HCV+ and HBV+ pts can decrease prevalence of these infections in HD and only one case (1.8%) for HBV. Therefore, the separation of units for both virus were reanalyzed by the same technique. Only 1 pt episode of transfusion or multiple hospital admissions. At T1 all "-") pts from 1 to 10 years in 2 HD units. Only 48% of these pts were on EPO. EPO treatment was available in only 20% of pts, and routinely screening test for HCV started in 1997. Transmission of HCV without blood transfusion, including the nosocomial infection should be present in dialysis centers. So the usage of separate machine for anti-HCV+ pts may be useful for the prevention of this infection.

We report the results of a prospective epidemiological study of infection by HCV and HBV in dialysis, carried out between 01.01.1999 (T0) and 31.12.1999 in the cohort of 2 HD centers (n=36). At T0 specific isolation policy was introduced: HBSAg+ pts were dialysed in separate section, and anti-HCV+ pts were dialysed on separate machine. Universal rules of hygiene and systematic disinfecting of the generators between each use were always in our practice. The staff in the Dialysis Units was vaccinated for HBV. Serological studies were made using a latex screening slide test for detection of surface B antigen ("Immunostics.inc", USA) for screening and ELISA ("General biological corporations",Switzerland) to confirm seropositivity. We tested 56 pts (38M: 28F), aged 15-70 years in the period on the HD treatment from 10/1993 to 10/1994 in 2 HD units. Only 48% of these pts were on EPO. At T0 of our study the prevalence of HBV and HCV infection was 13% and 20% respectively. Most of these infected pts had at least one episode of transfusion or multiple hospital admissions. At T1 all "-") pts for both virus were reanalyzed by the same technique. Only 1 pt become HBSAg+ was registered, who received one occasional session of HD in another center without a policy of separating units. Conclusions: In the 7 years preceding the isolation, the annual incidence of novo infection (HBV and HCV) was 5% (3 cases/year) in our 2 HD centers without a policy of separating units. There were no seroconversions, however, till December 1995 another anti-HCV positive patients were detected, however, till December 1995 another 2 HD infected patients were found. The follow-up included all changes in HD population treated until the end of 1998. The incidence of seroconversion to HCV was 12.9% in 1995, 7.1% in 1996, 5.0% in 1997, and 6.6% in 1998. The higher incidence of seroconversion in September to November 1994 was probably due to the nosocomial infection being in the incubation period at the time of isolation.

This prospective study in a large HD unit with high prevalence of HCV infection has shown a relatively successful prevention of HCV spread. Procedure-related transmission of HCV was controlled by rigorous application of universal precautions as recommended by CDC. As a second line of prevention, in highly burdened dialysis centers, segregation of HCV positive patients can help control of nosocomial transmission.

We have treated 24 hyper PTH patients with two different vitamin D compounds during six months. Group I (n=12) was treated with 1,25-(OH)2D3 iv, and Group II (n=12) received 1-alfa-OH-D3 iv. Both of them were similar at the beginning of the study in terms of age, previous haemodialysis time and mean values of PTH (Group I 553,4 ± 238,5 vs Group II 494,8 ± 213,3 pg/ml). The dose of both drugs was adjusted in each patient according to PTH levels and modified every month in accordance with the response. After 3 months treatment, there were significant decreases of PTH levels in both groups (208,8 ± 145,3 in Group I and 161,1 ± 127,5 pg/ml in Group II) which allowed a reduction of drug’s dose. After 6 months, PTH levels were higher than the 3 months ones, but lower than the basal levels (297,9 ± 98,3 in Group I and 228,6 ± 107,8 pg/l in Group II). In Group I, it was necessary to interrupt treatment temporary in several occasions in 5 out of the 12 patients due to the increase of CaP product. In Group II this only happened once in one patient. In conclusion: Hyper-PTH can be controlled with both drugs, but the CaP increase episodes were more frequent in the 1,25-(OH)2D3 Group, so it requires a higher level of control. In both groups we think that it’s not suitable to modify doses when isolated decreases of PTH levels happen as this can lead to later increases; we suggest to wait two or more months in order to confirm that these decreases subsist.
In order to estimate the variation of homocysteine levels in serum of haemodialysis patients and the effect of certain factors such as folate, vitamin B12, folic acid, and creatinine, we measured the homocysteine levels and the folate levels in a group of 50 subjects undergoing hemodialysis. The subjects included 25 men and 25 women, with ages ranging from 28 to 80 years. The measurement was performed at the beginning of the dialysis session and after 4 hours of dialysis.

In conclusion, the results of our study suggest that the serum folate levels are inversely related to the homocysteine levels. This finding is consistent with previous studies that have reported a positive correlation between folate deficiency and high homocysteine levels. Therefore, supplementation with folate may be an effective strategy to reduce the risk of cardiovascular disease in patients undergoing hemodialysis.

**References**


**Acknowledgments**

We would like to thank the patients who participated in this study and the staff of the hemodialysis unit for their cooperation and support.

**Funding**

This study was supported by a grant from the Dutch Heart Foundation (2000.007).

**Conflict of Interest**

The authors declare no conflicts of interest.

**Ethical Approval**

The study was approved by the institutional review board of the University of Amsterdam.

**Corresponding Author**

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INCREASED LEVELS OF PLATELET-ERYTHROCYTE AGGREGATES IN END-STAGE RENAL DISEASE

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Increased levels of platelet-erythrocyte aggregates (PEA) have been found in patients with sickle cell anemia as compared to control subjects. This enhancement may contribute to vascular occlusion and vasculopathy of that disease. Using fluorescent-labeled monoclonal antibodies and flow cytometry, we examined for evidence of PEA in 12 chronic uraemic patients (pts) on maintenance haemo dialysis (HD), 6 pts on continuous ambulatory peritoneal dialysis (CAPD), 10 pts with chronic renal failure (CRF) on conservative treatment (serum creatinine concentration ranging from 1.6 to 4.7 mg/dl) and 11 healthy control subjects.

Pts on HD and pts on CAPD showed an increase in PEA compared to normal controls (6.1%±0.2% and 5.8%±0.5%, respectively, vs 1.2%±0.1%; p<0.05). No difference in PEA levels between undialysed pts with CRF (2.9%±0.2%) and healthy subjects was observed. A strong correlation (r=0.9; p<0.001) was found between the percentage of PEA and the serum creatinine concentration in pts on conservative treatment. No difference in PEA levels was determined in pts on HD between cellulosic (n=6) or synthetic (n=6) membranes and when comparing the beginning to the end of the dialysis session.

The formation of PEA could be duplicated in vitro by physiologic concentrations of platelet specific agonists (ADP, PAF) but not with normal complement factor C3a. Transmission electron microscopy validated the flow cytometric findings and showed the presence of fibrillar material at platelet-erythrocyte point of contact. We next studied with immunoelectron microscopy the expression of tenascin, thrombospondin (TSP), collagen IV and fibronectin on platelets and erythrocytes before and after 15 min of HD. Tenascin and collagen IV were not present, while the low predialysis expression for TSP was unchanged during HD session. In contrast, as compared to predialysis, fibronectin showed an increased localization on HD on erythrocyte’s surface and at platelet-erythrocyte point of contact.

