**CARDIOVASCULAR COMPLICATIONS IN CKD 5D**

**MP451**

**THE ASSOCIATION OF KDIGO SUGGESTIONS FOR MINERAL AND BONE DISORDER MARKERS ACHIEVEMENT AND DIFFERENT ANKLEBRACHIAL SYSTOLIC PRESSURE INDEXES IN OUR HEMODIALYSIS PATIENTS**

Sasha Gjulsen1, Slavko Tošhev2, Lada Trajceska1, Svetlana Pavleska1, Ojusen Selim3, Paulina Dzcevova1 and Aleksandar Shikole1

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Introduction and Aims: The aim of this study was to evaluate the association between the attainment of KDIGO suggestions for mineral and bone disorder (MBD) markers and the presence of various ankle brachial systolic pressure index (ABI) levels in our hemodialysis (HD) patients.

Methods: In a cross-sectional study we analyzed 137 patients (85 male; mean age 55.8 ±14.2 years) dialyzed on average for 91.3±54.7 months. First, we evaluated the presence of peripheral arterial disease (PAD) (ABI lower than 0.9) and mediadorsus (ABI higher than 1.3) using ABI measurements. In addition, the serum levels and the proportion of the KDIGO guideline achieved ranges for MBD markers of the last 12 months recordings between the groups of patients with various ABI (N=58) groups with normal 0.9-1.3 ABI, H=group with high ABI levels (ABI ≥ 1.3), and L=group with low ABI ≤ (0.9) levels were compared.

Results: In total 1294 data for corrected serum calcium (Ca), 1266 data for serum phosphate (P), 1244 data for Ca × P product and 224 data for serum intact parathyroid hormone (iPTH) were analyzed. There was no significant difference in any of the serum MBD marker levels between the groups: Ca (2.88±0.11; 2.34±0.19; 2.38±0.26 mmol/L), P (1.38±0.37; 1.48±0.52; 1.59±0.47 mmol/L), Ca × P product (3.23±0.89; 3.48±1.06; 3.73±1.09 mmol/L) and iPTH (146±1.12±6; 138±8±241; 138±172.3 pg/ ml) in N, H and L group, respectively. In contrast, patients with normal range ABI (n=59) had significantly higher percentages of attained KDIGO recommended levels for corrected serum Ca (389/557; 68.9%) in comparison with patients (n=70; 53.1%) with QTc interval > 430 (40.8 ±32.3) ms had higher percentages of attained KDIGO recommended levels for corrected serum Ca (442/641; 68.9%) vs 309/689; 44.8%) serum P (383/617; 62.1% vs 235/693; 33.9%) and serum Ca × P product (364/608; 59.8% vs 274/687; 79.8%). On the other hand, there was no difference in percentages of the attained KDIGO recommended levels for serum iPTH between the groups of patients with various QT (72/112; 63.6% vs 79/142; 55.6%) and QTc interval (76/118; 64.4% vs 75/136; 55.1%) duration.

Conclusions: HD patients with a higher percentage of achieved serum Ca and P within the KDIGO suggested levels have shorter post HD QT interval. The greater prevention of cardiac arrhytmias and sudden death in HD patients probably could be managed if a higher proportion of the recommended levels for serum Ca and P are achieved.

**MP452**

**THE RELATIONSHIP BETWEEN KDIGO SUGGESTIONS FOR BONE AND MINERAL DISORDER MARKERS ATTAINMENT AND QT INTERVAL (ECG) DURATION IN OUR HEMODIALYSIS PATIENTS**

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Introduction and Aims: Hemodialysis (HD) patients may be at greater risk of cardiac arrhythmias and sudden death in post-HD period because of the increased QT duration on electrocardiograms (ECG). The aim of this study was to compare the percentages of the attained KDIGO suggested levels for mineral and bone disorder (MBD) markers in our HD patients with different values of the post-HD recorded QT interval duration.

Methods: In a cross-sectional study on 132 HD patients (78 male; mean age 55.8±24.1 years; HD duration 90.6±61.4 months) primarily we evaluated QT interval duration (calculated from the post-HD recorded 12-lead ECG) and stratified the cohort according to the variable of QT duration in two equal groups at a cut off level of 370 ms for QT and 430 ms for corrected QT (QTc) interval. Then, the proportion of the KDIGO guidelines achieved MBD markers (taken as average of the last 12 months measurements of corrected serum calcium (Ca) (1301 data), serum phosphate (P) (1310 data), Ca × P product (1295 data) and intact parathyroid hormone (iPTH) (254 data)) were compared among the groups of patients with different QT and QTc interval duration.

Results: The patients (n=59) with QT interval < 370 (353.7±19.6) ms in comparison with other patients (n=73; 55.3%) with QT interval > 370 (388±28.3) ms had significantly higher percentages of attained KDIGO recommended levels for corrected serum Ca (390/574; 67.9% vs 312/727; 42.9%), serum P (355/583; 60.9% vs 232/727; 31.9%) and serum Ca × P product (336/571; 58.8% vs 267/724; 36.8%). Similarly, the same pattern of significance was obtained when the groups with different QTc interval duration were compared. Namely, the patients (n=62) with QTc interval < 430 (414.5 ±25.5) ms in comparison with patients (n=70; 53.1%) with QTc interval > 430 (400.8 ±32.3) ms had higher percentages of attained KDIGO recommended levels for corrected serum Ca (442/641; 68.9% vs 309/689; 44.8%) serum P (383/617; 62.1% vs 235/693; 33.9%) and serum Ca × P product (364/608; 59.8% vs 274/687; 79.8%). On the other hand, there was no difference in percentages of the attained KDIGO recommended levels for serum iPTH between the groups of patients with various QT (72/112; 63.6% vs 79/142; 55.6%) and QTc interval (76/118; 64.4% vs 75/136; 55.1%) duration.

Conclusions: HD patients with a higher percentage of achieved serum Ca and P within the KDIGO suggested levels have shorter post HD QT interval. The greater prevention of cardiac arrhythmias and sudden death in HD patients probably could be managed if a higher proportion of the recommended levels for serum Ca and P are achieved.

**MP453**

**EVALUATION OF ARTERIAL STIFFNESS WITH PLASMA GGT LEVELS AND PULSE WAVE VELOCITY MEASUREMENT IN PATIENTS WITH FMF**

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Introduction and Aims: Pulse wave velocity (PWV) is a noninvasive ultrasound technique used to evaluate the arterial elasticity, which is an early indicator of atherosclerosis. Lately, GGT is being thought as a determinant of arterial stiffness (AS). In this study, we aimed to evaluate the relationship between the GGT levels and AS with pulse wave velocity in patients with Familiar Mediterranean fever (FMF).

Methods: The study was performed on 100 patients (60 patients with FMF and 40 healthy volunteers). The duration of FMF, the time and dosage of colchicine treatment were recorded. Genetic analysis of the patients were performed. AS was assessed by PWV and after the measurement of PWV; the presence of AS was determined.

Results: Plasma GGT levels, PWV and AS frequency were significantly higher in patients with FMF compared with the control group (p<0,001), (p<0,001), (p=0,004) respectively. In the correlation analysis, PWV and AS were positively correlated with being FMF (r = 0.349, p <0.001); (r = 0.435, p <0.001). The FMF duration and being FMF (r = 0.349, p <0.001); (r = 0.435, p <0.001). The FMF duration and being

Conclusions: In this study, it was found that, increased PWV and GGT values in FMF patients may show arterial stiffness. These patients can be followed closely with PWV and easily with GGT as an early indicator of atherosclerosis. So, the cardiovascular risk can be determined in early stages of the disease and it can be possible to take necessary precautions.

**MP454**

**ARTERIAL STIFFNESS, FITNESS SCORE, MUSCLE STRENGTH AND BODY COMPOSITION INTERRELATIONS IN A CHRONIC HEMODIALYSED POPULATION**

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Introduction and Aims: Cardiovascular risk factors such as arterial stiffness, obesity and low physical activity are highly prevalent in patients undergoing long-term haemodialysis (HD). The AIM of our study was to analyse the relationship between body composition, pre-dialysis blood chemistries, lower limbs muscle strength and arterial stiffness in a poorly fit population of chronic haemodialysis patients.

Methods: Body composition and fitness score were measured by multifrequency bioimpedance (InBody270 analyzer); lower limbs muscle strength was quantified with the use of Myostest PBO system and arterial stiffness was assessed by the measurement of aortic Pulse Wave Velocity (PWV=ao) and Aortic Augmentation Index (Aix) using
Conclusions: In MHD patients, there was a high incidence of cardiovascular disease. Serum phosphatase, iPTH, FGF-23 and Fetuin-A were quantified by enzyme-linked immunosorbent assay (ELISA). Coronary artery calcification score was obtained by CT scan of coronary artery; Intima-media thickness of carotid artery was determined with color Doppler B ultrasound instrument.

**Results:** 64 patients, including 30 males and 34 females were enrolled. Mean age was 60 ± 11.3 years, and the mean dialysis age was 6.8 ± 2.9 years. Among them, 27 cases (42.19%) had cardiovascular disease and 37 cases (57.81%) on dialysis. (2) In a cardiovascular disease group, the age, CACS, IMT, BMI, dialysis age and serum FGF-23, MGP, P, Ca×P product and iPTH were significantly higher than non-cardiovascular disease group. CACS, dialysis age, iPTH, serum FGF-23, Fetuin-A, P and iPTH were found to be independent variables that influenced the occurrence of cardiovascular disease by logistic regression analysis. (3) The ROC curves for serum FGF-23 and Fetuin-A were useful for identifying cardiovascular disease in MHD patients. Excessive serum FGF-23 levels and low serum Fetuin-A were predictive biomarkers for the occurrence of cardiovascular disease in MHD patients.

**SCLEROSIS LEVELS AND CLINICAL OUTCOMES IN INCIDENT DIALYSIS PATIENTS: RESULTS FROM THE NECOSAD STUDY**

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**Introduction and Aims:** Serum sclerostin is a Wnt pathway antagonist produced by osteocytes which downregulates osteoblast activity and bone turnover. Sclerostin offers interesting perspectives as novel biomarker for CKD-MBD since it may link bone and vascular disease. The present study tests the hypothesis that baseline sclerostin levels early after initiation of dialysis may be associated with future morbidity and mortality in incident dialysis patients.

**Methods:** We analyzed data from a prospective cohort study of incident dialysis patients in the Netherlands (NECOSAD). All patients for whom laboratory analysis for sclerostin was available at three months after initiation of dialysis (baseline) were included in the current analysis (n = 362, mean age = 63.14 yrs, 59% males, 93% hemodialysis, 25% diabetics). Serum sclerostin was assayed by ELISA (TECO® Sclerostin ELISA Kit). We stratified patients according to the median of serum sclerostin (1.10 ng/mL) into two groups for statistical analysis (high versus low sclerostin).

**Results:** Cumulative mortality curves were calculated using Kaplan-Meier analysis for all-cause mortality and we calculated Cox proportional hazard ratios (HR) with 95% confidence intervals (95% CI) to assess the impact of sclerostin upon mortality. **Results:** Median serum sclerostin levels were similar between PD patients (1.12 ng/mL) compared to HD pts (1.10 ng/mL) as well as between diabetics versus non-diabetics (1.10 vs 1.12 ng/mL). Median sclerostin was lower in females as compared to males. There was a negative correlation to PTH levels (Spearman correlation coefficient r = -0.22 ± 0.001) and alkaline phosphatase (r = -0.19, p < 0.001) at baseline in the entire cohort. After 3 yrs of FU, 31% of the patients had died. After adjustments for potential confounders including age, sex, dialysis modality and primary kidney disease, there was no significant difference in terms of survival between the two groups with a trend for better survival for those with higher serum sclerostin (HR 0.79, 95% CI 0.54 to 1.16, high versus low sclerostin).

**Conclusions:** Serum sclerostin levels in incident dialysis patients were negatively correlated to biomarkers of bone metabolism (PTH, BAP) supporting its role as bone-suppressive factor also in dialysis patients. In the NECOSAD cohort, there was a trend for improved survival over 3 yrs with higher baseline serum sclerostin levels at three months after initiation of dialysis.

**MP456**

**THE EFFECT OF SERUM FGF-23, FETUIN-A AND MGP IN CARDIOVASCULAR DISEASE IN MAINTENANCE HEMODIALYSIS PATIENTS**

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**Introduction and Aims:** To explore the role and the predictive value of serum FGF-23, MGP and Fetuin-A in cardiovascular disease in maintenance hemodialysis patients.

**Methods:** 64 cases of maintenance hemodialysis patients recruited into our study were diagnosed with end-stage renal disease in our hospital between February 2011 and February 2012. Basic clinical information and relevant laboratory indices were collected in our study. At the same time, the serum of all the patients were preserved which downregulates osteoblast activity and bone turnover. Sclerostin offers interesting perspectives as novel biomarker for CKD-MBD since it may link bone and vascular disease. The present study tests the hypothesis that baseline sclerostin levels early after initiation of dialysis may be associated with future morbidity and mortality in incident dialysis patients.

**Results:** Statistical analysis were performed using GraphPad Prism version 5 software. *p* < 0.05 was considered statistically significant. Data are presented as N (%) or mean ± SD; iPTH, intact parathyroid hormone; WHR, waist-to-hip ratio; PP, pulse pressure; SBPao, systolic blood pressure of aorta.

