls (116.2±24.5 vs. 167.0 ±31.3mg/dl, P<0.01). HDL-apoAII was significantly lower in the HD patients than in the controls (22.0±4.3 vs. 35.0±5.8mg/dl, P<0.01). There was no significant change in HDL2-C levels between the HD patients and the controls (33.4±14.2 vs. 28.0±10.9mg/dl, ns). HDL3-C was significantly lower in the HD patients than in the controls (11.1 ±4.3 vs. 29.6±9.2mg/dl, P<0.01). HDL3-apoAI was significantly lower in the HD patients than in the controls (36.3±15.7 vs.93.8±19.2mg/dl, P<0.01). HDL3-apoAII was significantly lower in the HD patients than in the controls (12.7±3.8 vs. 28.4±6.2mg/dl, P<0.01). (2) LDL-C levels significantly decreased during pitavastatin treatment from 99.6±23.7 to 76.0±17.5 mg/dL (p<0.01). Sd-LDL-C levels significantly decreased during pitavastatin treatment from 22.8±13.0 to 17.3±11.7 mg/dL (p<0.01). LDL-TG levels changed from 19.3±6.9 to 17.0±4.8 mg/dL (ns). Serum apo B levels significantly decreased during pitavastatin treatment from 101.0±23.8 to 81.1±20.2 mg/dL (p<0.01). HDL-C levels changed from 40.3±13.6 to 41.9±10.2 mg/dL (ns). HDL2-C levels significantly increased during pitavastatin treatment from 27.9±9.9 to 30.8±7.6 mg/dL (p<0.05). HDL3-C levels significantly decreased during pitavastatin treatment from 12.4±4.9 to 11.0±3.5 mg/dL (p<0.05). HDL2-apo AI levels significantly increased during pitavastatin treatment from 81.9±14.8 to 90.1±12.1 mg/dL (p<0.05). HDL2-apoAII levels changed from 9.4±3.5 to 8.9±3.2 mg/dL (ns). HDL3-apo AI levels significantly decreased during pitavastatin treatment from 46.0±14.7 to 35.3±12.2 mg/dL (p<0.01).
Conclusions: Dyslipidemia in chronic HD patients means the abnormality of the quality and quantity in HDL-C. Pitavastatin increased HDL2-C and HDL2-apo AI levels in chronic HD patients. These data suggest that pitavastatin may restore the anti-atherogenic function of HDL particles in chronic HD patients.

SP512 PON-1 CARBAMYLATION IS INCREASED IN HIGH-DENSITY LIPOPROTEIN OF UREMIA PATIENTS

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Introduction and Aims: High-density lipoprotein (HDL) is an anti-atherosclerosis factor made up of apolipoproteins and associated enzymes. The anti-atherosclerosis effect of HDL is mainly via its reverse cholesterol transport (RCT), a mechanism bringing cholesterol from macrophage and peripheral cells to liver for excretion. HDL protein modifications will lead to HDL dysfunction. Protein carbamylation is the most common protein modification of uremia patients. Urea in equilibrates with cyanate will conjugate with amino acid especially lysine residue of serum proteins. Carbamylate proteins are then formed. PON-1 is a HDL enzyme with anti-oxidant activity, which can affect RCT. Decrease PON-1 activity is a risk factor of atherosclerosis in uremia patients. Whether PON-1 of uremia patients will be carbamylated or not is unknown. The aims of the study were to quantify the degree of PON-1 carbamylation in HDL of hemodialysis patients and to study its functions.
Methods: HDL was isolated from control healthy subjects and uremia patients receiving hemodialysis by ultracentrifuge. Sandwich ELISA and western blotting studies were used to compare the PON-1 carbamylation difference between HDL of hemodialysis and control subjects. PON-1 enzyme activity was determined by the rate