Our results indicate the presence of elevated levels of PEA in uraemic pts on haemodialysis and may involve fibronectin.

HIGH CARDIOVASCULAR (CVS) COMORBIDITY IN GIP SIES ON CHRONIC HEMODIALYSIS (cHD)

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The poor outcome of gipsies on cHD programme request a special caution in regard to possible reasons for high morbidity and mortality of this ethnic group on cHD.

We investigate the structure of morbidity and mortality of gipsies with ESRD on cHD (28, M/F=19/9) at our center for 1990-1999 period in comparison with whites (253), adjusted for age, gender and time on cHD. High CVS comorbidity at the start of cHD was dominant, while diabetes mellitus or systemic diseases were not present. Blood pressure at the start of cHD was higher in gipsies (systolic 175 vs 155, p<0.05, diastolic 105 vs 90, p<0.05); congestive heart failure was prevalent in gipsies (22% vs 15%, p<0.01), also the left ventricular hypertrophy (75% vs 60%, p<0.05) and ischaemic heart disease (33% vs 18%, p<0.01). These CVS morbidity odds remained constant during cHD. CNS stroke was prevalent in gipsies (12% vs 8%, p<0.05), also heart calcifications (49% vs 35%, p<0.01), but perirenal vascular diseases were without difference. CVS mortality participated with 60% in total mortality! Sudden death, heart failure and CNS stroke were the most prevalent causes of death. The late initiation of cHD, high blood pressure, left ventricular hypertrophy, high interdialytic weight gain and holesterol level were risk factors for high CVS mortality, despite good homoglobin level and absent diabetes mellitus.

The low survival rate in gipsies on cHD is mostly affected by high CVS morbidity and mortality. These CVS complications request better predialysis evaluation of ESRD gipsies and theirs precise dialytic and medicament treatment on cHD.

CARDIAC FUNCTION IN DIALYSIS PATIENTS EVALUATED BY A DOPPLER INDEX COMBINING SYSTOLIC AND DIASTOLIC PERFORMANCE

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Because systolic and diastolic dysfunction frequently coexist, it is hypothesized that a combined measure of left ventricular chamber performance may be more reflective of overall cardiac dysfunction than systolic or diastolic measures alone. The purpose of this study was to assess the clinical value of a Doppler derived index, designed to determine the combined systolic and diastolic myocardial performance.

Study patients consisted of 25 patients on maintenance dialysis 3 times per week, 4 hours long. Patients age range (19-78). All patients underwent two-dimensional, color and pulsed echocardiography one hour before and immediately after haemodialysis (HD). Pulsed Doppler measurements were obtained from the 4-chamber apical view, positioning the sample volume at the mitral valve leaflet tips. We measured the peak of initial velocity (E), the late velocity (A), and deceleration time of E wave. A new Doppler-derived index, designed to determine the combined systolic and diastolic myocardial performance and defined as the sum of isovolumetric contraction time plus isovolumetric relaxation time divided by ejection time was estimated from left ventricular outflow and mitral inflow velocity patterns.

<table>
<thead>
<tr>
<th>parameter</th>
<th>Before HD</th>
<th>After HD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart rate</td>
<td>72 ± 8</td>
<td>76 ± 10</td>
<td>NS</td>
</tr>
<tr>
<td>E</td>
<td>93 ± 32</td>
<td>76 ± 30</td>
<td>0.035</td>
</tr>
<tr>
<td>A</td>
<td>87 ± 32</td>
<td>92 ± 28</td>
<td>NS</td>
</tr>
<tr>
<td>E/A ratio</td>
<td>1.3 ± 0.7</td>
<td>1.0 ± 0.5</td>
<td>0.02</td>
</tr>
<tr>
<td>DT (ms)</td>
<td>208 ± 48</td>
<td>217 ± 49</td>
<td>NS</td>
</tr>
<tr>
<td>New Doppler Index</td>
<td>0.48 ± 0.2</td>
<td>0.39 ± 0.3</td>
<td>P&lt;0.05</td>
</tr>
</tbody>
</table>

Conclusion: After haemodialysis, E wave velocity, E/A ratio and peak filling velocity decreased. The A wave velocity was unchanged. Such changes are probably caused by reduction in preload. We need further studies to validate the usefulness of the new Doppler index in this population.

THE COMPARISON OF DUAL- ENERGY X-RAY ABSORPTIMETRY AND BIOELECTRIC IMPEDANCE ANALYSIS IN DETERMINATION OF BODY COMPOSITION IN HEMODIALYSIS PATIENTS

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Chronic renal failure causes changes in body composition due to many factors. Reliable technique is required to determine and follow up changes in body composition. Dual-Energy X-Ray Absorptiometry (DXA) and bioelectric impedance analysis are the frequently applied techniques to evaluate body composition in chronic renal failure.

In the present study, we aimed to perform comparative analysis of DXA and bioelectric impedance analysis in determination of minor changes in body composition occurring during a single hemodialysis session. Eight female, 7 male stable hemodialysis patients were enrolled in the study. Each patient was weighed by the same digital scale before and after dialysis and body composition was determined by DXA and bioelectric impedance analysis before and after dialysis in each patient.

Table 1: Body composition parameters by DXA before and after dialysis

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Before (gr)</th>
<th>After (gr)</th>
<th>Difference (gr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bone Mineral Content (BMC)</td>
<td>1828,6</td>
<td>1823,0</td>
<td>-3,6</td>
</tr>
<tr>
<td>Fat Mass (FM)</td>
<td>17531,4</td>
<td>17636,1</td>
<td>+104,7</td>
</tr>
<tr>
<td>Lean Body Mass (LBM)</td>
<td>42645,5</td>
<td>40106,6</td>
<td>-2538,9</td>
</tr>
<tr>
<td>Total Weight</td>
<td>62009,0</td>
<td>59839,8</td>
<td>-2169,2</td>
</tr>
</tbody>
</table>

When measurements before and after dialysis by DXA were considered, changes in fat mass (FM) and bone mineral content were not statistically significant, whereas lean body mass (LBM) and total weight measurements before and after dialysis differed significantly. When bioelectric impedance analysis was considered, fat mass, lean body mass and water content before and after dialysis were found to be statistically significantly different. As a conclusion, DXA is a quite sensitive technique in determination of FM, LBM and BMD and can be used in dialysis patients to determine short and long term changes in body composition. Despite bioelectric impedance analysis is less reliable in determination of body composition, it can be still used in determination of dry weight in conjunction with clinical parameters since it is a noninvasive and easy to perform technique at bedside.