<table>
<thead>
<tr>
<th>Abnormality</th>
<th>Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium-phosphate product</td>
<td>3.55 ± 1.25</td>
</tr>
<tr>
<td>iPTH</td>
<td>1.16 ± 0.18</td>
</tr>
<tr>
<td>Soft lean mass (Kg)</td>
<td>51.2 ± 10.6</td>
</tr>
<tr>
<td>PWVao(m/s)</td>
<td>9.5 ± 1.5</td>
</tr>
<tr>
<td>Aix (aortic)</td>
<td>41.3 ± 13.6</td>
</tr>
<tr>
<td>PP (mmHg)</td>
<td>74.7 ± 12.7</td>
</tr>
<tr>
<td>SBPao (mmHg)</td>
<td>149.6 ± 62.0</td>
</tr>
</tbody>
</table>

**Data are presented as N (%) or mean ± SD; iPTH, intact parathyroid hormone; WHR, waist-to-hip ratio; PP, pulse pressure; SBPao, systolic blood pressure of aorta.**

**Conclusions:** Serum sclerostin levels were associated with aortic valve calcification in prevalent haemodialysis patients.

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**Introduction and Aims:** Sclerostin is a protein expressed by osteocytes and has been shown to be a good predictor for bone formation in patients with chronic kidney disease. Sclerostin was only recently identified in the subendothelial layer of the human aortic intima, suggesting a possible role in the pathogenesis of aortic calcification. The aim of this study was to evaluate the relationship between serum sclerostin levels and aortic valve calcification in prevalent haemodialysis patients.

**Methods:** 101 patients (48 females and 53 males, mean age: 59±12 years, mean haemodialysis vintage: 56±28 months) were included in a cross-sectional study. Serum sclerostin levels were measured by ELISA (R&D Systems, Minneapolis, MN). All patients underwent unenhanced, electrocardiography triggered 3D-source computed tomography of the heart.

**Results:** Serum sclerostin levels were measured by ELISA (R&D Systems, Minneapolis, MN). All patients underwent unenhanced, electrocardiography triggered 3D-source computed tomography of the heart.

**Conclusions:** Patients with aortic valve calcification had significantly higher serum sclerostin levels as compared to patients with no calcified aortic valves (2813±1367 vs 1362±1190 pg/mL, p < 0.001). The patients are grouped according to tertiles of serum sclerostin levels as follows: 1st tertile: serum sclerostin levels ≤370 pg/mL, 2nd tertile: 370≤serum sclerostin levels<2282 pg/mL, 3rd tertile: serum sclerostin ≥2282 pg/mL. The frequencies of aortic valve calcification were 33% in 35 cases, respectively (p<0.001 for the trend). In the multivariable regression analysis, age (β=0.46, p<0.015) and serum sclerostin levels (B=0.35, p=0.044) were independent factors for aortic valve calcification.
Conclusions: Further studies are needed to identify sclerosin as a pathogenetic factor or a suitable biomarker or a therapeutic target for aortic valve calcification in maintenance haemodialysis population.

**THE CARDIOVASCULAR EFFECTS OF CINACALCET IN HEMODIALYSIS PATIENTS WITH SECONDARY HYPERPARATHYROIDISM**

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**Introduction and Aims:** Secondary hyperparathyroidism (SHPT) in patients on haemodialysis is strongly associated with cardiovascular morbidity and mortality. Treatment of SHPT with cinacalcet decreases circulating parathyroid hormone (PTH) concentrations and lowers serum calcium and phosphorus concentrations. Therefore, we investigated the cardiovascular effects of cinacalcet in haemodialysis patients with SHPT.

**Methods:** We studied 12 hemodialysis patients with SHPT (serum intact PTH (iPTH) >300pg/ml). The study consisted of three phases: an initial run-in period of 16 weeks, including a wash-out period of four weeks (pre-treatment), a cinacalcet treatment period of 20 weeks (treatment), and a 20-week follow-up after suspension of cinacalcet treatment (post-treatment).

**Results:** Cinacalcet significantly decreased serum iPTH (P<0.01) and enhanced cardio-ankle vascular index (P<0.05) with cinacalcet treatment. Moreover, cinacalcet significantly improved diastolic E/e’ function (P<0.05) and the left ventricular mass index (P=0.04). Cinacalcet also increased serum NOx (P<0.05) and decreased serum isoprostane (P<0.05) and soluble intercellular adhesion molecule-1 concentrations (P<0.05). All of these values had returned to their pre-treatment concentrations at the end of post-treatment.

**Conclusions:** The addition of a calcimimetic cinacalcet ameliorates vascular endothelial dysfunction and cardiac diastolic dysfunction and hypertrophy by increasing nitric oxide production and decreasing oxidative stress in patients on haemodialysis with SHPT.

**THE INFLUENCE OF CALCITRIOL TREATMENT ON CIRCULATING SOLUBLE RECEPTOR OF ADVANCED GLYCOATION END PRODUCT (S-RAGE), S100A12 (EN-RAGE) IN HEMODIALYSIS PATIENTS WITH SECONDARY HYPERPARATHYROIDISM**

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**Introduction and Aims:** Hemodialysis (HD) patients with secondary hyperparathyroidism (SHP) suffered from inflammation and vascular complication. The receptor for advanced glycation end products (RAGE) has emerged as a central regulator for vascular inflammation and atherosclerosis. The soluble RAGE (S-RAGE) and extracellular RAGE-binding protein (EN-RAGE) exerts respectively an anti-inflammatory and a pro-inflammatory ligand for RAGE on the development of atherosclerotic vascular complications. However, the influence of vitamin D treatment on RAGEs has been unknown. This study evaluated the influence of vitamin D therapy on RAGEs and inflammatory markers in HD patients with SHP.

**Methods:** We designed prospective study to investigate calcitriol treatment in HD patients with SHP affects inflammatory response and RAGES. Fifty one long-term HD patients (mean age 52.6 ± 14.7, 26 males and 25 females) were enrolled in the study to receive calcitriol treatment. We evaluated changes log-transformed value of S-RAGE, EN-RAGE and at the end of one year. Specifically, we calculated the QT max and QTd. Also, in all the participants carotid intimae media thickness(CIMT) was measured Serum samples were collected from patients on HD and healthy controls(age39.9±7.1yrs) were evaluated for ED by using high resolution Doppler ultrasound of brachial artery. Also 25(OH)D3 deficiency patients with CKD have higher incidence of cardiovascular events due to the oxidative stress and endothelial dysfunction (ED).Our aim in this study, was to investigate the effect of25(OH)D3 deficiency and supplementation on endothelial dysfunction in patients with CKD who are treated with dialysis.

**Conclusions:** Twenty-nine dialysis patients and 20 healthy controls were included in the present study. Twenty-nine uremic patients(age45.8±11.7 yrs) were evaluated for ED by using high resolution Doppler ultrasound of brachial artery. Also 25(OH)D3 deficiency patients(30 mmol/L) with CKD(n=17) and healthy controls(n=8) were evaluated for ED, before and after 8 weeks of oral calcitriol(50,000 units) medication. Reactive hyperemia following sublingual glyceril trinitrate(GTN). Also, in all the participant carotid intima media thickness(CIMT) was measured Serum samples from patients and healthy controls were examined in terms of 25(OH)D3, iPTH, other biochemical laboratory tests. Also, the same measurements were performed before and after 8 weeks of oral calcitriol medication in 25(OH)D3 deficiency patients with CKD and healthy controls (<30 mmol/L).

**Introduction and Aims:** Cardiovascular event are high in chronic kidney disease compared to the general population. In patients with CKD, 25-hydroxyvitamin D3 (25 (OH)D3) low level is known. 25(OH)D3 deficiency patients with CKD have higher incidence of cardiovascular events due to the oxidative stress and endothelial dysfunction (ED).Our aim in this study, was to investigate the effect of25(OH)D3 deficiency and supplementation on endothelial dysfunction in patients with CKD who are treated with dialysis.

**Methods:** Twenty-nine dialysis patients and 20 healthy controls were included in the present study. Twenty-nine uremic patients(age45.8±11.7 yrs) were evaluated for ED by using high resolution Doppler ultrasound of brachial artery. Also 25(OH)D3 deficiency patients(30 mmol/L) with CKD(n=17) and healthy controls(n=8) were evaluated for ED, before and after 8 weeks of oral calcitriol(50,000 units) medication. Reactive hyperemia following 5 minutes forearm ischemia was accepted as endothelium-dependent vasodilation flow mediated dilation (FMD) and compared to endothelium-independent vasodilation in response to sublingual glyceril trinitrate(GTN). Also, in all the participant carotid intima media thickness(CIMT) was measured Serum samples from patients and healthy controls were examined in terms of 25(OH)D3, iPTH, other biochemical laboratory tests. Also, the same measurements were performed before and after 8 weeks of oral calcitriol medication in 25(OH)D3 deficiency patients with CKD and healthy controls (<30 mmol/L).

**Results:** The average 25(OH)D3 levels in control and dialysis groups were 34.26±8.77 nmol/l, 30.01±13.4 nmol/l, respectively. Patients on dialysis had a lower FMD% of 6.4±5.49 versus 15.99±8.19 and GTN of 13.02±6.5 versus 25.48±12.98 of the controls. Level of p<0.05 Patients on dialysis had higher CIMT left of 0.79±0.15 versus 0.60±0.09 and right 0.78±0.14 versus 0.59±0.09 than the controls. Level of p<0.05. The lowest 25
**MP462 Cox regression models to predict all-cause and cardiovascular mortality.**

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>All-cause mortality</th>
<th></th>
<th>All-cause mortality</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>HR (95% CI)</td>
<td>P</td>
<td>HR (95% CI)</td>
</tr>
<tr>
<td>Age, years</td>
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<td>0.97 (0.92-1.03)</td>
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<td>GFG-23, RU/mL</td>
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<td>1.00 (0.99-1.00)</td>
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<td>OPG, pmol/L</td>
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<td>0.2</td>
<td>0.96 (0.82-1.13)</td>
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<td>CaSc, 100 Agatstone units*</td>
<td>1.04 (1.005-1.07)</td>
<td>0.02</td>
<td>1.06 (1.02-1.11)</td>
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</tbody>
</table>

*In case of CaSc HR for the change of 100 Agatstone units is given.

**MP463 Simple correlations of selected variables with CaSc.**

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Spearman correlation coefficient</th>
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<tr>
<td>Age</td>
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<tr>
<td>Dialysis therapy duration</td>
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<tr>
<td>Ca</td>
<td>0.23</td>
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<tr>
<td>Pi</td>
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<td>Ca x Pi</td>
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<td>FGF-23</td>
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<td>OPG</td>
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<td>OC</td>
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<td>OCN</td>
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<td>0.8</td>
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</tbody>
</table>

**MP464 CALCULUS SCORING AS A NON-INVASIVE, SIGNIFICANT PREDICTOR OF MORTALITY IN DIALYSIS PATIENTS**

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**Introduction and Aims:** The aim of the study was to evaluate factors influencing all-cause and cardiovascular (CV) mortality in a group of peritoneal dialysis (PD) patients during a six year observation period.

**Methods:** The study included 55 patients (25 women, 30 men; mean age of 53 +/- 13 years) treated with PD for a median period of 24 months. Coronary arteries calcification score (CaSc) was measured using multi-row spiral computed tomography (MSCT). The concentrations: osteocalcin (OC), osteoprotegerin (OPG), osteopontin (OPN), fibroblast growth factor 23 (FGF-23), iPTH, total calcium (Ca) and phosphates (Pi) were measured. The data on mortality were collected over a 6 years period.

**Results:** During the six year observation period, 22 patients died (all-cause mortality), including 17 due to CV causes. Median overall survival on PD was 37 months. CaSc was a significant predictor of all-cause and CV mortality in simple analysis (HR=1.03 increase in CaSc, 95% CI: 1.005-1.07, p=0.02). Correlations between CaSc and serum sclerostin levels (r=0.394, p=0.004), albumin (r=-0.471, p=0.004) and age (r=0.390, p=0.006) were noted. A negative but insignificant correlation was obtained between serum 25-hydroxy D3 levels and CaSc (r=-0.12, p=0.40). Multivariable-adjusted regression analyses revealed that increased serum sclerostin concentrations were independently associated with increased CaSc (21.8% increase per 1 SD increase in sclerostin concentration, p=0.04). On the CaSc measurement, serum sclerostin levels were positively correlated with CaSc (r=0.439, p=0.0001) while serum 25-hydroxy D3 levels were negatively correlated (r=-0.36, p=0.002).

**Conclusions:** Osteoprotegerin, FGF-23 concentration and age influenced the severity of coronary arteries calcification score. CaSc is a significant predictor of all-cause and CV mortality in the dialysis patient population.

**MP464 INFLUENCE OF HYDRATION STATUS ON ARTERIAL STIFFNESS IN HEMODIALYSIS PATIENTS**

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**Introduction and Aims:** Cardiovascular(CV) complications continue to be the leading cause of death in hemodialysis (HD) patients (pts). In this population, both Aortic stiffness (assessed by carotid-femoral pulse wave velocity, PWV) and a Fluid Overload (FO) have been associated with increased CV mortality. In this study we evaluated the influence of hydration status on PWV and FO in HD pts.

**Methods:** We studied 63 prevalent pts (age=57±15; mean time on HD =61±15 months; women 33%; DBT=22%) Both PWV and PWVb data were collected in a non-invasive fashion. The PWV data were recorded within 30 days of the BIS measurement in all cases. The Pearson correlation coefficient was used to establish the correlation of PWV and PWVb with age (years),time on HD, blood pressure(BP) Systolic (Sys) and Diastolic(Dia),presence of Diabetes(DBT) and hydration status parameters delivered by BIS (BIS–TBW(L),ECW(L),ECW(ECW relation(E))/OH(L) and Rel OH %). Pts were further divided into a high PWVb group and a low PWVb group based on the median PWVb values. To compare the groups we used ANOVA and comparison of proportions.Values are expressed as mean(standard deviation).