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of paraoxon hydrolysis. Anti-oxidant activity of PON-1 was examined by 2.7 dichlorofluoresceindiacetate (DCFH-DA) fluorescence change using RAW264.7 cells treated with both H_2O_2 and HDL.
Results: There were 12 hemodialysis and 12 control subjects included for study. Sandwich ELISA study results showed that total HDL carbamylation of hemodialysis patients was 2.85± 0.40 fold that of control (p<0.05) and PON-1 carbamylation was 1.39±0.07 fold higher in HDL of hemodialysis patients than in control subjects (p<0.05). Western blotting study was used to further prove the results. Total PON-1 protein expression in HDL of hemodialysis patients was only 0.75±0.04 fold that of HDL of control (p<0.05). The carbamylated PON-1 protein expression in HDL of hemodialysis patients was, however, 2.72±0.61 fold higher than that of control HDL (p<0.05). HDL PON-1 enzyme activity of hemodialysis patients was 0.749±0.028 fold that of control subjects (p<0.05). Using DCFA as fluorescence indicator, H_2O_2 can induce Raw264.7 cells florescence changes 11.0±0.6 fold. Control HDL can decrease H_20_2 induced fluorescence change to 5.8±0.3 fold, but HDL of hemodialysis patients can only decrease the H_2O_2 induced flurorescence to 8.6±0.6 fold. Anti-oxidant activity was significantly higher in control than hemodialysis HDL (p<0.001).
Conclusions: PON-1 in HDL of hemodialysis patients was carbamylated to an extent higher that of PON-1 in HDL of control healthy subjects. Enhanced HDL PON-1 carbamylation can decrease PON-1 enzymatic activity and its anti-oxidant ability.

SP513 ABDOMINAL AORTIC CALCIFICATIONS IN HEMODIALYSIS

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Introduction and Aims: Vascular calcifications are common in chronic uremia. In contrast to coronary calcifications, abdominal aorta calcifications (AAC) are less well documented. The objective of this study is to describe the prevalence and risk factors of CAA in a population of hemodialysis patients.
Methods: To assess the prevalence and risk factors of vascular calcifications, 51 hemodialysis patients underwent lateral abdominal X-ray. Grading AAC was evaluated at the anterior and the posterior walls adjacent to vertebrae L1-L4. A score ranging from 0 to 24 was then assigned. Antecedents, calcium and vitamin D intakes, blood pressure, BMI, and Kt/v were determined. Biological parameters studied were: calcium, phosphorus, Ca × P product, albumin, iPTH, 25OH vitamin D, alkaline phosphatase, hemoglobin, intact parathyroid hormone, total cholesterol, LDL, HDL and triglyceride.
Results: The AAC was found in 49% of cases. The calcium score ranged from 1 to 24. Severe calcifications (score > 6) were found in 40% of cases. Incidental discovery of abdominal aorta aneurysm was made in one patient. Compared with the group without CAA, patients with CAA were older (61,5 vs 51.8 years, p 0.002), had more cases of diabetes (13 vs 9), dyslipidemia (8 vs 2) and ischemic heart disease (8 vs 3) and were older in hemodialysis (107.5 vs 57.5 months, p 0.003). There is no significant difference between the two groups regarding serum calcium, phosphate, haemoglobin, lipid parameters and CRP. Logistic regression shows a significant correlation between AAC, age and vintage in hemodialysis.
Conclusions: Our study confirms the increased frequency of AAC in hemodialysis. The use of LAR is a reliable and an inexpensive screening solution for this complication. Risk factors are multiple and interlinked. Advanced age and vintage in hemodialysis are irreversible major risk factors especially when renal transplantation couldn't be achieved. Preventive strategy focusing on proper monitoring of mineral metabolism disorders and classical cardiovascular risk factors remains essential in earlier stages of chronic kidney disease to reduce morbidity and mortality associated with these calcifications.

SP514 CONCOMITANT ACIDOSIS AND MULTIPLE CARDIOVASCULAR DISEASES WITH SHORT HEMODIALYSIS VINTAGE ARE PROGNOSTIC FACTORS FOR EMERGENT ISCHEMIC COLITIS IN HEMODIALYSIS PATIENTS