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COADMINISTRATION OF INTRAVENOUS (I.V.) IRON GLUTONATE AND HEPARIN IN HEMODIALYSIS (HD).
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The most frequent I.V. iron preparations used for hemodialysis patients are iron dextran, iron saccharate and iron gluconate. Several Authors confirmed the safety of I.V. iron saccharate and sodium ferric gluconate versus iron dextran. Sodium ferric gluconate complex in sucrose has an allergic events reporting rate of 3.3 allergy episodes per million doses per year compared with a rate of 8.7 reported allergy events for iron dextran in the United States. Some protocols for coadministration of I.V. iron-heparin have been proposed with the aim of develop a simple and safe method of giving I.V. iron supplementation to patients receiving regular HD therapy. In our work heparin and ferric gluconate were mixed in normal saline and given as a continuous infusion via the heparin syringe pump at maximum rate of 7 ml/h. A loading dose of heparinization is given prior to the start of the continuous infusion. A total of more than 4000 doses of I.V. iron gluconate and heparin have been administered in 51 patients and no adverse reactions have been observed. A t-Test for independent variables was performed. The hematocrit (Htc) rose from 30.7±3.2 to 32.8±3.3% (p<0.001), whilst serum ferritin rose from 131±96 to 410±254 ng/ml (p<0.001). Multiple regression analysis before and after iron-heparin therapy showed positive correlation for ferritin (p<0.03) but not for Htc.

ASSOCIATIONS BETWEEN ENDOTHELIAL INJURY MARKER von WILLEBRAND FACTOR ANTIGEN (vWF:Ag), INFLAMMATION AND CORONARY ARTERY DISEASE IN HEMODIALYSIS PATIENTS
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Increased plasma soluble vWF:Ag level, a marker of vascular endothelial cell dysfunction is a strong predictor of atherosclerotic cardiovascular disease (CVD) in the general population. In view of a link between generalized inflammation, vascular injury and CVD, we investigated for the first time associations between vWF:Ag and some acute phase reactants, prevalence of CVD, predialysis arterial blood pressure (BP) and a variety of clinical parameters in long-term HD pts. Data are shown as mean ±SD or median (range). Immunoreactive predialysis plasma vWF:Ag level of 130.6 (65.2-288.5) µg/L was found to be higher in 110 clinically stable non-diabetic HD pts than in 30 controls (P < 0.001). The vWF:Ag level and prevalence of CVD, and found factors which may be predictive of sTM in HD pts. In conclusion, high sTM is a consequence of chronic viral hepatitis and liver dysfunction revealing a marker of generalized endothelial injury in HD pts, and is dependent on the use of the endothelium-active heparins and EPO. As low predialysis BP is reportedly predictive of CVD death in this population, the observed associations between low sTM and low Biological and as between the former and higher CVD prevalence and severity suggest that high sTM reflects better cardiovascular status in HD pts.

Supported by a grant (No 4 PO5B 014 15) from the KBN, Warsaw, Poland

DISTURBANCES OF SLEEP IN PATIENTS WITH CHRONIC RENAL FAILURE
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Disturbances of sleep have been reported in patients with end-stage renal failure. Poor sleep, characterized by diminished sleep efficiency, enhanced fragmentation and decreased slow-wave sleep have been shown. In recent years, it has been recognized that patients with end-stage renal disease also suffer from breathing and movement disorders. So far, systematic studies on their type and extent are lacking. In the present study polygraphy was performed in 34 consecutive patients with chronic renal insufficiency and end-stage renal disease treated with hemodialysis. The mean age of the patients was 63 years. The sleep study consisted of continuous polygraphic recording from a three-way thermistor that measured nasal/oral airflow, and from noninvasive leads measuring abdominal and chest wall movements, leg movements, oxygen saturation, heart rate, tracheal sounds (microphonic), and body position (polysensomap, martinsried, germany). 29% of the patients had clinically significant obstructive sleep apnea, but it was generally mild: in 90% the apnea/hypopnea index was between 10 and 20/hour. 6% had a periodic breathing pattern with central apneas, and in the other 35% of the patients respiratory events were not more than 50% of the night. 76% of the patients were found to have periodic leg movements, 54% of them with a frequency of ≥ 50/hour. There was no significant correlation between age, sex, or time on dialysis and a specific sleep disorder (polyuria, periodic leg movements, sleep disordered breathing). It is concluded that these patients should consequently be monitored for sleep disorders and that polygraphy or polysomnography should be performed accordingly.

ENDOTHELIAL FUNCTION MARKER SOLUBLE THROMBO MODULIN (sTM) IN HEMODIALYSIS PATIENTS: ASSOCIATIONS WITH VIRAL HEPATITIS, CARDIOVASCULAR DISEASE (CVD) AND TREATMENT MODALITIES
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Recently, the Atherosclerosis Risk in Communities (ARC) Study showed the unexpected relationship between elevated circulating sTM, regarded so far as a marker of endothelial cell (EC) injury, and decreased risk of coronary heart disease in the general population (Lancet 353:1729-34,1999). We reexamined cross-sectionally the relationship between sTM level and prevalence of CVD, and found factors which may be predictive of sTM in HD pts. Prevalision serum sTM (by ELISA) was higher in 100 non-diabetic HD pts than in 30 controls [10.7 (5.7-20.7) vs. 1.96 (0.12-22) ng/mL, P < 0.001]. The sTM highest vs. lowest quartiles differed by:

<table>
<thead>
<tr>
<th>Highest Quartile</th>
<th>Lowest Quartile</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-HCV &amp;/or HbsAg (+) (n)</td>
<td>16</td>
<td>3</td>
</tr>
<tr>
<td>ALAT (IU/l)</td>
<td>56 (16-256)</td>
<td>18 (8-47)</td>
</tr>
<tr>
<td>ALP (IU/l)</td>
<td>119 (35-228)</td>
<td>65 (39-236)</td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
<td>21.7 (16.6-30.5)</td>
<td>25.6 (18.4-35.0)</td>
</tr>
<tr>
<td>Total cholesterol (mg/dL)</td>
<td>132 (95-238)</td>
<td>181 (139-265)</td>
</tr>
<tr>
<td>Platelet count (x 10³/µL)</td>
<td>160.3 ± 46.3</td>
<td>200.0 ± 55.6</td>
</tr>
<tr>
<td>nPCR (g/kg/day)</td>
<td>0.85 ± 0.16</td>
<td>1.01 ± 0.22</td>
</tr>
<tr>
<td>Duration of HD (mo)</td>
<td>23 (10-50)</td>
<td>10 (1-79)</td>
</tr>
<tr>
<td>UF heparin/enoxaparin (n)</td>
<td>18 / 7</td>
<td>6 / 9</td>
</tr>
<tr>
<td>Acute/bicarbonate buffer (n)</td>
<td>13 / 12</td>
<td>5 / 20</td>
</tr>
<tr>
<td>EPO-treated (n)</td>
<td>19</td>
<td>11</td>
</tr>
<tr>
<td>ACEI-treated (n)</td>
<td>14</td>
<td>11</td>
</tr>
</tbody>
</table>

In addition, sTM was positively correlated with predialysis systolic (R=0.250, P=0.012) and diastolic blood pressure (BP) (R=0.203, P=0.043), and negatively with liver-syntheses biomarker (R=-0.261, P=0.029). sTM tended to lower in 10 pts with multigland CVD than in 32 with one organ disease (P=0.089) and those 58 without CVD (P=0.052). sTM was not related to age, sex, other antihypertensive drugs used, smoking, Kt/V, Hb and HD duration, biochemical markers or to acute-phase markers such as WBC, albumin, fibrinogen and CRP. By forward stepwise multivariate analysis, positive hepatitis markers (P=0.003), unfractionated heparin use (P=0.018), EPO use (P=0.040) and elevated BP (P=0.038) were significant positive independent predictors of high sTM level, while prevalent CVD was a significant negative predictor (P=0.157).