**Results:** There was a significant correlation between PWV and age(0.47),E/I(0.54),BP Sys(0.37),DBT(0.36) and Rel OH % (0.32). To avoid the effect of VA on PWVb we selected the measurement of PWVb in arms without history of VA. The PWVb of this subpopulation(n=43) showed correlation with Rel OH % (0.50),BPSys(0.42) and E/I.
MP464

HIGH GLUCOSE DOES NOT MODULATE THE FORMATION OF VASCULAR CALCIFICATION IN EXPERIMENTAL UREMIC RATS

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Introduction and Aims: Vascular calcification is highly prevalent in patients with chronic kidney disease and diabetes, and is a risk factor for cardiovascular disease and mortality. Results of previous studies showed that high phosphate-induced phenotypic switching of vascular smooth muscle cells (SMCs) into osteogenic cells plays a critical role in the calcification process.

Methods: We examined whether glucose concentration affects high phosphate-induced SMC phenotypic switching and calcification in adenine-fed uremic rats and in cultured SMCs.

Results: First, formation of vascular calcification was compared among 4 groups: adenine-fed uremic rats; streptozotocin-injected hyperglycemic rats; adenine-fed and streptozotocin-injected uremic/hyperglycemic rats; and control rats. Vascular calcification was obvious in uremic rats and uremic/hyperglycemic rats, whereas it was not observed in other rats. Aortic calcium contents were significantly elevated in uremic rats and uremic/hyperglycemic rats, but they were not different between two groups. Moreover, hyperglyceremia had no effects on the reduced expression of osteogenic markers, such as Runx2 and osteopontin, in uremic rats and remained significant following multivariable adjustment. Conversely, the risks of mortality and kidney transplantation were increased in uremic rats on regular hemodialysis or hemodiafiltration.

Conclusions: Glucose concentration does not directly modulate high phosphate-induced SMC phenotypic switching and vascular calcification.

(0.34). No correlation was found between PWVab and age. The pts in the high PWVa group were older, had higher BP Sys and were more likely to be overhydrated (higher E/T and Rel OH %).

Conclusions: The present study showed fluid overload defined by BIS to be strongly correlated with arterial (aortic and brachial) stiffness in HD pts. A strong correlation was found between PWVab and age, however, this didn’t apply to PWVb. Future studies that evaluate the effect of the correction of overhydration on arterial stiffness are required to confirm these findings.

MP465

HIGH GLUCOSE DOES NOT MODULATE THE FORMATION OF VASCULAR CALCIFICATION IN EXPERIMENTAL UREMIC RATS

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Introduction and Aims: Vascular calcification is highly prevalent in patients with chronic kidney disease and diabetes, and is a risk factor for cardiovascular disease and mortality. Results of previous studies showed that high phosphate-induced phenotypic switching of vascular smooth muscle cells (SMCs) into osteogenic cells plays a critical role in the calcification process.

Methods: We examined whether glucose concentration affects high phosphate-induced SMC phenotypic switching and calcification in adenine-fed uremic rats and in cultured SMCs.

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Conclusions: These results suggest that glucose concentration does not directly modulate high phosphate-induced SMC phenotypic switching and vascular calcification.
**MP468**

**PREDICTORS OF CHANGES IN PRE-DIALYSIS SYSTOLIC BLOOD PRESSURE IN AN INTERNATIONAL COHORT OF HEMODIALYSIS PATIENTS**

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**Introduction and Aims:** Prior studies indicated that hemodialysis (HD) patients from US experience an increase in pre-dialysis systolic blood pressure (preSBP) in the first year of dialysis. In contrast, preSBP declines in patients from Europe, Latin America, and Asia Pacific [Guinsburg ERA-EDTA 2011]. We aimed to explore factors associated with changes in preSBP in a large international sample of HD patients.

**Methods:** The MONitoring Dialysis Outcomes (MONDO) consortium consists of HD databases from Renal Research Institute (RRI) clinic in the US; Fresenius Medical Care (FMC) clinics in Europe, Asia Pacific (AP), Latin America (LA); KHI clinics in Germany; Imperial College, London, UK; Hadassah Medical Center, Jerusalem, Israel; and University of Maastrict, The Netherlands [Usvyat, Blood Purification 2013]. Databases from RRI, FMC AP, and FMC LA were queried to identify all incident HD patients who survived at least 2 years on HD. We employed simple linear regression to compute per-patient changes (slopes) of preSBP, post-dialysis weight, weekly erythropoietin (EPO), and serum sodium between min 12 and 24 from HD start. For each variable, “decline” was defined as a significant (P<0.05) negative slope and “increase” was defined as positive slope (P<0.05). Patients with non-significant slopes (P>0.05) were considered “stable”.

**Results:** We studied 6883 patients (FMC AP N=1483; FMC LA N=625; RRI N=4275). 21% of the patients experienced increase in preSBP, with highest frequency in RRI (26%; Figure 1A). There was no notable difference in changes in preSBP between patients with declining, increasing, or stable post-dialysis weight slopes. In all regions studied, there was a trend for an increase in EPO dose being associated with an increase in preSBP (P=0.05 for RRI) (Figure 1B).

**Conclusions:** Our multi-national study indicates the existence of a trend towards preSBP increase in the second year on HD in the presence of EPO dose increase. In addition, an increase in serum sodium is associated with a decrease in preSBP. We found no clear relationship between changes in body weight and preSBP.

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**MP469**

**IMPACT OF CLOPIDOGREL ON CLINICAL OUTCOMES IN ACUTE MYOCARDIAL INFARCTION WITH RENAL DYSFUNCTION**

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**Introduction and Aims:** Clopidogrel is an established treatment of acute myocardial infarction (AMI). However, renal dysfunction appears to be associated with reduced anti-platelet effects or increased bleeding risk of clopidogrel. We examined the impact of clopidogrel on clinical outcomes in patient with AMI according to the renal function.
Introduction and aims: Oxidative stress and inflammation are implicated in the pathogenesis of cardiovascular disease (CVD). Although C-reactive protein (CRP), as one of the markers of inflammation, is an established predictor of CVD and all-cause mortality, there is little evidence showing that serum biomarkers oxidative stress are useful in predicting CVD and/or mortality. The purpose of this study was to test a hypothesis that serum biomarkers of oxidative stress predict poor outcome in hemodialysis patients.

Methods: The subjects were 517 hemodialysis patients in a prospective cohort named DREAM that was followed-up from 2004 to 2009. At baseline, we assayed several biomarkers of oxidative stress including derivatives of reactive oxygen metabolites (dROMs, a measure of hydroperoxides) and oxy-adsorbent test (OXA, a measure of oxidative stress). We analyzed the association of these biomarkers with outcomes in hemodialysis patients.

Results: Out of 261 patients, 34% started HD in the ER group and 66% in LR group. At the time of the initiation of HD, mean estimated glomerular filtration rate (GFR) was 8.5±3.44ml/min in the ER (>12 months) and 7.8±3.70ml/min in the LR (p = 0.838). At the start of HD, ER (>12months) patients had higher proportion of native arteriosenous fistula (AVF) (59.4% vs 16.7%, p = 0.000), higher homoglobin (g/dl) (82.46 ±1.65 vs 79.20 ±13.97, p = 0.048), albumin (g/dl) (39.74 ±0.7 vs 35.78 ±6.31, p = 0.000), diuresis (ml) (1325.64 ±672.87 vs 484.49 ±52.18, p = 0.000) and lower LVM (g/m²²) (145.79 ±60.77 vs 166.60 ±52.23, p = 0.031) than LR patients. During HD treatment until follow-up the study, ER (>12months) and LR remain significantly different with pulse pressure (mmHg) (52.83 ±12.23 vs 58.14 ±16.04, p = 0.023), hemoglobin (107.73 ±12.34 vs 101.05 ±14.36, p = 0.005), albumin (39.01 ±2.72 vs 37.74 ±3.98, p = 0.024) and K/V (1.25 ±0.21 vs 1.18 ±0.21, p = 0.026). During follow-up, 27 of 89 patients in the ER (>12months) (30.3%) and 90 of 172 in the LR (47.7%) died, with significant difference in survival between ER (>12months) and LR groups (log-rank, p = 0.0005). All-cause mortality was higher both LR vs ER < 6 months (HR 1.68; 95% CI 1.15-2.45, p = 0.007) and LR vs ER >12 months (HR 2.05; 95% CI 1.33-3.15; p = 0.001). Cardiovascular mortality did not differ between LR vs ER <6 months (HR 1.46; 95% CI 0.92-2.34, p = 0.11), but was higher for LR vs ER >12 months (HR 2.44, 95% CI 1.38-4.30, p = 0.002).

Conclusions: This study showed that early regular nephrology referral above 12 months before initiation of HD was associated with a reduced risk of all-cause and cardiovascular mortality in HD patients.

Oxidative stress biomarkers as predictors of mortality and cardiovascular disease in a cohort of hemodialysis patients

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Introduction and Aims: Oxidative stress and inflammation are implicated in the pathogenesis of cardiovascular disease (CVD). Although C-reactive protein (CRP), as one of the markers of inflammation, is an established predictor of CVD and all-cause mortality, there is little evidence showing that serum biomarkers oxidative stress are useful in predicting CVD and/or mortality. The purpose of this study was to test a hypothesis that serum biomarkers of oxidative stress predict poor outcome in hemodialysis patients.

Methods: The subjects were 517 hemodialysis patients in a prospective cohort named DREAM that was followed-up from 2004 to 2009. At baseline, we assayed several biomarkers of oxidative stress including derivatives of reactive oxygen metabolites (dROMs, a measure of hydroperoxides) and oxy-adsorbent test (OXA, a measure of oxidative stress). We analyzed the association of these biomarkers with outcomes in hemodialysis patients.

Results: Out of 261 patients, 34% started HD in the ER group and 66% in LR group. At the time of the initiation of HD, mean estimated glomerular filtration rate (GFR) was 8.5±3.44ml/min in the ER (>12 months) and 7.8±3.70ml/min in the LR (p = 0.838). At the start of HD, ER (>12months) patients had higher proportion of native arteriosenous fistula (AVF) (59.4% vs 16.7%, p = 0.000), higher homoglobin (g/dl) (82.46 ±1.65 vs 79.20 ±13.97, p = 0.048), albumin (g/dl) (39.74 ±0.7 vs 35.78 ±6.31, p = 0.000), diuresis (ml) (1325.64 ±672.87 vs 484.49 ±52.18, p = 0.000) and lower LVM (g/m²²) (145.79 ±60.77 vs 166.60 ±52.23, p = 0.031) than LR patients. During HD treatment until follow-up the study, ER (>12months) and LR remain significantly different with pulse pressure (mmHg) (52.83 ±12.23 vs 58.14 ±16.04, p = 0.023), hemoglobin (107.73 ±12.34 vs 101.05 ±14.36, p = 0.005), albumin (39.01 ±2.72 vs 37.74 ±3.98, p = 0.024) and K/V (1.25 ±0.21 vs 1.18 ±0.21, p = 0.026). During follow-up, 27 of 89 patients in the ER (>12months) (30.3%) and 90 of 172 in the LR (47.7%) died, with significant difference in survival between ER (>12months) and LR groups (log-rank, p = 0.0005). All-cause mortality was higher both LR vs ER < 6 months (HR 1.68; 95% CI 1.15-2.45, p = 0.007) and LR vs ER >12 months (HR 2.05; 95% CI 1.33-3.15; p = 0.001). Cardiovascular mortality did not differ between LR vs ER <6 months (HR 1.46; 95% CI 0.92-2.34, p = 0.11), but was higher for LR vs ER >12 months (HR 2.44, 95% CI 1.38-4.30, p = 0.002).

Conclusions: This study showed that early regular nephrology referral above 12 months before initiation of HD was associated with a reduced risk of all-cause and cardiovascular mortality in HD patients.

Protein-bound uremic toxins and advanced glycation products in patients on long-term hemodialysis

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Introduction and Aims: Advanced glycation end products (AGEs), a pro-inflammatory and pro-oxidative compounds, may play a essential role in endothelial dysfunction and atherosclerosis. Protein-bound uremic toxins - indoxyl sulfate (IS) and p-cresyl sulfate (PCS) will also result in endothelial dysfunction. Our objective was to explore the association of IS, PCS and AGEs in a hemodialysis-based cohort.

Methods: This study recruited 129 stable HD patients in a single medical center. Serum levels of total and free IS, PCS and AGES were measured concurrently. General laboratory results and patient background were also investigated.

Results: The serum levels of AGES was associated with total IS (r=0.29, p<0.01) and total PCS (r=0.28, p<0.01) not total PCS (r=0.01, NS), free IS (r=0.11, NS) and free PCS (r=0.04, NS) by Pearson’s analysis. Multiple linear regression analysis showed total IS was significantly related to AGES (β=0.296, p<0.01), free IS (β=0.052, p<0.01) and creatinine (β=0.294, p<0.01). Serum AGES levels correlated significantly and positively with DM status (β=0.250, p=0.01) and total IS (β=0.341, p<0.01) concentrations by another multivariate model. Moreover, patients with DM had higher serum AGES levels than those without DM (p<0.01).

Conclusions: These findings suggest that the total IS levels were associated with AGES levels and may participate the process of atherosclerosis.
**Nephrology Dialysis Transplantation**

**MP474 PREDICTORS OF CARDIAC EVENTS IN END-STAGE RENAL DISEASE PATIENTS WITH NORMAL MYOCARDIAL PERFUSION SINGLE PHOTON EMISSION COMPUTED TOMOGRAPHY**

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**Introduction and Aims:** Normal myocardial perfusion imaging is closely associated with very low rates of cardiac events and better long-term outcomes. However, little is known about its prognostic value in patients with end-stage renal disease (ESRD). Moreover, it is uncertain whether subsets of these patients are at increased risk for serious cardiac events, even in the presence of a normal perfusion scan.