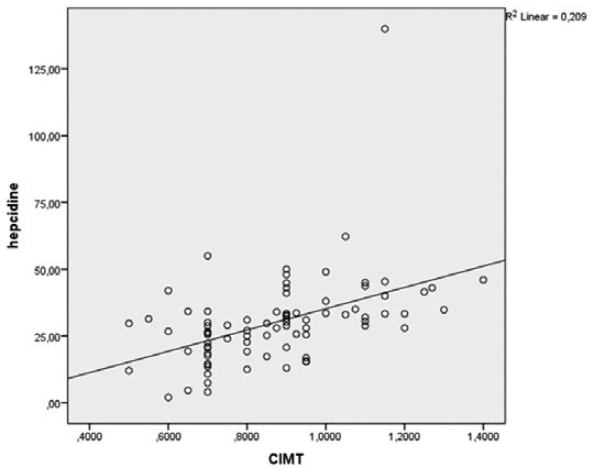
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Introduction and Aims: Gastrointestinal (GI) complications are frequent in patients with advanced CKD, and are responsible for substantial morbidity and mortality. Atherosclerosis has been emerged as a major disease for end-stage kidney disease, involving systemic vascular lesions. Recently atherosclerotic GI lesions, such as non-occlusion mesenteric ischemia (NOMI), have been known as life-threatening complications in chronic dialyzed subjects. In our institution, the emergency admission of dialysis patients with ischemic GI lesions increased annually. Thus we investigated retrospectively the clinical manifests and prognostic factors in ischemic colitis including NOMI among hemodialysis (HD) patients.
Methods: Forty-six HD patients (72+/-11 year old, HD vintage: 6.6 years, 45% of diabetes) admitted due to ischemic colitis for 5 years were submitted. All the patients showed symptoms of acute abdomen and admitted at emergency unit by ambulance. Nine of 46 (19%) patients were diagnosed as NOMI with angiography and/or enhanced CT. Out of 46, 26 were survived and 20 were dead in the hospital. Multiple regression analysis was performed to select the independent variables which influenced on mortality using stepwise variable selection method. Clinical characteristic and laboratory data considered to be associated with prognosis, which included age, diabetes mellitus, HD vintage, number of CVD (cerebral, coronary, cardiac, aortic and peripheral lesions), arterial blood pH, and hemoglobin level on admission, were subjected the model.
Results: Survived patients were significantly more frequently complicated with CVDs (2.4 vs 1.5, P<0.01). Compared with survived patients, dead patients showed significantly lower arterial blood pH (7.15 vs 7.34, p<0.01), higher hemoglobin level (11.3 vs 10.2 g/dl, P<0.02) on admission. There was no difference in age, HD vintage, presence of diabetes and surgical treatment between the groups. Multiple regression analysis revealed blood pH (p=0.008), number of complicated CVD (p=0.011) lesions and HD vintage (p=0.034) are independent prognostic factors. Age and hemoglobin level were not selected as an independent variable in the model.
Conclusions: Blood acidosis, increase in CVDs, and short H vintage were independent predictors of mortality in the hospital. Chronic HD patients complicated with multiple cardio-vascular diseases have high risk for life-threatening gastrointestinal ischemic lesions, even with short HD vintage. In addition, optimal management of anemia may be necessary to improve prognosis of ischemic GI emergency.

SP515 IS SERUM HEPCIDIN LEVEL AN INDICATOR OF ATHEROSCLEROSIS IN HAEMODIALYSIS PATIENTS?

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Introduction and Aims: Dysregulated iron metabolism has been suspected to be linked to anaemia of chronic disease and to cardiovascular disease (CVD). CVD is one of the majör causes of mortality and morbidity in dialysis patients. A recently discovered iron regulatory peptide, hepcidin, has been suspected to be one of the culprits for endothelial dysfunction via iron sequestration. In order to clarify the factors affecting atherosclerosis we evaluated the relationship between iron metabolism, carotid intima media thickness (CIMT) and risk factors for CVD in maintenance haemodialysis (MHD) patients.
Methods: A total of 82 MHD patients were recruited and the levels of iron parameters, hepcidin, CVD risk factors and CIMT were evaluated. CIMT was evaluated by using high-resolution B-mode ultrasonography. The level of serum hepcidin -25 was evaluated by using human hepcidin-25 ELISA kit.
Results: CIMT was significantly correlated with age(P<0,01, R= 0,33), alkaline phosphatase(P<0,01, R= 0,30) and hepcidin(P<0,01,R=0,46) but not with other iron parameters and CVD risk factors. According to multiple regression analysis age (β=0, 34), alkaline phosphatase(β=0,30) and hepcidin(0,36) were selected as the significant predictors of CIMT in MHD patients.
Conclusions: Serum levels of hepcidin is found to be associated with CIMT in MHD patients. Iron metabolism and accumulation may be associated with the development and/or progression of atherosclerosis.