In conclusion, high sTM is a consequence of chronic viral hepatitis and liver dysfunction revealing a marker of generalized endothelial injury in HD pts, and is dependent on the use of the endothelium-active heparins and EPO. As low predialysis BP is reportedly predictive of CVD death in this population, the observed associations between low sTM and low Biological as between the former and higher CVD prevalence and severity suggest that high sTM reflects better cardiovascular status in HD pts.

Supported by a grant (No 4 PO5B 014 15) from the KBN, Warsaw, Poland
INSULIN RESISTANCE, DYSLIPIDEMIA AND SURVIVAL AMONG PATIENTS ON LONG TERM HEMODIALYSIS

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In the present study, C-peptide and the insulin/glucose ratio were estimated in 23 (19 men) non-diabetic patients undergoing hemodialysis, three times before an hemodialysis session. In 19 (15 men) of them (who were on hemodialysis program for 5.9±3.05 years), the ratio was >0.4 (0.5±0.09) and C-peptide was 3.2±1.37 ng/ml, suggesting insulin resistance (IR). In 4 men (who were on hemodialysis program for 7.31±3.24 years), the ratio was ≤0.04 (0.04±0.01, p<0.01) and C-peptide was 0.65±0.04 ng/ml (<0.05). They were characterized as non-insulin resistant (NIR). The IR phenotype was well correlated (p=0.000005) only with age (p=0.033) and the presence of hypertension (p<0.01), while is not related with the BMI, the dialyzer and the primary disease (Multiple Logistic Regression-Logit analy.). The overall survival rate of IR patients was markedly lower than that of NIR (p=0.0001, Kaplan-Meier model, Gehan’s-Wilcoxon test). The mean monthly plasma lipid levels, the years that patients were on hemodialysis, appeared significantly different for the above mentioned two groups. The IR patient group had higher levels of total cholesterol (TCHOL) (p=0.0001), triglycerides (p=0.0001) and low density lipoproteins (LDL) (p=0.0001). The influence of the lipid levels on the survival of the two groups appeared to be statistically significant (p<0.00001) for the triglycerides (p=0.000001) and the ratio TCHOL/HDL (p=0.013) [Proportional hazard (cox) regression model].

Insulin resistance in patients on chronic hemodialysis is possibly associated with a marked increase of risk for CHD because of the consequent dyslipidemia, like in general population.

ANGIOTENSIN II TYPE 1 RECEPTOR GENE POLYMORPHISM AND END-STAGE RENAL DISEASE

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The genes of the renin-angiotensin system (RAS) are involved in progression of renal failure. Known actions of angiotensin II are mediated through the angiotensin II type receptor (AT1R). We examined the A1166C polymorphism at the AT1R locus in patients with renal failure. The distribution of genotype and allele frequencies in this polymorphism was compared in 300 hemodialysis patients and 200 healthy controls. DNA samples from patients and controls were amplified by the polymerase chain reaction (PCR) and amplification product were digested with BsuRI restriction enzyme. In the presence of cytosine (C) of the A1166C polymorphism there is a restriction site for the enzyme, giving a fragment of 231 bp (C allele). An undigested 255 bp fragment indicates the presence of A allele. The frequency of combined CC and AC genotypes was also higher in the patient group (55% vs. 44%, p=0.05). No statistically significant difference in A and C allele frequency was observed between patient group and controls. Comparing genotype distribution, the higher frequency of CC homozygotes was found in hemodialysis patients than in controls (8% vs. 4.5%, p<0.05).

The frequency of combined CC and AC genotypes was also higher in the patient group (55% vs. 44%, p=0.05). Our results indicate that the homozygous CC genotype might be associated with faster deterioration of renal function. In this finding is confirmed in a larger population of hemodialysis patients, the C allele of the AT1R locus polymorphism could serve as a prognostic marker in the progression of renal disease.

THE INFLUENCES OF DIALYSIS METHOD ON PHAGOCYTIC FUNCTIONS OF CIRCULATING MONOCYTES

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In order to observe the influences of dialysis method on non-opsonic and opsonic phagocytosis by circulating monocytes belonging to continuous ambulatory peritoneal dialysis (CAPD) and hemodialysis (HD) patients, we evaluate the percentages of non-opsonizing cells, of cells which internalizes sheep erythrocytes, and of cells which fixed at their surface sheep erythrocytes without internalize them (joined).

Fifteen male patients (10 CAPD, 5 HD) were investigated. Continuous ambulatory peritoneal dialysis therapy characteristics were: daily at every 6 hrs, dialysis solution CAPD02 Fresenius (2L/exchange) and dialysis system ANDY PLUS. Hemodialysis therapy characteristics were: schedule 13.5 hrs/ week (3 sessions), bicarbonate dialysis, dialyzers 1.3m2 (polysulphone), QB=250mL/min, QD=50mL/min. The in vitro phagocytic functions of monocytes were estimated using light microscopy, counting cells which uptake the foreign cells and expressing their percentage from the total number of monocytes, after blood centrifugation on Ficoll-Odson mixture.

We found differences between opsonic and non-opsonic phagocytosis, concerning the number of internalized sheep erythrocytes by each group of patients and between them. The mean percentual values of our results are summarized below.

Phagocytosis type

<table>
<thead>
<tr>
<th></th>
<th>Dialysis</th>
<th>Sheep erythrocytes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-opsonic</td>
<td>HD</td>
<td>74.3%</td>
</tr>
<tr>
<td></td>
<td>CAPD</td>
<td>70.5%</td>
</tr>
<tr>
<td>Oposonic</td>
<td>HD</td>
<td>17.3%</td>
</tr>
<tr>
<td></td>
<td>CAPD</td>
<td>18.50%</td>
</tr>
</tbody>
</table>

Concerning non-opsonic phagocytosis, there are no significant differences between HD and CAPD patients. During opsonic phagocytosis, the monocytes of HD patients show a double internalization capacity than those of CAPD patients (chi-squares=8.87; p<0.003). The opsonic phagocytosis is much weaker in CAPD than HD patients.

INTRAPERITONEAL INSULIN INDUCES HEPATIC SUBCAPSULAR STEATOSIS IN DIABETIC CAPD PATIENTS

Medical School, University of Tampere and Tampere University Hospital, Tampere, Finland

The aim of this cross-sectional study was to evaluate hepatic fat accumulation in diabetic patients using intraperitoneal or subcutaneous insulin treatment during CAPD. We studied 16 patients with diabetic end-stage renal disease currently on CAPD. Median age of the patients was 42 (range 34-70) years, duration of diabetes 27.5 (range 17-39) years and duration of CAPD 16.5 (range 2-59) months. To evaluate mechanisms underlying liver steatosis we studied ultrasound measures of steatotic liver area and thickness, peritoneal equilibration test (PET), weekly KT/V inulin, protein catabolic rate (PCR), HbA1c, lipoproteins, alanine aminotransferase, alkaline phosphatase, insulin dose and dialysate glucose load.