**Methods:** A total of 266 incident ESRD patients underwent baseline cardiac evaluation with echocardiography and stress/rest single-photon emission computed tomography (SPECT). A summed stress score (SSS) <4 was considered normal, and 177 (61.9%) patients showed a normal SPECT.

**Results:** During the 4-year follow-up period, there were a total of 79 cardiac events. Patients with SSS <4 had significantly lower annual rates of cardiac events than those with SSS ≥4 (6.1% versus 13.2%, hazard ratio (HR), 0.60; 95% confidence interval (CI), 0.38–0.94). Among patients with SSS <4, however, cardiac event rates significantly differed according to baseline characteristics such as age, presence of diabetes and coronary artery disease and C-reactive protein levels. Regarding the echocardiographic parameters, left ventricular (LV) hypertrophy (LVH), decreased LV ejection fraction (LVEF), and increased LV mass index (LVMi) were closely associated with the occurrence of cardiac events. After adjustment for traditional cardiovascular risk factors, every 10-unit increase in LVMi increased the adjusted hazard of cardiac events by 12% (p < 0.001). Findings were similar in the subgroup with normal SPECT and EF ≥50% (HR 1.10, 95% CI 1.02–1.20).

**Conclusions:** ESRD patients with normal SPECT had a significantly lower risk of cardiovascular disease than those with abnormal SPECT. However, the baseline clinical and echocardiographic parameters strongly influenced the long-term prognosis of these patients. Particularly, increased LVMi was independently associated with cardiac outcomes in patients with normal SPECT.

**MP475 CARDIAC HYPERTROPHY IS SUPPRESSED BY REDUCING UREMIC TOXINS AT THE EARLY STAGE OF CHRONIC KIDNEY DISEASE**

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**Introduction and Aims:** Patients with chronic kidney disease (CKD) generally have a high risk of complications including accelerated cardiovascular disease than the general population. Left ventricular hypertrophy is a well-known feature of renal disease, and that mass correlates with survival in renal patients. Blood pressure is currently regarded as a candidate cause of cardiac hypertrophy in CKD. However, it is uncertain whether subsets of these patients are at increased risk for serious cardiac events, even in the presence of a normal perfusion scan.

**Methods:** A total of 266 incident ESRD patients underwent baseline cardiac evaluation with echocardiography and stress/rest single-photon emission computed tomography (SPECT). A summed stress score (SSS) <4 was considered normal, and 177 (61.9%) patients showed a normal SPECT.

**Results:** During the 4-year follow-up period, there were a total of 79 cardiac events. Patients with SSS <4 had significantly lower annual rates of cardiac events than those with SSS ≥4 (6.1% versus 13.2%, hazard ratio (HR), 0.60; 95% confidence interval (CI), 0.38–0.94). Among patients with SSS <4, however, cardiac event rates significantly differed according to baseline characteristics such as age, presence of diabetes and coronary artery disease and C-reactive protein levels. Regarding the echocardiographic parameters, left ventricular (LV) hypertrophy (LVH), decreased LV ejection fraction (LVEF), and increased LV mass index (LVMi) were closely associated with the occurrence of cardiac events. After adjustment for traditional cardiovascular risk factors, every 10-unit increase in LVMi increased the adjusted hazard of cardiac events by 12% (p < 0.001). Findings were similar in the subgroup with normal SPECT and EF ≥50% (HR 1.10, 95% CI 1.02–1.20).

**Conclusions:** ESRD patients with normal SPECT had a significantly lower risk of cardiovascular disease than those with abnormal SPECT. However, the baseline clinical and echocardiographic parameters strongly influenced the long-term prognosis of these patients. Particularly, increased LVMi was independently associated with cardiac outcomes in patients with normal SPECT.

**MP476 UREMIC FOOT: A SILENT KILLER AMONG DIALYZED PATIENTS**

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**Introduction and Aims:** Foot ulceration (FU) is a common complication (15–25%) affecting patients with diabetes during their lifetime; it is associated with infections, amputation and death. Diabetes is responsible for 24–45% of incident renal replacement therapy, but Hemodialyzed patients (HDpts) have higher prevalence of other vascular risk factors (inflammation, calciphylaxis). Thus, the risk of FU is four times higher than in diabetic non HDpts and the risk of amputation is 10 times higher than in general population. We prefer the term “uremic foot” to define the ischemic lower limb chronic ulceration, which affects the quality of life, the mortality rate and the costs of health care. The aim of our retrospective study is to evaluate the prevalence of uremic foot among HDpts affiliated to our Centre.

**Methods:** We enrolled 316 prevalent and incident HDpts from January 2006 to December 2011, mean follow-up 3±24 months; mean age 67.2±14.9 years (65.2%) male, 101 (32.6%) diabetic, 136 (43%) with ischemic heart disease. We evaluated the history of surgical revascularization or percutaneous transluminal angioplasty (PTA), the prevalence of smoldering peripheral arterial disease (sPAD), intermittent claudication or non critical ischemia revealed through the Doppler ultrasonography, the presence of chronic FU and amputation (above or below the malleolus).

**Results:** The prevalence of sPAD is 53.2% (168 pts), foot ulcerations 27.8% (88 pts), amputation 10.4% (33 pts), previous surgical revascularization 8% (25 pts) and PTA ≤10% of operated or transplanted HD pts are excluded, the prevalence increases up to 63.7, 40.3, 11.7% for sPAD, FU and amputation respectively. In spite of the higher prevalence among diabetic HDpts, FU and amputation are consistent among non diabetic pts too (55.9% vs. 20.8% and 20.6% vs. 3.8%, respectively; p<0.001). At the end of the follow up 144 (45.7%) pts died, 24% because of ischemic heart disease, 16.4% complications of PAF, 16.1% not otherwise specified cachexia, 14.2% neoplasiae, 6.2% infections and 3.8% others causes. HDpts with FU compared with pts without FU are older (72.8±9.2 vs. 64.5±16.3 years) and presented more diabetes (56.4% vs. 21.2%), ischemic heart disease (70.3 vs. 29.7%), surgical revascularization (13.9% vs. 0.01%) and amputation (26.7 vs. 0.9%). They have also less chance to undergo kidney transplantation (0.9 vs. 18.4%) and higher risk of death (75.2 vs. 32.5%) (p<0.001). The PTH values are different (226.15±3 vs. 199±15 ng/ml).

**Conclusions:** Our study demonstrated that the “uremic foot” is very common condition among HDpts, associated to the other cardiovascular risk factors. The uremic foot represents the second cause of death after heart disease. More efforts are required to diagnose and treat the uremic foot, for it is associated with very high direct and indirect costs and with life threatening outcomes.

**MP477 NT-proBNP IS A MORE SIGNIFICANT PROGNOSTIC BIOMARKER OF MORTALITY THAN TROPONIN T IN INCIDENT HEMODIALYSIS PATIENTS**

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**Introduction and Aims:** Numerous previous studies have demonstrated that cardiac and inflammatory biomarkers are significant predictors of cardiovascular (CV) and all-cause mortality in ESRD patients, but most of the studies were retrospective or included small numbers of patients, only prevalent dialysis patients, or only measured one or two biomarkers. The aim of this study was to investigate the association between three cardiac biomarkers and mortality in incident hemodialysis patients.

**Methods:** A prospective cohort of 864 incident hemodiagnosis patients was followed for up to 30 months. Based on the median values of baseline NT-proBNP, cTnT, and hsCRP, the patients were divided into ‘high’ and ‘low’ groups, and CV and all-cause mortality were compared between each group.

**Results:** The CV survival rates were significantly lower in the ‘high’ NT-proBNP and cTnT groups compared to the corresponding ‘low’ groups, while there was no significant difference in CV survival rates between the two hsCRP groups. However, all-cause mortality rates were significantly higher in all three ‘high’ groups compared with each lower group. In multivariate Cox models, natural log of NT-proBNP and cTnT were found to be significant independent predictors of CV and all-cause mortality. Moreover, among the three biomarkers, NT-proBNP had the highest positive predictive values for not only CV mortality (AUC = .812, P<0.001) but also all-cause mortality (AUC = .666, P<0.001).

**Conclusions:** Although high levels of NT-proBNP and cTnT, but not hsCRP, are independently associated with CV and all-cause mortality in incident hemodialysis patients, the prognostic value of NT-proBNP for mortality is higher than that of cTnT.
Conclusions: This study shows circulating S-RAGE levels are associated in an inverse manner to VCS in HD patients. Longitudinal observations and intervention studies are required to further investigate on prognosis should be further investigated.

Methods: Among 160 patients receiving dialysis therapy at Yokohama Minami Clinic, 16 (10 males and 6 females; mean age 71.2 ± 11.2, range 50-91 years; mean hemodialysis duration 103.4 ± 74.9 months) with AF (13 paroxysmal, 3 persistent) were enrolled. We performed complete isolation of the whole posterior left atrium including all pulmonary veins (box isolation) guided by a 3D-mapping system (Ensite NavX) at The Arrhythmia Center, Hayama Heart Center.

Results: Box isolation therapy was performed in all 16 patients. A second session was performed in 6 patients (38%) because of AF recurrence. In two patients with persistent AF, third and fourth sessions were needed to maintain sinus rhythm. At 20.3 ± 13.6 months of follow-up, all patients but one who received AF ablation were free from recurrent AF or atrial tachycardia, and all patients with paroxysmal AF had no AF during dialysis. One patient developed cerebral hematoma due to the patient's sudden motion during therapy. Mild cerebral infarction occurred in only one patient during the follow-up period. There were no other complications.

Conclusions: In patients on dialysis, the optimal treatment for AF to restore and maintain sinus rhythm has not been established. In this collaborative investigation, radiofrequency catheter ablation in dialysis patients with AF achieved complete maintenance of sinus rhythm. Only one case of cerebral infarction occurred among 16 patients during 20.3 ± 13.6 months of follow-up, compared to the reported incidence of over 30% within one year. Therefore, in-farct-related disorders such as cerebral infarction may be reduced by this treatment. The effect of radiofrequency catheter ablation on prognosis should be further investigated.

Abstracts
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STROKE THROMBOLYSIS IN END-STAGE RENAL DISEASE - A NATIONAL SURVEY OF UK NEPHROLOGY OPINION

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Introduction and Aims: Systemic thrombolysis for acute ischaemic stroke is standard of care in the UK with defined pathways to expedite treatment. In the absence of trial data on the safety and efficacy of thrombolysis treatment in end-stage renal disease (ESRD) patients, we aimed for the first time to capture the perspective of UK nephrologists and highlight healthcare policy & research objectives.

Methods: Consultant nephrologists in the UK were invited to participate in an internet-based questionnaire by e mail invitation. Respondents were asked about their experience, their wish for involvement in thrombolysis decisions, safety concerns in haemodialysis (HD) and peritoneal dialysis (PD) patients rated from 1-10 [10=highest risk], views on stroke rehabilitation in HD & PD, opinions on antithrombolite and warfarin use.

Results: 122/433 [28%] clinicians responded [69% with >15 yrs consultant experience]. 64% expressed a high degree of concern [≥7/10] regarding intracranial bleeding risk in HD. Overall risks of intra- & extra-cranial bleeding were rated lower in PD vs. HD [p<0.001]. There were no significant differences in concern around cardiovascular stability, efficacy of thrombolysis or evidence base for its use between modalities. There was however an increased level of concern regarding the logistics of administering HD following thrombolysis compared to PD [ranksum p=0.001]. 85% felt the HD schedule impacted negatively on rehabilitation whereas 63% felt this was the case in PD [p=0.001]. Over 75% would prefer/assume antithrombolite therapy after stroke with 62% respondents making this treatment change within 24hrs of stroke onset. This was not influenced by modality although more clinicians would use warfarin for stroke prevention in PD patients with AF than in HD patients [79% vs. 66%, p=0.04]. 71% wished to participate in national collaborative studies of stroke in ESRD.

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THE IMPACT OF CATHETER ABLATION ON DIALYSIS PATIENTS WITH ATRIAL FIBRILLATION

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Introduction and Aims: Atrial fibillation (AF) occurs significantly more frequently in dialysis patients than in the general population. AF causes significant clinical and haemodynamic derangements such as low blood pressure during HD. AF is of particular clinical importance mainly because of the increased risk of stroke, and approximately one-third of hemodialysis patients with AF are reported to have thromboembolic complications within 1 year. Although maintenance of sinus rhythm is the ideal therapeutic goal in AF patients, AF and adverse effects of antiarrhythmic drugs offset the benefits of sinus rhythm. Use of warfarin is not recommended because of high risk of mortality in hemodialysis patients. Up to year 2000, treatment options were limited to medications that regulate the heart's rhythm, electrical cardioversion to restore sinus rhythm, anticoagulation therapy, and the Maze procedure. More recently radiofrequency catheter ablation with pulmonary vein isolation has been developed as a nonsurgical approach that may be required for patients with AF tolerant to medications.

Methods: Among 160 patients receiving dialysis therapy at Yokohama Minami Clinic, 16 (10 males and 6 females; mean age 71.2 ± 11.2, range 50-91 years; mean hemodialysis duration 103.4 ± 74.9 months) with AF (13 paroxysmal, 3 persistent) were enrolled. We performed complete isolation of the whole posterior left atrium including all pulmonary veins (box isolation) guided by a 3D-mapping system (Ensite NavX) at The Arrhythmia Center, Hayama Heart Center.