SP515

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SP516 LOW 25-HYDROXY VITAMIN D, HIGH FIBROBLAST GROWTH FACTOR 23 AND ARTERIAL STIFFNESS IN HEMODIALYSIS PATIENTS WITH CHRONIC KIDNEY DISEASE: "THE CHICKEN OR EGG PHENOMENON"

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Introduction and Aims: Decreased vitamin D serum level was related to arterial stiffening, vascular calcification and high mortality in haemodialysis (HD) patients. We hypothesized the drugs used in renal osteodistrophy could have am impact on low vitamin D levels in dialysis patients. We anlaysed the influence of one years' cumulative calcium and vitamin D (paricalcitol and calcitriol) intake, FGF23 level on 25(OH)D3 levels and the impacts of these parameters on the change in annual pulse wave velocity (PWV) measurement results in maintainance hemodialyisis patients.
Methods: We included 117 patients (age: 52.4 ± 14.2 years, HD duration of 42.9±39.3 months). One years clinical data and laboratory were collected from the records. PWV was measured (PWV1) at the beginning of the study and after 12 months of follow-up (PWV2). Samples for FGF-23 and 25(OH)D3 were determined cross-sectionally. Patients were divided into two groups cccording to 25(OH)D3 levels: Insufficiency (group 1, 25(OH)D3 <30 ng/mL) and normal group (Group 2, 25(OH)D3 >30 ng/mL).
Results: Patients in group 1 (n:91) had significantly higher annual mean values of phosphorus, CaxP product and FGF-23 compared to group 2 (n:26) (p< 0.018, 0.044 and 0.046, respectively). Administered elementary calcium dose was significantly higher in group 1 than compared to group 2 (p<0.014). There was no significant difference in terms of mean equivalant dose of vitamin D receptor activator between two groups. Patients in Group 1 had higher PWV1 and PWV2 measurements compared to Group 2 (p<0.018 and 0.011). Serum levels of 25(OH)D3 were negatively correlated with mean phosphorus (r=−0.19, p=0.039) and mean administered elemantary calcium dose (r =−0.22, P = 0.017). On multivariate analysis, levels of 25 (OH)D3 were independently associated with the adjusted dose of elementary calcium (P < 0.002).
Conclusions: Low level of 25(OH)D3 is not only a primary risk factor for cardiovascular health but might occur as a result of high phosphorus level or high cumulative calcium intake. These factors are also known to insult an increase in FGF23. While targeting to control renal osteodistrophy and achieving a higher 25 (OH)D3 and lower FGF 23 for better outcome, better phosphorus control and minimum calcium supplementation should be the priority in the plan.

SP517 THE ROLE OF ADIPONECTIN/LEPTIN RATIO IN METABOLIC SYNDROME AND CARDIOVASCULAR RISK IN END STAGE RENAL DISEASE (ESRD) PATIENTS

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Introduction and Aims: Obesity and metabolic syndrome (MS) affect renal metabolism through mechanisms such as oxidative stress, inflammation and altered adipokines' levels, like adiponectin and leptin. In the general population hypoadiponectinemia and hyperleptinemia are related to cardiovascular complications. In the current study we investigated the association of adiponectin/leptin ratio with the MS factors and the healthy/metabolically obesity.
Methods: Adiponectin and leptin levels were measured in 65 ESRD patients (43 on hemodialysis and 22 on peritoneal dialysis, 35 male and 30 female, aged 45-83, mean time on renal replacement therapy 65.9 months) from the Nephrology Clinic of the University Hospital of Crete. The adiponectin/leptin ratio was calculated and then evaluated across the MS criteria, as defined by International Diabetes Federation. Furthermore, patients divided into four groups, such as Healthy Normal weight (without MS), Healthy Overweight/obese (without MS), Metabolically Normal weight and Metabolically Obese.
Results: The ratio of adiponectin/leptin decreased progressively with the increase in the number of metabolic syndrome criteria in all patients (p≤0.016). The effect persisted even when adiponectin/leptin ratio was adjusted for Fat Mass Index, sex and age of the participants (p<0.033). Additionally, an inverse correlation was determined between the adjusted ratio and clusters of the plethora of MS factors (rho=-0.350, p<0.004). The adiponectin/leptin ratio was also progressively decreased from Healthy Normal weight patients, to Metabolically Normal weight subjects, and then to Healthy Overweight/obese, while the lowest ratio was noticed in the Metabolically Obese patients (p≤0.002).
Conclusions: Our results show that adiponectin/leptin ratio can be a reliable predictive marker of cardiovascular risk in ESRD patients.