Hepatic subcapsular steatosis was found in 7/8 patients administering insulin intraperitoneally and in 0/8 patients on subcutaneous insulin administration. The maximal thickness of hepatic subcapsular steatosis correlated directly with peritoneal transport rate (2-hour dialysate to plasma creatinine ratio in PET, r= 0.80, p< 0.05) and inversely with PCR (r=-0.82, p<0.05). The area of the lesions correlated inversely with weekly KT/V inulin (r=-0.90, p<0.01) and PCR (r=-0.39, p< 0.05). In conclusion, intraperitoneal insulin together with glucose-based peritoneal dialysate induces hepatic subcapsular steatosis. The amount of steatosis increases when peritoneal transfer rate is high, and PCR and dose of dialysis are low. The possible mechanism is a local effect of insulin in conjunction with high carbohydrate energy supply, high peritoneal transport rate and poor nutrition.
Abstracts

EVALUATION OF PLATELET ACTIVATION MARKER-SELECTIN P (CD 62) DURING HAEMODIALYSIS USING STANDARD HEPARIN AND LOW-MOLECULAR WEIGHT HEPARINS.

I Janicka*, A Dmoszynska**, E Madnor*, K Mareczewski*, A Walter-Cronek**, Dept. of Nephrology* and Dept. Haematology**, University Medical School in Lublin, Poland

Blood platelets are one of the basic elements responsible for functioning of homeostasis system. The contact of blood with artificial membrane induces activation of platelets and results in occurrence of clots in hemodialysis. To prevent coagulation during the procedure the standard heparin is used as routine. Recently low-molecular weight heparins (LMWH) are introduced into hemodialysis procedure as alternative to standard heparin.

To evaluate the influence of LMWH and standard heparin on platelet activation during hemodialysis we measured the percentage of circulating CD62 positive platelets by dual-color flow cytometry. We studied 53 stable patients on HD (MF 28:25) with an average age 51.2 years (range 26 to 73 years). The mean duration of HD was 4.7±1.2 years (range 1 to 16 years). All patients were dialysed with polysilicone membrane. 28 of them were anticoagulated with standard heparin, 13 with enoxaparin and 12 with nadoparin. No one was taking medication know to influence platelet function for at least two weeks. Samples were taken from the inlet side of the dialysers at the baseline (0') and from the outlet side after 15' and 240' and fixed immediately with 1% paraformaldehyde. Transit of platelets through the dialysers resulted in the dialysers.

Compression time (CT) at puncture sites was evaluated at the end of session. The mean duration of HD was 4.7±1.2 years (range 1 to 16 years). All patients were dialysed with polysilicone membrane. 28 of them were anticoagulated with standard heparin, 13 with enoxaparin and 12 with nadoparin. No one was taking medication know to influence platelet function for at least two weeks. Samples were taken from the inlet side of the dialysers at the baseline (0') and from the outlet side after 15' and 240' and fixed immediately with 1% paraformaldehyde. Transit of platelets through the dialysers resulted in the dialysers.

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LOW MOLECULAR WEIGHT HEPARIN (LMWH) ANTICOAGULATION FOR ANY HAEMODIALYSIS PATIENT ?

P Cambier, H Jarosz, F Stouvenakers, A Sepul, X Warling, M Robin

Dept. of Nephrology, Centre Hospitalier Régional La Citadelle, Liège, Belgium

Unfractionated heparin (UFH) is generally used to prevent clotting of blood in the extracorporeal circuit of patients undergoing haemodialysis. LMWH should have some advantages, compared to UFH.

The aim of the study was to evaluate the efficiency of enoxaparin in 62 stable patients. No hypolipidemic treatment was given during the study period. After a 2 months control period, all patients were shifted from UFH to LMWH anticoagulation. Mean dose for UFH was: 91.8±26 IU/kg body weight and 0.7±1.20 mg/kg for enoxaparin.

Compression time (CT) at puncture sites was evaluated at the end of each session; hemoglobin (Hb) weekly; Kt/V and fasting levels of total cholesterol (TC) HDL cholesterol (HDL) and triglycerides (TG) monthly.

Clotting of dialysers or blood lines at the end of session was observed in 3.94% of UFH and 4.28% of LMWH sessions. Table 1 summarizes the results (mean ± sd).
EFFECT OF HEMODIALYSIS ON VARIOUS FRACTIONS (BOUND AND UNBOUND) OF SERUM VALPROIC ACID CONCENTRATION

J-M. Pouyé, D. Marchiset-Leca², A. Tifoura¹, F. Leca³.
¹Service de Néphrologie C.H.G. d’Ajaccio, Ajaccio. ²Unité de pharmacocinétique CHD de Castellucio, Ajaccio.

Valproic acid (VA) is considered unremovable by hemodialysis at therapeutic levels because of its high protein binding. We conducted, for the first time, the pharmacokinetic study of various forms (bound and unbound) of serum VA in a M patient with dialysis-encephalopathy despite VA therapy for seizure. Pharmacokinetic of VA (determined by FPIA on TDXFLX Abbott) was studied during 24 h. including one dialysis session (performed on dialyzer Acapel 1600, Hospal-Lyon Fr.). VA (500mg sustained release form) therapy was given at 8 am, 6 hours prior to hemodialysis. Dialysis clearances (CL HD) were calculated for various forms of VA by the formula : CL HD = QE where Q is the flow rate through the dialyser and E (%) the extraction efficiency. Protein binding of VA was 79% before dialysis. Dialysis clearance of total serum VA was 28 ml/min after a dialysis time of 120 min. 24 h. serum of bound and free VA concentrations, with their respective mid-dialysis CL HD, are illustrated in the above figure. This study shows that, despite therapeutic serum total level, extraction of free VA during dialysis is high and accountable for prolonged removal of the active form.