Results: Box isolation therapy was performed in all 16 patients. A second session was performed in 6 patients (38%) because of AF recurrence. In two patients with persistent AF, third and fourth sessions were needed to maintain sinus rhythm. At 20.3 ± 13.6 months of follow-up, all patients but one who received AF ablation were free from recurrent AF or atrial tachycardia, and all patients with paroxysmal AF had no AF during dialysis. One patient developed cerebral hematoma due to the patient’s sudden motion during therapy. Mild cerebral infarction occurred in only one patient during the follow-up period. There were no other complications.

Conclusions: In patient on dialysis, the optimal treatment for AF to restore and maintain sinus rhythm has not been established. In this collaborative investigation, radiofrequency catheter ablation in dialysis patients with AF achieved complete maintenance of sinus rhythm. Only one case of cerebral infarction occurred among 16 patients during 20.3 ± 13.6 months of follow-up, compared to the reported incidence of over 30% within one year. Therefore, infarct-related disorders such as cerebral infarction may be reduced by this treatment. The effect of radiofrequency catheter ablation on prognosis should be further investigated.

SPECKLE TRACKING ECHOCARDIOGRAPHY DETECTS UREMIC CARDIOMYOPATHY AND PREDICTS CARDIOVASCULAR AND ALL CAUSE MORTALITY IN ESRD

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Introduction and Aims: Cardiovascular mortality is dramatically high in end stage renal disease (ESRD). This is mainly driven by sudden cardiac death and recurrent heart failure due to urmic cardiomyopathy. Currently available methods for determination of regional myocardial function are subjective and semi-quantitative. 2-dimensional (2D) strain echocardiography is a recently developed speckle tracking based method to determine myocardial function in a multidimensional fashion. The aim of this study was to test whether 2D strain echocardiography can detect uremic cardiomyopathy and predict cardiovascular mortality in ESRD.

Methods: Two dimensional strain echocardiographic parameters, ejection fraction (EF) and clinical characteristics were assessed in 171 ESRD patients and 44 subjects without known kidney or cardiac diseases. Patients were followed up for 2.5 years. In an animal study using two rat models of uremic cardiomyopathy (i.e. 5/6 nephrectomy with high protein diet and adenosine nephropathy) we tested whether a 2D strain echocardiography is superior to routine echocardiography to detect early changes in myocardial contractility and blood flow.

Results: During the follow-up period of 2.5 years the longitudinal peak systolic and late diastolic longitudinal rates showed the highest rate of variance to predict cardiovascular mortality in ESRD (primary end-point) in a multivariable cox model (hazard ratios HR 5.7; 95% confidence interval CI 1.533-21.233; p=0.009 and HR 0.2; 95% CI 0.006-0.659; p=0.008, respectively). Whereas the strongest predictor for all cause mortality (secondary end-point) was the circumferential early diastolic strainrate (HR 43; 95% CI 0.236-0.766; p=0.06). Using speckle tracking echocardiography in two rat models of uremic cardiomyopathy early i.e. 4-6 weeks and late i.e. 8-10 weeks after induction of kidney disease we observed that various strain parameters were significantly decreased whereas fractional shortening or doppler monochromatic calculated cardiac output remained unchanged at the early time-point. Furthermore echocardiographic strain parameters as peak global and systolic circumferential and radial strain and strain rate showed a higher correlation with hallmarks of uremic cardiomyopathy (i.e. grade of interstitial fibrosis, reduced biventricular cross-sectional area) as routine echocardiographic parameters (fractional shortening or cardiac output).

Conclusions: Speckle tracking echocardiography can detect uremic cardiomyopathy in rats and predicts cardiovascular and all-cause mortality in end-stage renal disease patients.
Conclusions: In the first survey of nephrologists to our knowledge, the majority of clinicians want involvement in thrombolysis decisions for their ESRD patients. We validate concerns about bleeding risk with thrombolysis and clarify key areas of concern among professionals. In particular we identify a stark need to improve access to stroke rehabilitation especially in HD patients. This national survey provides a clear mandate for wider collaborative research into stroke in ESRD.

Methods: This study was conducted from July 2011 to April 2012. All of subjects are 18 years old or older who on stable HD procedure at least 3 months (2x weekly, 5 hours per session), and willing to participate. The exclusion criteria were history of myocardial infarction or cardiovascular intervention, symptomatic coronary heart disease, left ventricle EF 40% or less, arrhythmia, diabetes mellitus. The subjects were divided into 3 groups who are dialyzed in the different dMg level. Group A used low dMg & dCa level (0.2 mmol/L & 1.3 mmol/L), group B used moderate dMg & dCa level (0.51 mmol/L & 1.54 mmol/L) and group C used high dMg & dCa level (1.0 mmol/L & 1.9 mmol/L). Group A, B & C respectively enclosed 15, 12 & 15 subjects that were followed up within 9 month forward. The following blood pressure was measured at the time of dialysis and at one-hour intervals during the subsequent 5-hour dialysis period. IDH defined as a decrease in blood pressure necessitating fluid replacement therapy or and stopped the dialysis procedure for awhile or terminated dialysis at this time, and or when the SBP and or DBP less than 90 and or 60 mmHg respectively, or decreasing SBP more than 40 mmHg below the predialysis SBP.

Results: The characteristics of subjects in 3 groups were not different statistically, enclosed age, gender, starting HD, frequency of HD, ultrafiltration per session, sMg, sCa, sAlb, pH and cardiac status. Group A was found sMg pre-post test, respectively 0.89 ± 0.22 mmol/L & 0.63 ± 0.11 mmol/L, sCa 2.21 ± 0.33 mmol/L & 2.10 ± 0.31 mmol/L, sAlb 3.42 ± 0.46 g/dL & 3.39 ± 0.43 g/dL. Analysis paired sample test, the decreasing sMg level was significant (p=0.05), decreasing sCa level was not significant (p=0.267), Group B was found sMg pre-post test, respectively 0.87 ± 0.21 mmol/L & 0.86 ± 0.17 mmol/L, sCa 2.20 ± 0.36 mmol/L & 2.30 ± 0.25 mmol/L, sAlb 3.33 ± 0.57 g/dL & 3.50 ± 0.44 g/dL. Analysis paired sample test, the decreasing sMg level was not significant (p=0.749), increasing sCa level was not significant (p=0.158). Group C was found sMg pre-post test, respectively 0.87 ± 0.18 mmol/L & 0.90 ± 0.16 mmol/L, sCa 2.22 ± 0.31 mmol/L & 2.43 ± 0.26 mmol/L, sAlb 3.42 ± 0.46 g/dL & 3.44 ± 0.42 g/dL. Analysis paired sample test, the increasing sMg level was significant (p=0.05), increasing sCa level was significant (p=0.05). Mean arterial pressure (MAP) decreased significantly (p=0.005) in group A by 14.7% compared to the other groups. Increasing significantly sMg in group C did not compromise blood pressure by vasodilatation. Inversely, 1.0 mmol/L dMg in group C was superior to the other groups regarding intradialytic morbidity (p=0.05) and blood pressure stability (p=0.05).

Conclusions: A low dMg level proved contributing to IDH. Increasing dMg level could prevent IDH. dMg level independently or in dCa combining might has important implications to dialysis tolerance.

Introduction and Aims: In hemodialysis patients, physical activity appears to carry many health benefits, such as amelioration of physical deconditioning, hypertension, hyperlipidemia, sleep disorders, and depression. However, the association between physical activity and cardio-cerebrovascular events in these patients remains unclear. We investigated the prognostic significance of physical activity, as evaluated with an accelerometer, in regard to cardio-cerebrovascular events requiring hospitalization among hemodialysis patients.

Methods: A total of 209 Japanese outpatients undergoing maintenance hemodialysis 3 times a week at a dialysis treatment center between October 2002 and August 2012 were followed for up to 5 years. At patient entry to the study, physical activity was evaluated with an accelerometer as the number of steps per day for a consecutive 5-day period consisting of 3 non-dialysis days and 2 dialysis days. Patients were categorized into two physical activity groups by using a cutoff value of 5000 steps/day. In addition, clinical characteristics, including age, sex, body mass index, time on hemodialysis, comorbid conditions, and serum albumin and C-reactive protein levels were determined at baseline. A Kaplan-Meier estimate of survival and a Cox proportional hazard regression were used to assess the contribution of physical activity to all-cause hospitalization, cardio-cerebrovascular-related hospitalization, and non-cardio-cerebrovascular-related hospitalization.

Results: The median (25th, 75th percentiles) age of the study population was 64 (57, 72) years, 50.7% of the patients were women, and the time on hemodialysis was 39.0 (16.0, 116.0) months at baseline. Seventy-five percent of the patients were placed in the group with <5000 steps/day. During a median follow-up of 44 months there were 46 hospitalizations for cardio-cerebrovascular events and 31 hospitalizations for other causes. After adjustment for the effects of clinical characteristics, the adjusted hazard ratios for hospitalization from all causes, cardio-cerebrovascular events, and non-cardio-cerebrovascular events in the <5000 steps/day group were, respectively, 2.48 (95% CI: 1.20–5.13; P = 0.02), 4.00 (95% CI: 1.39–11.54; P = 0.01), and 1.31 (95% CI: 0.47–3.63; P = 0.61) compared with that in the ≥5000 steps/day group.

Conclusions: Physical inactivity seems to be strongly associated with increased risk of hospitalization associated with cardio-cerebrovascular events among hemodialysis patients.
CORONARY ARTERY BYPASS GRAFTING IN DIALYSIS PATIENTS

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Introduction and Aims: To evaluate the outcome after isolated coronary artery bypass grafting (CABG) in patients requiring preoperative chronic dialysis for end stage renal failure (ESRF).

Methods: We retrospectively analyzed data by chart review and questionnaire from 151 patients (119 male, 32 female) who were operated in our institution between April 1994 and November 2012 and were on maintenance dialysis for at least 1 month preoperatively.

Results: Data from 151 pts. (119 male, 32 female) with a mean age of 64.2 years (range 37-83), who had been on dialysis for a mean of 46.3 months (range 1-1241) preoperatively, were analyzed. 85.4% (129 pts.) suffered from triple vessel disease, 11.3% (17 pts.) had double and 3.3% (5 pts.) had single vessel disease. 2.6 grafts (range 1-6) were performed per operation, thereby using the left internal thoracic artery (LITA) in 78.2% (118 pts) of cases. In 7 pts. (4.6%) the procedure was performed off pump. Mean follow-up was 43.2 months (range 3-147). Mean ICU stay was 10.0 days (range 1-80), and patients were discharged after a mean of 22.7 days (range 6-135). 11 patients died within 30 days (5.3%), in hospital mortality was 6.6% (10 patients).

Conclusions: Coronary artery bypass grafting can be performed on dialysis patients with acceptable higher perioperative morbidity and mortality, compared to the normal population. Long term survival of ESRF patients is considerably reduced compared to patients with normal renal function. However, improved postoperative quality of life in the majority of patients, justifies this strategy.

What is the skin microcirculation affected in hemodialysis patients?

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Introduction and Aims: The interest in the study of skin microcirculation rose from the hypothesis that skin microvascular function can mirror the state of microcirculation in all other vascular beds. Endothelial function is part of the microvascular function that can be examined by the Laser Doppler Fluxmetry (LDF) and is an important cardiovascular risk factor to determine. The LDF is considered a safe and reliable method to study the skin microcirculation. The components of the reactive hyperemia test, namely the peak flux and percent change measurements, are considered good estimates of endothelial function. The so-called novel risk factors for CVD, such as inflammation, endothelial dysfunction, sympathetic over activation, oxidative stress, vascular calcification are highly prevalent in the hemodialysis patients and seem to play an important role in vascular disease progression. Not just the oxidative stress, vascular calcification are highly prevalent in the hemodialysis patients such as inflammation, endothelial dysfunction, sympathetic over activation, which could be considered good estimates of endothelial function. The so-called novel risk factors for cardiovascular disease (CVD), such as inflammation, endothelial dysfunction, sympathetic over activation, oxidative stress, vascular calcification are highly prevalent in the hemodialysis patients and seem to play an important role in vascular disease progression. Not just the oxidative stress, vascular calcification are highly prevalent in the hemodialysis patients.

Methods: 60 subjects were examined, 36 males and 24 females with an age range 35-55 years old. Subjects were divided into three groups: Group A: composed of 20 subjects, on regular maintenance hemodialysis (5-10 years duration). Less than 60 years old, with no diabetes, hypertension or dyslipidemia (factors known to affect endothelial function). Group B: composed of 20 subjects with long standing essential hypertension and Group C: the control group, composed of 20 subject, these were young healthy volunteers. We continued our evaluation and assessed the apparent structural abnormalities in skin microvascular structure using the capilloroscope in the three groups.

Results: Results of the LDF showed a statistically significant difference in the peak flux and the percent change between groups A and C (p < 0.001 and 0.002 respectively) between groups B and C (p < 0.001 and 0.001). These results denote the presence of endothelial dysfunction in the group of hypertensive patients compared to the control group and as well in the group of hemodialysis patients compared to the control group. Results of the capilloroscope showed a statistically significant difference in the abnormal capillary morphology, capillary rarefaction and the presence of capillary hemorrhage in the hypertensive group compared to the control group but no statistically significant difference between the hemodialysis and the control group in the three studied morphologic parameters.