SP518 LOW SERUM URIC ACID LEVEL PREDICTS ALL-CAUSE AND CARDIOVASCULAR MORTALITY IN HEMODIALYSIS PATIENTS:5YEAR FOLLOW-UP ANALYSIS

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Introduction and Aims: Although elevated serum uric acid (UA) is associated with increased cardiovascular (CV) risk in the general population, the relationship between serum UA and mortality risk in patients on hemodialysis (HD) has been poorly investigated. Our study investigated the influence of serum UA levels on mortality in HD patients in a five year follow-up analysis.
Methods: We studied a cohort of 223 prevalent HD patients (mean age at beginning of HD 48.96±15.06 years, mean HD vintage 105.96±72.38 months, diabetes 16.6%) receiving thrice-weekly HD treatment. The mean values of minimum twelve serum UA measurements during the six months before follow-up were used for analysis. Patients were divided into two groups according to the median serum UA levels:a lower UA group (UA<410 μmmol/l) and a higher UA group (UA ≥410 μmol/L) and were prospectively followed up for 60 months.
Results: During the 5-year follow-up, 80 out of 223 patients (35.9%) had died, most from CV disease (70%). The mean serum UA level was 424.61±59.06 μmol/L (range 294- 619.8μmoml/L). The serum UA level of the survivors (431.99±58.34μmol/L) was higher than in patients who died of all-causes (411.43±58.39μmol/L) and CV causes (406.72±58.60μmol/L) and the difference was statistically significant (p=0.012; p=0.008). Patients with diabetes and cardiovascular disease had significantly lower serum UA than those without diabetes and cardiovascular disease (392.77±54.13 vs 431.15±58.02, p=0.000; 410.97±59.49 vs 437.19±56.02, p=0.000. High serum UA (UA≥410μmol/L) was associated with younger age, higher body mass index, hemoglobin, serum creatinine, albumin, serum phosphorus, blood urea nitrogen, and lower pulse pressure and left ventricular mass index. Kaplan-Meier analysis showed that all cause mortality (log rank, p=0.012) and CV mortality (log rank, p=0.008) were significantly higher in the lower serum UA group (<410 μmol/L), compared to that in the higher UA group (≥410 μmol/l).
Conclusions: This study showed that lower uric acid levels (UA<410μmol/L) were associated with higher risk of all-cause and CV mortality in the HD population. The higher uric acid concentration was associated with better nutritional and cardiovascular status, but these results are in contrast to published literature in the general population and should be the subject of future investigations.

SP519 ENDOTHELIAL DYSFUNCTION AND RISK FACTORS IN NON-DIABETIC PATIENTS WITH CHRONIC RENAL FAILURE

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Introduction and Aims: Endothelial dysfunction is accelerated in patients with end-stage renal failure but less is known about major risk factors such as hypertension, disorders of heart rate variability in patients with different stages of chronic renal failure (CRF).
Methods: In our study 89 non-diabetic patients with CRF defined as CrEDTA clearance <90 ml/min/1.73m^2 were included (mean 37.8 ml/min/1.73m^2, range from 5 to 87). We compared intima-media thickness (IMT) and brachial artery vasodilatation after occlusion using high-frequency ultrasound (US) in these patients with that in 42 control subjects without renal failure (25 were women, 17 men; mean age was 48.6 years). We also investigated the relationship of variables to renal clearance and to possible disorders of heart rate variability (HRV) risk factor in our patients. No difference in age sex between patients and control subjects was found.
Results: The IMT values (0.78 versus 0.60 mm; P<0.001 were higher in patient with CRF. More patients had disorders of heart rate variability (52.6% versus 18.5%; P<0.0001) and number of patients with brachial artery vasodilatation were also higher (P <0.002). In CRF patients flow-mediated response increased both brachial artery diameter and flow, hyperaemic flow-mediated response during supine position and Head-Up Tilt test to stimulate sympatic stimulation after 5, 15, 30 second showed a reduced brachial artery diameter and flow compared to subjects white normal renal function. The daily value of SDNNi, characterizing the total HRV, was on average by 41.1% lower than in the subjects without renal failure (P < 0.001), rMSSD, was 42.64% lower in patients with hypertension than in those without, pNN50 was reduced by 70,45% compared to without renal failure (p < 0.001), the rate of daily LF / HF was higher by an average of 49.34% in patients with hypertension noted the predominance of sympathetic activity. There was significant negative correlation between IMT and CrEDTA clearance (r=-0.348; P<0.0001), between presence of HRV (r=-0.245; P<0.001). With multiple regression analysis relationship between IMT and CrEDTA clearance (P<0.0001) and presence of hypertension (P<0.005) was found.
Conclusions: In conclusion, in CRF patients the HUT-test, as sympatic stimulation, seemed to influence less the endothelial reactivity. Our results showed a decrease of

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protective endothelial response in CRF patients, hypertension, disorders of heart rate variability may suggest a potential explanation in the increased cardiovascular mortality in this population.