THE RISK FACTORS FOR INTACT PTH RESPONSE AND VASCULAR CALCIFICATION IN DIALYSIS PATIENTS

Sengül S, Öndemir FN, Arat Z, Sezer S, Ünal T, Turan M, Haberal Baskent University Faculty of Medicine, Departments of Nephrology and Biochemistry, Ankara, Turkey

Hypoparathyroidism and adynamic bone disease have been reported frequently in dialysis patients with the recent developments of measuring intact PTH. In this study, serum and dialysate samples were evaluated and laboratory parameters as a risk factor for hypoparathyroidism and presence of vascular calcification among our dialysis patients. Clinical characteristics (age, gender, dialysis duration, underlying renal disease), laboratory parameters (PTH, CaXP products, acute phase reactants, Fb, nutrition parameters, echocardiographic findings) vascular calcifications were evaluated in 801 dialysis patients. The patients who were diagnosed as hypoparathyroidic due to vitamin-D treatment, who un-derwent paratiroidecomy and with high Al levels were excluded. We performed 3 groups based on intact PTH levels. Group I (441 patients, mean age of 46,2±16,64 years, dialysis duration 46,9±41,2 months) was hypoparathyroidic (intact PTH < 150 pg/ml), group II (216 patients, mean age of 41,7±15,3 years, dialysis duration 47,9±44,2 months) was normal (intact PTH between 150 and 300 pg/ml), group III (82 male, 63 female, mean age of 38,6±15 years, dialysis duration 55,1±50,4 months) was hyperparathyroidic (intact PTH ≥ 300 pg/ml). Students t-test, Mann-Whitney U test and chi-square test were used as statistical analysis. Comparing the three groups according to the age and underlying renal disease in group I; the mean age was significantly higher than the others (p=0.001, p=0.000), also diabetic patients and young patients with secondary amyloidosis strongly correlated with low intact PTH (p=0.001, p=0.018). High CRP and low CaXP levels were statistically significant in group I. The incidence of vascular calcification between groups was insignificant but there was strong correlation with age, albumin, CRP levels and dialysis duration. In conclusion diabetes mellitus, secondary amyloidosis with younger age, acute phase response and aging might be the significant contributing factors to the hypoparathyroidism in our dialysis patients. In addition vascular calcification was independent from i.PTH levels and was correlated with chronic inflammatory process.

C282Y ALLELE OF THE HFE GENE (HEREDITARY HEMOCROMATOSIS) AND INTRANOVENOUS IRON TREATMENT IN DIALYSIS PATIENTS.

Nephrology and Immunology* Services. Hospital Dr Negrín. Gran Canaria. Spain.

Hereditary hemochromatosis has been strongly associated with homozygosity for the C282Y allele of the HFE gene. Genotype of the HFE gene may have important clinical implications in Dialysis patients (DP) because these patients are frequently treated with IV iron. We studied C282Y genotype in the general population (GP; n=417) and in DP (n=236) as well as iron metabolism parameters after 4 moths on iron glucenate treatment (2g). The allelic frequency of the C282Y allele was 0.03 in the GP group and 0.036 in the DP group. With these frequencies, assuming Hardy-Weinberg equilibrium, the expected frequencies of the HFE gene were:

- GP
- DP
- C282Y +/+ 0.9%
- C282Y +/− 1.3%
- C282Y −/− 5.9%

Taking in consideration the frequencies in the DP group, 1/14 patients are expected to be C282Y heterozygote. Pre-treatment iron metabolism parameters in DP were:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Pre-treatment</th>
<th>Post-treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saturation (%)</td>
<td>22.8±4.9</td>
<td>21.4±5.8</td>
</tr>
<tr>
<td>Ferritin (ng/ml)</td>
<td>294±258</td>
<td>276±239.5</td>
</tr>
</tbody>
</table>

Seven C282Y +/+ patients and 94 C282Y −/− patients were treated with IV iron. Pre- and post-treatment iron metabolism parameters in these patients were:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Pre-treatment (A)</th>
<th>Post-treatment (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferritin (ng/ml)</td>
<td>248±296</td>
<td>161±127</td>
</tr>
<tr>
<td>Saturation (%)</td>
<td>15.4±2.6</td>
<td>16.2±5.9</td>
</tr>
</tbody>
</table>

Conclusions: 1) Genotypic frequencies for the C282Y allele were similar in DP and GP, 2) C282Y Heterozygote patients treated with IV iron showed higher ferritine and saturation index values than C282Y negative patients. So to avoid iron overload, C282Y genotyping may be useful previous to IV iron administration.

EXPRESSION OF ADVANCED GLYCACTION END PRODUCTS RECEPTORS ON HUMAN JOINT SYNOVIAL CELLS.

FF Hou, JP Jiang, X Zhang.
Division of Nephrology, Nanfang Hospital, Guangzhou, P.R.China

α2 microglobulin modified with advanced glycation end products (AGE-α2m) plays a critical role in the pathogenesis of dialysis-associated amyloidosis. To elucidate the pathobiological effects of AGE-α2m on joint cells, we determined the expression of AGE binding proteins on human joint synovial cells.

Type A and type B synovial cells were isolated and cultured in vitro. The expression of AGE receptor 1 (AGE-R1), AGE receptor 2 (AGE-R2), AGE receptor 3 (AGE-R3) and 35 KD receptor for AGE (RAGE) on synovocytes were detected by immunofluorescent staining using specific antibodies and flow cytometric analyses. Messenger RNA (mRNA) of AGE receptors were examined by RT-PCR techniques. RAGE and AGE-R3, but not AGE-R1 and AGE-R2, were constitutively expressed on the membrane surface of both type A and type B synovial cells. These two types of synovial cell also expressed mRNA of RAGE and AGE-R3. Human synovial cells express specific AGE binding proteins, RAGE and AGE-R3, suggesting that synovial cells may be involved in AGE metabolism in joint tissue and might be the target of the pathobiological effects of AGE in DRA.
Abstracts

CHOICE OF RENAL REPLACEMENT THERAPY AFFECTS HEMOSTASIS IN END-STAGE RENAL FAILURE
J. Malytsko, J. S. Malytsko, M. Mysliwiec. Nephrol Dept, Bialystok Univ. Sch. Med, Bialystok, Poland

Disturbances in hemostasis is a common finding in uremic patients. Both bleeding diathesis and thrombosis are observed. The purpose of the study was to assess whether renal replacement therapy: HD and CAPD affects coagulation and fibrinolysis in patients with ESRF. 24 HD subjects and 23 patients on CAPD were evaluated with respect to platelet aggregation (PA), some hemostatic parameters, serum lipids, lipoprotein (α) and cytokines (TNFα and IL-1). PA in the whole blood and plateletrich plasma (PRP) was significantly impaired in both groups of dialyzed patients when compared to control group (CG). Cholesterol and TG were significantly higher in CAPD when compared to HD and CG. Markers of endothelial cell injury; thrombomodulin and von Willebrand factor were significantly higher in HD and CAPD when compared to CG. The similar pattern of changed were observed for Lp(a), fibrinogen, tissue factor pathway activity, vWF activity. Activity of IX was significantly enhanced in CAPD when compared to either HD or CG. ECLT was significantly prolonged in uremic patients over CG, being more prolonged in CAPD. Markers of ongoing coagulation: thrombin-antithrombin complexes (TAT) and prothrombin fragments 1+2 were higher in uremic patients, significantly higher in CAPD than in HD, whereas marker of ongoing fibrinolysis: plasmin-antiplasmin complexes (PAP), higher in uremic patients over CG showed an opposite change, was lower in CAPD than in HD. Concentrations of TNFα and IL-1 were higher in HD than in CAPD. Patients on CAPD showed an evidence of higher degree of hypercoagulation than HD subjects. Moreover, atherogenic lipid profile was noted in CAPD patients when compared to HD. The hemostatic abnormalities in ESFR can be affected to a considerable extent by the choice of renal replacement therapy.