QTc INTERVAL PREDICTS ARTERIAL STIFFNESS AND INFLUENCED BY ANEMIA AND VITAMIN D SUPPLEMENTATION IN MAINTENANCE HEMODIALYSIS PATIENTS

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Introduction and Aims: Mortality from cardiovascular disease is high in maintenance haemodialysis patients (MHD), accounting for 50% of all-cause deaths. However, as well as the conventional atherosclerotic heart disease, there is a greatly increased incidence of sudden death in MHD patients. The QTc interval has been reported to be increased and to be associated with high-risk ventricular arrhythmias and sudden death. There is a direct evidence that in MHD patients increased effect of arterial wave reflections is an independent predictor of all-cause and cardiovascular mortality. We aimed to evaluate the relationship between QT intervals and pulse wave velocity (PWV) and the risk factors for arterial stiffness in maintenance haemodialysis (MHD) patients.

Methods: This is a 12-months prospective study. Eligible 149 MHD patients were enrolled into the study. Electrocardiographic evaluations were performed at the beginning and end of the study. Each QT interval was corrected for the patient’s heart rate using Bazett’s Formula. A QTc interval greater than 440 ms was considered abnormally prolonged. Patients with QTc interval < 440 ms at the beginning and end of the study was defined as Group A (n=48). Patients whose initial QTc interval were >440 ms and/or those whose QTc interval increased >440 at the end of the follow-up were defined as Group B (n=101). In addition to demographical and laboratory parameters, PWV were assessed at the beginning and end of the study.

Results: Patients in Group B had significantly higher intitial and follow-up PWV values, compared to the patients in Group A (7.9 ± 2.8 m/s vs 6.2 ± 2.7 m/s at 6.5 ± 2.1 m/s ) values both at the beginning and end of the study (p < 0.03 and p <0.001). When the whole patient group was concerned, percentage increase in QTc interval was positively correlated change of PWV during follow-up period (p =0.047). In multivariate analysis revealed that hemoglobin variability was an independent risk factor for the change of PWV (r²: 0.027, p=0.045). Additionally administered equivalent vitamin D dose was significantly higher in Group A compared to Group B (41 ± 4.7 mcg/week vs 27.3 ± 3.2 mcg/week, p <0.035).

Conclusions: Prolonged initial QTc and an increase in follow-up QTc is significantly associated with pulse wave velocity in dialysis patients. We suggest that yearly electrocardiographic evaluation and analysis the changes of QT interval could be a useful guide and a predictor of arterial stiffness of MHD patients. This study also showed that good control of anemia and vitamin D supplementation have an additive cardiovascular risk reduction in MHD patients.

CHRONIC SHEAR STRESS AND CARBAMYLATED-LDL MODULATE EXPRESSION OF AETHEROCGENIC LR1 IN HUMAN CORONARY ARTERY ENDOTHELIUM

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Introduction and Aims: Chronic kidney disease (CKD) patients suffer from accelerated coronary atherosclerosis. Elevated levels of carbamylated LDL induced by uremia and low shear stress resulting from anemia were linked to this process. We investigated how the interplay between LDL receptor family members in human coronary artery endothelial cells, proatherogenic low and atheroprotective high chronic shear stress and carbamylated LDL modulate expression of atherogenic LR1 in human coronary artery endothelium.
shear stress and carbamyalted LDL contribute to atherosclerosis.

Methods: First, by means of RT-PCR and Western blotting we explored which LDL-receptor family member was differentially expressed in human coronary artery endothelial cells under chronic low shear stress. Transmembrane as well as soluble LR11 expression was significantly reduced under chronic low shear stress to levels with carbamyalted LDL or non-detectable levels with native LDL. Medium from coronary endothelial cell cultures containing soluble LR11 enhanced vascular smooth muscle cell migration. This was inhibited if blocking antibody against LR11 was added, clearly showing the specific effect of soluble LR11. Expression of LR11 depended on p38MAPK phosphorylation. Finally, in vivo expression of LR11 was shown in human coronary artery endothelium.

Results: LR11 was not expressed under static conditions. Chronic low shear stress induced high levels of endothelial LR11 irrespective of the added LDL type (native, carbamyalted). The Chronic Kidney Disease and the hemodialysis treatment has significant potential in changing negatively the lifestyle of these patients, leading them to less reliance on health care and rehabilitation and, eventually, less control of social roles. Because of the changes mentioned, it's essential the implementation of strategies and programs for exercise training, designed to minimize many of the complications of this syndrome and consequently contribute to an improved quality of life. This research aims to evaluate the effects of aerobic training in hemodialysis patients with chronic renal disease.

Methods: The study population was composed of 100 patients with Chronic Kidney Disease on regular hemodialysis program in the NortDial hemodialysis Unit, being offered to everyone the same opportunity to participate in the program training.

Conclusions: Here we show in vitro and in vivo expression of the atherogenic LR11 in human coronary artery endothelial cells for the first time. Carbamyalted LDL and chronic low shear stress, both present in CKD patients, induce expression and shedding of endothelial LR11 through p38MAPK. This leads to pro-atherogenic changes via increased vascular smooth muscle cell migration. High shear stress attenuates these effects. Thus, LR11 and p38MAPK are potential targets for prevention of atherosclerosis in CKD.

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**MP492**

**THE RELATIONSHIP BETWEEN NEUTROPHIL-TO-LYMPHOCYTE RATIO AND CORONARY ARTERY CALCIFICATION IN END-STAGE RENAL DISEASE PATIENTS**

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Introduction and Aims: Cardiovascular (CV) diseases are the most common cause of death in patients with end-stage renal disease (ESRD) receiving hemodialysis (HD) and peritoneal dialysis (PD). Traditional risk factors including diabetes mellitus, hypertension, dyslipidemia, and obesity cannot completely explain this heightened CV risk. Systemic inflammation was found to be correlated with coronary artery disease (CAD) in this population. Neutrophil-to-lymphocyte ratio (NLR) was introduced as a potential marker to determine inflammation in cardiac and renal disorders. Additionally, NLR was shown as a predictor of long-term mortality in patients who underwent percutaneous coronary intervention. Hence, we aimed to investigate the relationship NLR and coronary artery calcification scores (CACS) in HD and PD patients.

Methods: This was a cross-sectional study involving 62 end-stage renal disease (ESRD) patients receiving PD or HD for 36 months in the Dialysis Unit of Necmettin Erbakan University. Complete blood counts with automated differential counts, which included neutrophils, and lymphocytes were obtained. NLR was calculated as the ratio of the neutrophils to lymphocytes. Unenhanced coronary computed tomography (CT) was performed on electrocardiography-gated cardiac CT scans using 64-slice MDCT. CACS was defined as the presence of more than two contiguous pixels with Hounsfield units greater than 130. Statistical differences between parametric data of two groups were analyzed using the Student's t test. The Mann-Whitney U test was used to determine differences between nonparametric data. Linear associations between continuous variables were assessed using the Spearman correlation test.

Results: The baseline characteristics of 62 ESRD patients were shown in Table 1. In the bivariate correlation analysis, NLR was positively correlated with CACS (r: 0.261, p: 0.04) and hemoglobin (r: -0.324, p: 0.01) in ESRD patients. We concluded that increased NLR is associated with CACS in ESRD patients. Simple calculation of NLR can predict inflammation and CACS in this population.

**Table 1: Baseline characteristics of 62 ESRD patients**

<table>
<thead>
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**MP493**

**THE CONTROL OF VOLUME OVERLOAD BY BIOIMPEDANCE SPECTROSCOPY (BCM) IS RELATED TO REDUCTION IN BLOOD PRESSURE**

Sandra Castellano1, Ines Païmonares1 and Jose Ignacio Meroño1

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Introduction and Aims: Cardiovascular disease is the main cause of death among hemodialysis (HD) patients. Fluid overload and its effects influence the hydration state of patients. We divided patients into groups (tertiles) according to their relative overhydration (ROH) at baseline (endpoint 1). Graph 1 and Table 1. Then we selected those patients decreasing the percentage of ROH from baseline (endpoint 2). Aim: Monitoring fluid overload and its correlation with albumin in the study. While it remains the survival analysis that could accompany any good marker of nutritional status as evidence by its correlation with albumin in the study. We found higher PCR, ESA and tissue index. There was lower systolic blood pressure at first group even receiving a smaller amount of hypotensive. Endpoint 2: After 3 months, we selected patients with higher decrease of ROH from baseline. A decrease of volume overload is associated with lower systolic blood pressure, higher haemoglobin, less doses of ESA, lower ERI and better nutritional parameters (p<0.05). Although CRP doesn’t seem to change from T0 to T5 (p<0.18), if we select those patients with baseline ROH>15% versus ROH<15%, then those differences in PCR comes to be more significant (p<0.07).

Conclusions: Adjusting the hydration status of patients using BCM allows us to control blood pressure slightly decreasing the antihypertensives. As well, it reduces the morbimortality which a volume excess and hypertension are related to. Lean and Fat Tissue Index could be considered as new markers of nutritional status as evidence by its correlation with albumin in the study.
HDL-cholesterol (r = -0.455, p = 0.001), single pool Kt/V urea (r = -0.311, p = 0.028) and percent lean tissue mass (LTM) (r = 0.421, p = 0.002). EFP thickness had no associations with age, TNF-α, IL-6, hs-CRP and visfatin (for all, p > 0.05). TG/HDL-cholesterol ratio, HOXA-13 scores, LVM, spKt/V urea, BMI, FT and percent LTM were determined as independent predictors of EFP thickness in regression models. Conclusions: Epicardial fat pad thickness has considerable associations with well-known cardiovascular risk predictors in HD patients and could be evaluated by transthoracic echocardiography which is a non-invasive, reproducible and low-priced method.

### Methods

250 prevalent dialysis patients from a large hemodialysis facility were included. The Michigan Neuropathy Score Instrument (MNSI) was used for the diagnosis of UN. Electroneuographic (ENG) examination was performed in these patients to confirm UN and to diagnose CTS. AVF surveillance was conducted by means of clinical and ultrasonographic evaluation. AVF dysfunction is definitely diagnosed on angiographic basis. Serum sclerostin levels were measured by an ELISA kit (R&D Systems, Minneapolis, MN).

Results: 211 patients were considered free of neuropathic signs and symptoms (Group 1), 26 patients (10.4%) were identified as being affected by UN (Group 2), while 13 patients (5.2%) were diagnosed as CTS superimposed to UN (Group 3). No isolated cases with CTS were diagnosed. Patients with neuropathic involvement (Group 2 plus Group 3 patients) had higher sclerostin levels than patients free of neuropathic signs and symptoms (195±1.262 vs 1466±1.384 pg/ml, p = 0.03). During 1 year follow-up, AVF dysfunction occurred in 90 cases in Group 1 (43%), 15 cases in Group 2 (58%) and finally 11 cases in Group 3 (85%) respectively (p for the trend = 0.029). Cox regression analysis revealed that presence of neuropathy (HR: 1.7, 95% CI: 1.12–2.88, P = 0.04) as an independent factor for AVF dysfunction.

Conclusions: The present work links neuropathy to vasculopathy in patients on haemodialysis that should be further studied.

### Introduction and Aims

Patients with end-stage renal disease have a high incidence of cardiovascular disease (CVD). Dyslipidemia could be one of the key factors for atherosclerosis and oxidized low-density lipoprotein (LDL) would present a critical step in the initiation and progression of atherosclerosis. Lysophosphatidylcholine (LPC) regulates biologic effects of oxidized LDL. Although oxidized LDL and LPC have been proposed as important mediators of the atherosclerosis, the long-term contribution to the risk of CVD in haemodialysis patients has not been evaluated. This study investigated the relation between oxidized LDL and LPC levels with long term risk of CVD.

Methods: Plasma oxidized LDL and LPC levels were determined in 69 Korean chronic haemodialysis patients as a prospective observational study for 5 years. The endpoints of the study were new fatal and non-fatal cardiovascular events requiring admission. Coronary artery disease, cerebrovascular disease and peripheral artery disease were defined as CVD. Oxidation of LDL was assessed by using an enzyme linked immunosorbent assay kit. LPC concentrations were determined, based on the standard curve for 18:0 LPC.

Results: During the observation period, 18 cardiovascular events (26.1%) occurred including 6 deaths among the haemodialysis patients. The subjects were divided two groups according to serum LPC levels at baseline (median value of LPC: 254 μM/L). The low LPC level group showed higher pulse pressure and decreased phosphorus level compared to the high LPC level group. The low LPC level group (≤ 254 μM/L, median value) had much more increased risk of CVD compared to the high LPC level group (> 254 μM/L) (P = 0.01). However, serum levels of oxidized LDL were not significantly different between groups with and without CVD. In adjusted Cox analysis, previous CVD, (hazard ratio [HR], 5.68; 95% confidence interval [CI], 1.94–16.63, P = 0.002) and low LPC level (HR, 3.45; 95% CI, 1.04–11.42, P = 0.04) were significant independent risk factors for development of CVD.

Conclusions: The study demonstrates that low level of LPC, but not oxidized LDL, is the principal risk factors for CVD in a population of Korean haemodialysis patients. Larger scale longitudinal studies are needed to confirm our results and to explore this phenomenon in dialysis population.
FLUID OVERLOAD, HYPERTENSION AND LEFT VENTRICULAR HYPERTROPHY IN HEMODIALYSIS PATIENTS: THE BEST WAY TO SOLVE A PROBLEM IS TO ATTACK THE CAUSE

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Introduction and Aims: Left Ventricular Hypertrophy (LVH) is the most frequent cardiac abnormality in End Stage Renal Disease (ESRD). Although its pathogenesis is considered to be multifactorial, Hypertension (HT), and Fluid Overload (FO) are identified as the major determinants in these patients. Overhydration (OH) is thought to be not only an important cause of HT among haemodialysis (HD) patients, but also an important and independent predictor of mortality in chronic HD. We conducted a cross sectional study on a population of 59 HD patients in order to find out the associations between derived parameters of FO, measured by BIA, BP and LVH. 36 male and 14 female, age 69±18 years and treated thrice weekly for 719±126 min per week. All of them had on HD (HD age) for 34±17,7 months.