SP520 HIGH CALCIUM LEVEL IS AN INDEPENDENT RISK FACTOR FOR VASCULAR CALCIFICATION IN HEMODIALYSIS PATIENTS

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Introduction and Aims: Vascular calcification (VC) is an important component of chronic kidney disease - mineral bone disorder (CKD-MBD) associated to adverse hard outcomes, such as mortality. The aims of this study were to assess (i) the prevalence of VC in a cohort of hemodialysis (HD) patients and (ii) the risk factors associated to this condition.
Methods: In this cohort study, 81 HD (age: 57.2 ± 13.8 years; 61% males; 50% of diabetics; length on HD: 18 ± 8 months) patients were submitted to simple X-rays of hands and hips to evaluate VC (Adragao score) and to laboratorial measurements (calcium, phosphate, alkaline phosphatase, 25-OH-vitamin D, intact-PTH, albumin and lipid profile).
Results: VC was present in 45% of the patients. Patients with VC were older (62±10 vs 53±19 yrs; p=0.002), most of them were diabetics (64%; p=0.01) and had significantly higher levels of calcium (9.2±0.9 vs 8.7±0.6 mg/dL; p=0.005) when compared to patients without VC. Notably, in patients with calcium levels above the median (8.9 mg/dL), a value below the upper limit of the reference range (8.4 - 10.2 mg/dL) there was a significantly higher prevalence of VC (58%; p=0.04). Calcification score was directly associated with age (r=0.27;p=0.01) and calcium levels (r=0.27;p=0.01) and inversely associated with iPTH (r=-0.22;p=0.04), total cholesterol (r=-0.22;p=0.04) and albumin (r=-0.21;p=0.05) levels. Multivariate binary logistic regression analysis showed that VC was independently associated with calcium (β coefficient= 2.36; p=0.03; 95% confidence interval= 0.393 - 4.771) and diabetes status (β coefficient=3.06; p=0.05; 95% confidence interval= 0.566 - 3.903).
Conclusions: VC was highly prevalent in this population. In conjunction with traditional risk factors, such as age and diabetes status, and mineral metabolism derangement, inflammation and altered lipid metabolism may also play a part on VC development. The independent association between VC and calcium reinforces the concept that therapeutic strategies to control CKD-MBD should avoid calcium overload and suggests that calcium levels should be kept below the upper limit of the reference range.

SP521 DOES NEUTROPHIL TO LYMPHOCYTE RATIO TELL SOMETHING ABOUT ATHEROSCLEROSIS IN HAEMODIALYSIS PATIENTS?

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Introduction and Aims: Atherosclerotic cardiovascular disease (CVD) is an important cause of mortality and morbidity in end-stage renal disease (ESRD) patients. In chronic kidney disease cardiovascular mortality is 20-40 times higher than normal population. Atherosclerotic changes in carotid arteries show the extend of systemic atherosclerosis not only in general population also in chronic renal disease patients. CIMT which is a reliable indicator of both systemic and coronary atherosclerosis can be measured by ultrasonography. Inflammation plays a role in pathogenesis of atherosclerosis. White blood cell count is told to be an independent predictor of cardiovascular disease. Neutrophil to lymphocyte ratio (N/L) may show the patients who has higher cardiovascular risk. The aim of this study was to detect the relationship between N/L, C-reactive protein and CIMT as an indicator of atherosclerosis.
Methods: 75 patients (42 female, 33 male) who were on maintenance haemodialysis treatment at least for 6 months were included in this study. Patients who had an active infection, known malignancy and a cardiovascular disease were excluded. CIMT was measured by using B mode ultrasonography. Patients' laboratory parameters at the time of inclusion were noted and neutrophil to lymphocyte ratio was calculated.
Results: Mean age was 58.07±16.23 and 44% of the patients were male. Mean dialysis vintage was 79, 27±67, 06 months. In correlation analysis CIMT was found to be positively correlated with age, CRP and N/L (respectively r=, 380 P=, 001; r=, 255 P=, 005; r=, 283 P=, 014). By regression analysis age (β=, 527, p=0, 00), CRP (β=, 419, p=0,001) and N/L (β=, 419, p=0,001) were found to be independent determinants of CIMT.
Conclusions: NLO was found to be independently correlated with CIMT in patients on maintenance haemodialysis and may be used in cardiovascular risk assessment in clinical practice.

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