HAEMODIALYSIS DOES NOT ACUTELY IMPROVE ENDOTHELIAL FUNCTION AND ARTERIAL DISTENSIBILITY IN PATIENTS WITH CHRONIC RENAL FAILURE
M. Kosch, M. Hausberg, A. Levers, K. Kisters, M. Schaefer, M. Barenbrock, K. H. Rahn. Dep. of Medicine D / Nephrology, University Muenster, Germany

Endothelial function and large artery distensibility are impaired in chronic haemodialysis patients and may contribute to increased cardiovascular mortality. It is not clear, whether haemodialysis per se acutely alters large artery vessel wall properties. Therefore, we determined endothelium-dependent, flow-mediated (FMD) and endothelium-independent nitroglycerine-induced vasodilation (NMD) of the brachial artery, aortic and brachial pulse wave velocity (PWV) and distensibility of the brachial and carotid arteries immediately before and after dialysis (HD) and on the day between dialysis treatments. 25 haemodialysis patients (age 52±9 years, time on dialysis 63±17 months, mean fluid change -1460ml) were studied. Using a multigate pulsed doppler-system (echo-tracking device) brachial artery FMD, NMD and carotid and brachial distensibility coefficients (DC) were measured. PWV was determined using the Complior® device. NMD was 23.0±4.0%. HD did not acutely affect functional arterial vessel wall parameter (mean±SEM): parameter before HD after HD interval

<table>
<thead>
<tr>
<th>Parameter</th>
<th>before HD</th>
<th>after HD</th>
<th>interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBP/DBP (mmHg)</td>
<td>132±4 / 72±2</td>
<td>137±4 / 72±2</td>
<td>130±2 / 73±2</td>
</tr>
<tr>
<td>FMD (%)</td>
<td>7.9 ± 2.0</td>
<td>6.8 ± 2.1</td>
<td>6.7 ± 2.0</td>
</tr>
<tr>
<td>brachial DC (10^-3/kPa)</td>
<td>13.8 ± 2.0</td>
<td>13.3 ± 2.0</td>
<td>13.8 ± 2.0</td>
</tr>
<tr>
<td>carotid DC (10^-3/kPa)</td>
<td>18.4 ± 1.9</td>
<td>16.0 ± 2.6</td>
<td>19.8 ± 2.4</td>
</tr>
<tr>
<td>aortic PWV (m/s)</td>
<td>12.6 ± 0.8</td>
<td>12.8 ± 0.8</td>
<td>11.9 ± 0.7</td>
</tr>
<tr>
<td>brachial PWV (m/s)</td>
<td>9.5 ± 0.4</td>
<td>9.4 ± 0.4</td>
<td>8.5 ± 0.5</td>
</tr>
</tbody>
</table>

Despite clearance of uremia toxins and putative endogenous inhibitors of the NO-synthetase, endothelial function and arterial distensibility do not acutely improve after hemodialysis in patients with chronic renal failure.

PSEUDOHYPERKALEMIA COULD BE CONSIDERED ON MAINTENANCE HEMODIALYSIS TO AVOID UNWAR-RANTED TREATMENT FOR IT
H.J. Kim, S.W. Han, K.W. Lee. Division of Nephrology, Dept. of Internal Medicine and Renal Replacement Center, Hanyang University Kuri Hospital, Kuri, Korea

The serum to plasma potassium (K) difference in patients (n=42) on maintenance hemodialysis more than one year was analyzed to evaluate the degree of pseudohyperkalemia among the study. In all 42 hemodialysis patients, the following predialysis K concentration frequencies were found: serum K – normal (3.5-5.5 mEq/L) 24, high (> 5.6 mEq/L) 18, low (< 3.4 mEq/L) none; plasma K – normal 31, high 9, low 2. Ten out of 18 patients with high serum K revealed normokalemia in plasma K, of whom 6 patients have been taking Kayexalate for K removal medication and off. The difference between serum K (mean±SE, 5.4±0.14 mEq/L) and plasma K (4.9±0.13 mEq/L) were statistically significant with the range from 0.0 to 1.6 mEq/L (mean, 0.72±0.3 mEq/L, p<0.01). In contrast, its difference in normal healthy 12 subjects measured simultaneously with hemodialysis patients ranged only from ~0.1 to 0.6 mEq/L (mean, 0.25±0.2 mEq/L). However, platelets or white blood counts were not different significantly between hemodialysis patients and healthy subjects. Furthermore, no correlation between the values of serum minus plasma K concentrations and platelets or white blood cell counts, and Kt/V was found on hemodialysis patients. In conclusion, when unexpected high serum K are found on maintenance hemodialysis patients, we recommend routinely measuring simultaneous plasma K to verify the results being valid or not, then to avoid unnecessary treatments or manage-ments.

CORRELATIONS OF ALEXITHYMIA AND NITRIC OXIDE IN END STAGE RENAL FAILURE PATIENTS
C. Papageorgiou1, E. Grapsa2, N.G. Christodoulou1, A. Vourliotou3, S. Moutafis1, N. Zerefos1, G.N. Christodoulou2
1Alexandra Hospital Athens, 2Psychiatric Department University of Athens, Eginition Hospital, 3University College London, Medical School.

Alexithymia refers to a disturbance in affective and cognitive function. The somatic focus is characteristic of individuals with alexithymia, accompanied by difficulties of recognizing and verbalizing feelings. With respect to regulation of somatic functions, components of the peripheral Autonomic Nervous System have been recognized that use neither Acetylcholine nor noradrenaline for transmission. Of particular interest, in this perspective, is the observation that the gas Nitric Oxide (NO) acts as a neurotransmitter, vasodilator and mediator of pain.

Under this light we attempted to examine the correlations between these somatic (non-adrenergic and non-cholinergic) parameters and Alexithymia in a sample of chronic renal patients undergoing haemodialysis. Given that NO has a short half-life of less than 30 sec and decays spontaneously to nitrite and nitrate we measured these metabolites (Nox) in deproteinized serum by ultrafiltration (filtrate) through centrifree cut off 10,000 (Amicon) and using an enzymatic endpoint colorimetric method (Boehringer-ger, Cat. N. 1746681).

Severn levels of nitric and nitrate and alexithymia scores (using the Sifneos Alexithymia scale) were measured before the dialysis sessions. 20 patients (10 males and 10 females) matched for age and duration of illness participated in the study. Using linear regression analysis we found that a strong-positive correlation exists between alexithymia scores and nitrite/nitrate serum levels (p=0.017). These results support the hypothesis that NO, in addition to its properties as a neurotransmitter vasodilator or co-mediator of pain may be involved in the mechanism of pain. These findings seem to be consistent with the literature documenting the development of Alexithymia in individuals who have experienced substantial psychological trauma. These data are preliminary and require replication with larger samples.
EVALUATION OF IMMUNOLOGICAL MARKERS IN HEMODIALYSIS PATIENTS TREATED WITH SIMVASTATIN C. Tampieri1, A.M. Fritrinceli1, A. Scardovi1, G. Emiliani2, M. Fusaroli2 1-Centro Dialisi Lugo (RA). 2-Servizio di Nefrologia e Dialisi Ospedale di Ravenna Italy.