Methods: We performed the following tests: - body composition analysis with the BCM-Body Composition Monitor-FMC (pre-weekend HD session). We considered OH/EWC, to assess Fluid Status, defining OH as OH/EWC>15%. - Blood chemistries at the beginning of the same midweek HD session. - A two-dimensional-guided M mode echocardiography within the two weeks including BCM measurement. LV mass was measured according to the ASE guidelines on inter-HD midweek days. Left ventricle internal diastolic diameter (LVDD), diastolic posterior wall thickness(PWT) and interventricular septum thickness (IVS) were included for LVM calculation (Devereux formula). LVH (males, LVH, 150 g/m²; females, LVM, 102 g/m²). Relative wall thickness (RWT) was calculated (>0.45 in the presence of LVH suggested concentric LVH). We also collected Antihypertensive medication,Inte & Intra diastolic symptoms. HT (Mean value of the monthly office pre-HD monitoring) was defined as office BP>140/90.

Results: The overall prevalence of OH was 36%. Although, 70 % of subjects had normal BP values, we found a high prevalence of LVH (87%), 51% had eccentric hypertrophy, and 13% had no LVI. OH/EWC<15% group, had a longer HD-age, lower BP level and the antihypertensive drug use was much lower. Pearson's correlation coefficients showed associations between OH/EWC% and LVH. On the other hand, BP was linked to PWT and IVS. Multiple stepwise linear regression was performed using LV mass as the dependent variable and , HD age, Kt/V, hemoglobin, CPR, Albumin, BP and OH/EWC as independent variables. OH was the most important factor leading to an eccentric LVH while BP influence leads mostly to concentric changes. HT is present, OH/EWC influence on LVH and its geometry is even higher. HD- Age doesn't change any of this links.

Conclusions: LVM was correlated not only with BP but also with OH/EWC. The finding that LVH was eccentric in the majority of patients confirms that the increase in LVM was related to FO which itself is the cause of both hypertrophy and LVH. Improving Fluid Status is needed to minimize cardiovascular morbidity and mortality.

THE IMPACT OF LONG-TERM HEMODIALYSIS THERAPY ON HYDRATION, CARDIOVASCULAR RISK AND BONE METABOLISM

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1Department of Nephrology, Transplantology and Internal Diseases, Poznan University of Medical Sciences, Poznan, Poland

Introduction and Aims: Patients with end stage renal disease (ESRD) undergoing chronic hemodialysis (HD) are exposed to many risk factors for serious cardiovascular incidents, which ultimately result in the decreased quality of life. The aim of this study was to assess the influence of long-term hemodialysis treatment on a patient’s water balance and cardiac function.

Methods: The studied cohort consisted of 91 HD patients (30 females, 61 males, mean age 55.2±15.4 years). Hydration status was assessed using impedance analysis (Fresenius BCM) and with clinical methods. Cardiovascular dysfunction was estimated using NT-proBNP and TnT concentrations, while HD intensity was assessed by ultrafiltration and dialysis dose [hours] per week. Bone metabolism was analysed by measuring the concentrations of osteocalcin, Ca, P, O and PTH levels. The study group was divided into three subgroups according to the duration of hemodialysis treatment (short: <40 weeks, n=31, mean age 52.3±18.9 years; medium: 40-200 weeks, n=29, mean age 62.8±10.0 years; and long: >200 weeks, n=31, mean age 51.0±13.8 years; respectively).

Results: There were significant differences among studied groups in terms of daily diuresis favorable for the "short" and "medium" group ([ml/24 hours] 1278±978 vs. 1156±967, p=0.002; 1343±999 vs. 1282±956, p=0.004), which was related to lower overhydration levels ([L] 2.27±2.38 vs. 2.33±2.22 vs. 3.93±2.58, p=0.02) and HD ultrafiltration volume ([ml] 1818±1332 vs. 2125±1308 vs. 2950±1141, p=0.007). Patients in the "long" term group presented with the highest values of cardiac dysfunction indicators i.e. NT-proBNP ([ng/ml] 392±49 vs. 2924±12250 vs. 6996±600, p<0.002). The duration of hemodialysis treatment was strongly and positively correlated with dialysis dose per week (r=0.354, p=0.001) and negatively correlated with residual renal function (r=-0.535, p=0.0001) in the entire study group.

Conclusions: The HD time-span exceeding 200 weeks seems to dramatically increase cardiovascular dysfunction. Long-term hemodialysis therapy predictably leads to a decrease of daily residual renal function and to an increase of overhydration requiring a stricter water intake regime which affects the patients’ quality of life. Further studies are necessary to verify relationships between the metabolism of osteocalcin and duration of hemodialysis treatment, overhydration, and cardiovascular risk.
**Results:**

Thirty-one patients undergoing dialysis in the Dialysis Unit in the University of Lodz, Lodz, Poland, were included. The mean age of the patients was 72.3 years ± 4.5, with 30% being males. All the patients were in the stage of CKD (not on HD) and 129 patients on HD.

**Introduction and Aims:**

Systolic blood pressure in heart right ventricle reaching over 30-35 mmHg, assessed by echocardiography on the basis tricuspid regurgitation velocity with the use of Doppler method, is reported in 35% of pre-dialysis patients and in 52% in patients on haemodialysis. Arteriosclerotic fistula, duration of chronic kidney disease (CKD), smoking and female sex are among factors associated with increased pressure in the right ventricle. In patients with pulmonary hypertension (PH), lower values of left ventricular ejection fraction are also observed. It was found that the atrial fibrillation, increased dimensions of the left atrium (LA), increased atrial volume before dialysis VLA 34.9 ±21.1, VRA = 31.4 ± 19.6 and decreased after procedure VLA 34.4 ± 20.9, VRA =30.8± 18.0, reduction in early filling velocity (E) and the ejection fraction were more frequent.

**Conclusions:**

Pulmonary hypertension occurs in the majority of dialysis patients with diastolic heart failure. Female sex, atrial fibrillation, increased LA volume and reduced velocity of early left ventricular filling (E) are independent predictors of the presence of pulmonary hypertension.

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**MP502**

**PULMONARY HYPERTENSION IN CKD PATIENTS**

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**Introduction and Aims:**

Systolic blood pressure in heart right ventricle reaching over 30–35 mmHg, assessed by echocardiography on the basis tricuspid regurgitation velocity with the use of Doppler method, is reported in 35% of pre-dialysis patients and in 52% in patients on haemodialysis. Arteriosclerotic fistula, duration of chronic kidney disease (CKD), smoking and female sex are among factors associated with increased pressure in the right ventricle. In patients with pulmonary hypertension (PH), lower values of left ventricular ejection fraction are also observed. It was found that the compression closing arteriovenous fistula may result in the reduction of PH.

**Methods:**

Thirty-one patients undergoing dialysis in the Dialysis Unit in the Department of Nephrology, Hypertension and Family Medicine, WAM University Hospital in Lodz were enrolled into this study. All patients underwent echocardiographic transhoracic examination to determine systolic blood pressure in the pulmonary artery, indices of diastolic function (E, E′, S) of left and right chamber and assess the volume of right and left atrium. The study was carried out before and shortly after dialysis. Pulmonary hypertension was defined as systolic blood pressure in the pulmonary artery > 35 mmHg.

**Results:**

Mean age of patients was 72.3 years ± 4.5, 30% of them was males. All the patients had impaired diastolic function of left ventricle: E/A = 0.75, E′ = 9.4 ± 4.0 (before dialysis) and E′ = 9.0 ± 4.7 (after dialysis), E/E′ = 13.5 ± 5.0 (before dialysis), E′ = 12.5 ± 5.4, E/E′ = 8.0 ± 5.0, S′ = 30.5 ± 19.6 (after dialysis).

**Conclusions:**

Pulmonary hypertension occurs in the majority of dialysis patients with diastolic heart failure. Female sex, atrial fibrillation, increased LA volume and reduced velocity of early left ventricular filling (E) are independent predictors of the presence of pulmonary hypertension.
R=0.32) and ba-PWV (P=0.001, R=0.29). In multiple regression analysis, alb (P=0.001, β=0.31) and Ca (P=0.029, β=-0.18) were selected as significant predictors of Mg level in HD patients. Furthermore, serum level of Mg (P=0.012, β=-0.22) was selected as significant predictors of ba-PWV. A high level of serum Mg had no significant relation to Cr, UN, β-2MG, alb, and int-PTTH. Moreover, there was no significant correlation between serum levels of Mg and ba-PWV or ABI in HD patients. There was no significant difference in serum levels of Mg between CKD (2.19±0.26 mg/dL) and HD patients (2.34±0.35 mg/dL).

Conclusions: Although, serum levels of Mg had no clinical significance in CKD patients, in patients on maintenance HD, serum Mg level was regulated by serum level of Ca and alb. Furthermore, low serum Mg levels in HD patients was associated with the index of vascular stiffness (ba-PWV).

MP508 RELATIONSHIP BETWEEN N-TERMINAL PRO-BRAIN NATRIURETIC PEPTIDE (NT-proBNP) AND MORTALITY IN HEMODIALYSIS PATIENTS

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Introduction and Aims: N-terminal pro-brain natriuretic peptide (NT-proBNP) is released in blood with an increasing circulating blood volume or increased ventricular stress. NT-proBNP has been reported to be positively associated with left ventricular mass fraction in hemodialysis patients. A high level of serum NT-proBNP has been shown to be a risk factor for heart failure and hospitalization for cardiovascular disease in hemodialysis patients. In this study, we examined the relationship between the serum level of NT-proBNP and mortality and also investigated the cut-off value which could predict cardiovascular death.

Methods: A total of 103 patients receiving maintenance hemodialysis at Sangenjaya Hospital were enrolled in this study. A peripheral blood sample was obtained before hemodialysis on a Monday or a Tuesday, and the serum NT-proBNP levels were measured. Because of the skewed distribution of NT-proBNP, data were normalized by logarithmic transformation for further statistical analysis. A univariate Cox proportional hazards model for the predictor of survival was examined. A receiver operating characteristic (ROC) analysis was performed to assess the cut-off point, the area under the curve (AUC), the sensitivity and specificity.

Results: The mean follow up period was 1.6 ± 0.6 year. During the follow-up period, 20 deaths were recorded. The cause of death was cardiovascular disease in 10 patients and other causes in 10 patients. The univariate Cox analysis identified a high level of log [NT-proBNP] as a predictor of all causes of mortality (Hazard ratio 1.6 (1.33 – 2.98), P < 0.001) and as a predictor of death from cardiovascular disease (Hazard ratio 3.64 (1.91 – 7.85), P < 0.001). The ROC analysis of the NT-proBNP for death from cardiovascular disease revealed 9,412 pg/mL as the cut-off point and the AUC was 0.79, with a sensitivity of 0.90 and specificity of 0.71 over the entire observation period. Among 44 patients who were observed for more than 2 years from their NT-proBNP examination, 7 patients died from cardiovascular disease within 2 years. The ROC analysis of the NT-proBNP for death from cardiovascular disease revealed 9,412 pg/mL as the cut-off point and the AUC was 0.88, with a sensitivity of 0.90 and specificity of 0.78 over the 2-year observation period. The value of NT-proBNP under 9,412 pg/mL was 8,634 pg/mL and the patients survived. The cut-off point might therefore be about 9,000 pg/mL.

Conclusions: Mortality related to cardiovascular disease in hemodialysis patients and related with morbidity and mortality. Aortic knob width (AKW) and the patients survived. The cut-off point might therefore be about 9,000 pg/mL.

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MP509 GENETIC POLYMORPHISM AND CARDIOVASCULAR CO-MORBIDITY IN HEMODIALYSIS PATIENTS

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Introduction and Aims: Cardiovascular morbidity is the major concern in dialysis patients and many risk factors have been supposed to be associated to it. Apart from traditional and non-traditional risk factors, genetic susceptibility may be of importance including renin-angiotensin system (RAS), matrix metalloproteinase 3 (MMP 3) and endothelial nitric oxide synthase (eNOS) polymorphism. The aim of this study was to analyze ACE, MMP 3 and eNOS polymorphism in our group of haemodialysis patients and to correlate the findings with cardiovascular morbidity.

Methods: The study included 200 patients on regular haemodialysis, three times per week on polysulfphone membrane for more than six months. Genetic analysis was performed by using polymerase chain reaction – restriction fragment length polymorphism method (PCR RFLP).

Results: Out of 200 patients 73% had 5A/6A, 21% had 5A/5A and 6% had 6A/6A. MMP 3 genotype respectively. I/D had 55%, D/D had 35% and I/I had 10% of our patients included ACE genotype. Regarding NOS genotype 58% had G/T, 33% had G/G and 9% had G/G. It was shown that patients with D allele genotype experienced significantly higher incidence of cerebrovascular accidents, left ventricular hypertrophy and peripheral vascular disease. The ACE polymorphism showed significant association with incidence of cerebrovascular accidents and hyperlipoproteinemia in our group of haemodialysis patients. The results of this study have shown correlation between 5A allele of MMP 3 gene and significantly higher risk for developing myocardial infarction, cerebrovascular accident and peripheral vascular disease. Less favorable genotype combination allele for MMP3 and D allele for ACE had higher incidence of developing cerebrovascular accident. Although without statistical significance, T/T homozygots for eNOS gene have shown 1.4 folds higher risk for developing myocardial infarction and hyperlipoproteinemia and 1.6 folds higher risk for developing coronary artery disease regarding the G/T heterozygots. Also, G/G homozygots have shown twice higher incidence of left ventricular hypertrophy and 1.4 higher incidence for developing arhythmias and cerebrovascular accident regarding the G/T heterozygots.

Conclusions: Although our results clearly confirmed association of RAS, MMP3 and eNOS genetic polymorphism with CV co-morbidity, we need more studies and longer follow-up in order for definitive conclusion about importance of this finding in daily clinical practice.
CD16/PTX3 and ROS generation in neutrophils was measured by flow cytometry. CAVI and ABI were measured by VaSera VS-1000, whereas endothelium-dependent vasodilatation was assessed non-invasively, using high-resolution ultrasound.

Results: An increase in neutrophil (CD16+) and PTX3 expression were observed in neutrophils (CD16+, CD18+) isolated from HD patients after 30’ (p<0.003 vs T0) and 240’ (p<0.001 vs T0) of HD. The co-localization of PTX3 and collagen IV, observed within neutrophil-specific granules was associated with a significant increase in PTX3 plasma levels at the end of HD (T240’) (p<0.005 vs T0). In HD patients, PTX3 serum levels were significantly and inversely correlated with both FMD responses (p=0.02) and ABI (p=0.03), while a significant positive correlation was found between PTX3 and CAVI values (p=0.0001). Increased PTX3 levels were an independent predictor of both abnormal FMD and CAVI values.

Conclusions: PTX3 expression during HD in “activated neutrophils” may represent a new emerging marker of the chronic inflammatory state in HD patients and a potential risk factor for endothelial dysfunction and vascular damage progression in this setting.

MP509 SCREENING, DIAGNOSIS AND TREATMENT OF ATRIOVENTRICULAR BLOCK IN MAINTENANCE HEMODIALYSIS
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Introduction and Aims: Systemic calcifications are a common finding in chronic renal disease. However, cardiac involvement is especially ominous and leads to conduction defects and arrhythmias that may cause sudden death.

Methods: Prospective study screening 52 hemodialysis patients for cardiac arrhythmia using ECG and 24 h holter ECG monitoring including hemodialysis sessions. Patients with symptomatic atrioventricular block (AVB) were treated by permanent pacing.

Results: Atrioventricular block was found in 4 patients (7.7%), 4 men, aged 61 years with a mean hemodialysis duration of 83.25 months. Two patients were diabetic and hypertensive and one had ischemic cardiomyopathy history. Clinical symptoms were especially fatigue and unconsciousness. One case of reversible cardiopulmonary arrest was noted. ECG/Holter-ECG revealed complete atrioventricular block in all cases. Mitral valve calcifications were present in 2 patients, 2 subjects had aortic valve calcifications and left ventricular hypertrophy. Systolic function was normal in 3 cases. CTVS demonstrates a high ACCS (>401) in two cases with a special involvement of anterior interventricular artery. No short or long-term complications related to pacemaker implantation were encountered.

Conclusions: Cardiovascular calcifications are associated with several disturbances of the conduction system in maintenance hemodialysis, and leads to substantial morbidity and mortality. Many risk factors are established such as advanced age and duration of dialysis. In our patients, AVB was contributed to metastatic calcifications involving the cardiac valves and the coronary arteries consequent to long-term exposure to imbalances in mineral metabolism and the use of calcium carbonate as exposure to imbalances in mineral metabolism and the use of calcium carbonate as a source of calcium. Calcium carbonate has been implicated in the pathogenesis of vascular calcifications in patients on long-term HD. Therefore, calcium carbonate should be substituted by other forms of calcium such as calcium lactate or citrate.
on chronic HD without clinical signs of progressive heart failure.

Methods: This study was conducted on 100 persons, 55 were known as ESRD patients on regular HD (Dialysis group) and 25 patients with CKD not on HD (CDK group) in addition to 20 healthy volunteers (control group). All participants were thoroughly interrogated and examined clinically and were subjected to plasma NT-proBNP level, carotid Duplex and transthoracic echocardiography at baseline and after six months.

Results: Mean NT-proBNP showed significantly higher in dialysis group compared to the CKD group (P<0.001) [Fig. 1]. There is a significant strong inverse correlation between NT-proBNP and EF (P<0.001). There is also a strong positive correlation between NT-proBNP and change of LVM & LVMI over six months (A LVMI (P<0.001). Mean carotid intima-media thickness showed significantly higher in dialysis group and the CKD group, compared to the control group (P<0.01).

Conclusions: The study recommended that plasma NT-proBNP assessment is an easy non-invasive test and should be monitored in HD patients owing to its close relation to left ventricular mass, systolic dysfunction and cardiovascular morbidity and mortality in this population. Rising NT-proBNP levels may reflect worsening ventricular stress and may help earlier diagnostic and therapeutic strategies. CIMT can be used to detect an accelerated disease process and subclinical disease.

**MP513 | EFFECTS OF NOCTURNAL BLOOD PRESSURE ON NUTRITIONAL PARAMETERS IN PATIENTS UNDERGOING HEMODIALYSIS**

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1Department of Nephrology, Abant Izzet Bayazıt University Medical Faculty, Bolu, Turkey, 2Department of Nephrology, Cedral Bajar University Medical Faculty, Manisa, Turkey, 3Nephrology Department, Tipoeck Education and Training Hospital, İzmir, Turkey

**Introduction and Aims:** Malnutrition is a common problem in uremic patients. It is unclear whether there is an association between the degree of malnutrition and 24-h ambulatory blood pressure patterns in patients undergoing hemodialysis (HD). In the present study, we observed the relationship between the degree of malnutrition and ambulatory blood pressure patterns, which are both risk factors for cardiovascular morbidity and mortality.

**Methods:** We observed 148 patients undergoing HD in the Nephrology Department of Cedral Bajar University Medical Faculty, Manisa, Turkey. All cases were assessed for body weight alteration, dietary food intake, gastrointestinal symptoms, loss of subcutaneous fat and muscle tissue, presence and severity of comorbidities, and functional capacity. Each parameter was evaluated between 1 and 5 points; thus, a total malnutrition score was calculated for each case (subjective global assessment). Ambulatory blood pressure measurements were performed for all cases on the day between the two HD sessions.

**Results:** We found that the circadian blood pressure rhythm deteriorated in patients with a high-malnutrition score, and that malnutrition was more common and severe in those subjects with the non-dipper (ND) and reverse diperper (RD) blood pressure patterns. The malnutrition scores of the patients in the RD group were significantly higher than those of the patients in the ND (p = 0.021) and dipper (D) (p = 0.003) groups. Malnutrition score was positively correlated with the nighttime systolic and nighttime mean arterial pressure and mean 24-h arterial blood pressure (p < 0.01). Serum albumin was significantly lower in the ND group compared with the D and ND groups. Serum albumin was negatively correlated with HD duration (p = 0.04, r = -0.21), nighttime systolic blood pressure (p = 0.005, r = -0.28), nighttime mean arterial blood pressure (p = 0.04, r = -0.21), nighttime/daytime mean systolic blood pressure ratio (p = 0.016, r = -0.36), nighttime/daytime mean diastolic blood pressure (p = 0.027, r = -0.32), and nighttime/daytime mean blood pressure (p = 0.012, r = -0.41). The malnutrition index was significantly correlated with the mean nighttime/daytime systolic blood pressure ratio (p < 0.001, r = 0.42) and mean nighttime/daytime diastolic blood pressure ratio (p = 0.002, r = 0.40).

**Conclusions:** This is the first study to investigate the possible association between malnutrition and deterioration of the blood pressure circadian rhythm in a HD population. We suggest that a deteriorated diurnal blood pressure rhythm parallels the malnutrition phenomenon in patients undergoing HD. However, the issue of sympathetic overactivity or volume overload as the main cause of deterioration in circadian blood pressure rhythm in patients with malnutrition remains unclear.

**MP514 | THE RELATIONSHIP BETWEEN NEUTROPHIL/LYMPHOCYTE RATIO AND BRAIN NATRIURETIC PEPTIDE IN HEMODIALYSIS PATIENTS**

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**Introduction and Aims:** We observed 148 patients undergoing HD in the Nephrology Department of Cedral Bajar University Medical Faculty, Manisa, Turkey. All cases were assessed for body weight alteration, dietary food intake, gastrointestinal symptoms, loss of subcutaneous fat and muscle tissue, presence and severity of comorbidities, and functional capacity. Each parameter was evaluated between 1 and 5 points; thus, a total malnutrition score was calculated for each case (subjective global assessment). Ambulatory blood pressure measurements were performed for all cases on the day between the two HD sessions.

**Results:** We found that the circadian blood pressure rhythm deteriorated in patients with a high-malnutrition score, and that malnutrition was more common and severe in those subjects with the non-dipper (ND) and reverse diperper (RD) blood pressure patterns. The malnutrition scores of the patients in the RD group were significantly higher than those of the patients in the ND (p = 0.021) and dipper (D) (p = 0.003) groups. Malnutrition score was positively correlated with the nighttime systolic and nighttime mean arterial pressure and mean 24-h arterial blood pressure (p < 0.01). Serum albumin was significantly lower in the ND group compared with the D and ND groups. Serum albumin was negatively correlated with HD duration (p = 0.04, r = -0.21), nighttime systolic blood pressure (p = 0.005, r = -0.28), nighttime mean arterial blood pressure (p = 0.04, r = -0.21), nighttime/daytime mean systolic blood pressure ratio (p = 0.016, r = -0.36), nighttime/daytime mean diastolic blood pressure (p = 0.027, r = -0.32), and nighttime/daytime mean blood pressure (p = 0.012, r = -0.41). The malnutrition index was significantly correlated with the mean nighttime/daytime systolic blood pressure ratio (p < 0.001, r = 0.42) and mean nighttime/daytime diastolic blood pressure ratio (p = 0.002, r = 0.40).

**Conclusions:** This is the first study to investigate the possible association between malnutrition and deterioration of the blood pressure circadian rhythm in a HD population. We suggest that a deteriorated diurnal blood pressure rhythm parallels the malnutrition phenomenon in patients undergoing HD. However, the issue of sympathetic overactivity or volume overload as the main cause of deterioration in circadian blood pressure rhythm in patients with malnutrition remains unclear.

**MP515 | HUMORAL AND ECHOCARDIOGRAPHIC PREDICTORS OF MORTALITY IN CHRONIC KIDNEY DISEASE**

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**Introduction and Aims:** Previous studies indicate that several humoral and echocardiographic factors are predictive for cardiovascular mortality in patients with chronic kidney disease (CKD). However, complete quantitative echocardiograms evaluating several parameters in conjunction with humoral factors have not been reported. The aim of this study was to determine humoral and echocardiographic predictors of survival in two groups of patients, predialysed and dialysed.

**Methods:** Three humoral factors, brain natriuretic peptide (BNP), C-reactive protein (CRP), fibrinogene, and complete echocardiograms were evaluated in 95 CKD patients (59 predialysed, and 45 dialysed). Kaplan-Meier survival analysis and Cox proportional hazards regression analysis were used to determine which variable predicted the all-cause mortality.

**Results:** In a group of predialysed patients predictors of all-cause mortality were BNP and CRP. Regarding echocardiography, several parameters appeared to be predictive for all-cause mortality: left ventricular ejection fraction, left atrial volume index, indexes of myocardial deformation, and systolic myocardial velocity by tissue doppler. In the group of hemodialysis patients the only predictor of all-cause mortality were BNP and CRP. Cox proportional hazards regression analysis revealed, that in predialysed patients the strongest predictor of mortality were BNP, CRP, and left atrial volume index. For hemodialysis patients the strongest predictor was only CRP.
PROGNOSTIC VALUE AND LINK TO ATRIAL FIBRILLATION OF CIRCULATING KLOTHO AND FGF23 IN HEMODIALYSIS PATIENTS

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Introduction and Aims: A deranged calcium-phosphate metabolism contributes to the burden of morbidity and mortality in dialysis patients. This study aimed to assess the association of the phosphaturic hormone Fibroblast growth factor 23 (FGF23) and its coreceptor Klotho with morbidity and mortality.

Methods: This is a prospective multicenter longitudinal observational study. We measured circulating Klotho and FGF23 levels at enrollment and two weeks later in 239 prevalent hemodialysis patients.

Results: Median Klotho levels were similar in non-survivors and in survivors (351 vs 338 pg/ml, P=0.85). Increasing Klotho levels were not associated with mortality in a multivariable adjusted analysis when examined either on a continuous scale (HR 1.24; 95%CI 0.83-1.87 per SD increase) or in tertiles, with the tertile 1 as the reference category (HR for tertile two 0.65; 95%CI 0.26-1.64; HR for tertile three 2.18; 95%CI 0.91-2.23). Kaplan-Meier analysis with long-rank test did not reveal a significant difference between groups stratified according to the Klotho tertiles. Klotho levels were lower among patients with atrial fibrillation than without (307 vs. 350 pg/ml, P=0.03). Increasing Klotho levels were associated with the absence of atrial fibrillation in a multivariable adjusted logistic regression analysis (OR 0.66; 95%CI 0.42-1.02 per SD increase). Median FGF23 levels tended to be higher in non-survivors than in survivors (394 vs 201 reference units/ml, P=0.03). Increasing FGF23 levels were associated with monotonically increasing mortality risk in a multivariable adjusted analysis when examined either on a continuous scale (HR 1.45; 95%CI 1.06-1.98 per SD increase) or in tertiles, with the tertile 1 as the reference category (HR for tertile two 1.57; 95%CI 0.62-3.99; HR for tertile three 3.91; 95%CI 1.26-12.34).

Conclusions: FGF23, but not circulating Klotho levels, are associated with mortality in hemodialysis patients. Higher circulating Klotho levels seem to be protective against atrial fibrillation.