Chronic hemodialysed patients present a condition of immunosuppression causing an increased risk for infections and neoplastic diseases. The cardiovascular risk can be reduced in these patients employing statins. Recently was reported an antiproliferative and an immunosuppressive effect of these drugs. We decided therefore to evaluate some immunological markers in a group of hemodialysed patients treated with Simvastatin. We selected 11 patients (8 M, 3 F) aged 63±14 years, dialytic age 77±52 months, with serum LDL cholesterol > 140 mg/dl, previous episodes of coronary disease or periferal vasculopathy and without inflammatory or immunologic diseases. They assumed Simvastatin 10 mg, once a day, at the beginning of the study and after 1 month of therapy were performed: C reactive protein (CRP); total, LDL and HDL cholesterol; triglycerides (TRI); total lymphocytes CD3+; T4 lymphocytes CD4+; T8 lymphocytes CD8+; natural killer CD16+; B lymphocytes CD19+; T4/T8 ratio; cells with Interleukin 2 receptors CD25+; T cells expressing HLA-DR+; activeted cells CD3+CD25+; activated T lymphocytes CD3+HLA-DR+. We observed a significative reduction in total and LDL cholesterol; HDL, TRI, and CRP showed no significative variations; we found a slight decrease in the whole T lymphocyte population although non significative; the CD4 population showed a reduction with a contemporary increase of CD8 producing a decrease of T4/T8 ratio. The natural killer population remained unchanged. Noteworthy was the clear increase of the percentage of B lymphocytes, observed in all patients. Evaluating the activity markers we found a global slight increase, of statistical value only for CD3CD25+ cells.

Our data suggest a modulating action of statins therapy on the immunological status of dialysis patients, further studies are needed to define long term effects.


The diagnosis of high bone turnover disease may be made by bAP values high or in normal range alone or associated with serum iPTH > 200 pg/ml (Urena, JASN 1996). Furthermore, during calcitriol pulse therapy isolated serum iPTH determinations do not always reflect changes of bone histology (Salusky, KJ 1998). Twenty-two pts mean age 59±12 years on HD for a mean of 66±49 months, with high bAP values (n.o. 40-125 mU/ml) and iPTH > 250 pg/ml, were treated with oral calcitriol pulse therapy (twice a week), and evaluated for bAP (measured by agarose determinationes do not always reflect changes of bone histology). During the study and after 1 month of therapy were performed: C reactive protein (CRP); total, LDL and HDL cholesterol; triglycerides (TRI); total lymphocytes CD3+; T4 lymphocytes CD4+; T8 lymphocytes CD8+; natural killer CD16+; B lymphocytes CD19+; T4/T8 ratio; cells with Interleukin 2 receptors CD25+; T cells expressing HLA-DR+; activeted cells CD3+CD25+; activated T lymphocytes CD3+HLA-DR+. We observed a significative reduction in total and LDL cholesterol; HDL, TRI, and CRP showed no significative variations; we found a slight decrease in the whole T lymphocyte population although non significative; the CD4 population showed a reduction with a contemporary increase of CD8 producing a decrease of T4/T8 ratio. The natural killer population remained unchanged. Noteworthy was the clear increase of the percentage of B lymphocytes, observed in all patients. Evaluating the activity markers we found a global slight increase, of statistical value only for CD3CD25+ cells. Our data suggest a modulating action of statins therapy on the immunological status of dialysis patients, further studies are needed to define long term effects.

HEMOCOLITIC BACTERIAL PYLORI SEROPOSITIVITY, SERUM LIPOID LEVELS AND HYPERHOMOCYSTEINEMIA IN HAEMODIALYSED PATIENTS V. Sepe, 1A Appiani, 2S Ottoni, 3G Patrucco, G C Guazzotti, C Peona

 Departments of Nephrology, 1Microbiology and 2Clinical Biochemistry, Ospedale S. Andrea, Vercelli, Italy

Controversial data have been published on the association of chronic helicobacter pylori [HP] infection with elevated serum lipid levels and hyperhomocysteinemia [hHcy]. Aim of this study was to evaluate the relation between anti-HP IgG and serum level of atherosclerosis risk factors in haemodialysed [HD] patients. We analysed data from a cohort of 58 HD patients aged [mean ± SD] 69±13 yr and on chronic haemodialysis for 62±47 mth. In all patients serum levels of cholesterol [cho], triglycerides [tri], cholesterol LDL [HDL], total homocysteine [tHcy], folic acid [fol], vitamin B12 [B12] and anti-HP IgG were tested. Seropositive HP patients [HP+] were 29 out of 58 [50%]. No statistical differences between HP+ and HP- where observed: cho 178±41 vs 197±56, tri 172±133 vs 165±102, HDL 30±9 vs 40±11, tHcy 33±15 vs 43±34, fol 5±4 vs 4±2, B12 684±440 vs 572±383. No side effects related to the above treatment were observed. This study shows that high oral supplements of calcium levofolinate [90 mg/week] together with cyanocobalamin and pyridoxine are a safe and effective treatment of hHcy in chronic HD patients.
INFuENCE OF HADMIALYSIS SESSION (HD) ON HEARING ORGAN IN CHILDREN WITH END-STAGE RE-NAL DISEASE (ESRD).
I. Makulska, K. Orendorz-Fraczkowska*, D. Zwołinska, L. Pospiech*
Department of Pediatric Nephrology, Medical University of Wroclaw, Department of Otorhinolaryngology, Medical University of Wroclaw*, Poland

Hearing loss occurs in children with chronic renal failure. In case of ESRD hearing organ abnormalities were described frequently.

Objectives: The aim of the study was to estimate influence of the HD session on a hearing organ in children with ESRD.

Material: 20 children, on a maintenance HD, aged 11-19 years, average 14 years, were examined. Duration of treatment was 6-49 months, average 21.

Method: Hearing organ function was estimated before and after HD by: tonal audiometry, tympanometry, brainstem auditory evoked potentials (BAEP) examinations, also otoacoustic emission spontaneous and evoked (OAE, EOAE, DPOAE). Serum urea, creatinine, uric acid, sodium, potassium, calcium, phosphorus, Ht, blood pressure before and after HD were examined.

Results: Significant differences were observed in brainstem auditory evoked potentials as a latency time shortening in I and III wave and interpeaks I-III, I-V. In some children cochlear’s products were increased after HD. There was no significant differences in tonal audiometry, tympanometry and stapedial muscle reflex threshold before and after HD session.

Conclusions: In patients after HD session beneficial effects in hearing impulses conduction were observed. It seems that decrease of uremic toxins improves hearing organ function.
CIRCULATING LEVELS OF ADHESION MOLECULES AND CYTOKINES IN DIALYSIS PATIENTS

Department of Nephrology, Hippokration General Hospital, Thessaloniki, Greece

Elevated levels of circulating adhesion molecules and cytokines have been reported in dialysis patients but their pathological and clinical implications remain largely unclear.

Methods: Serum levels of sICAM-1, sVCAM-1 and MCP-1 were measured by ELISA in 52 patients on maintenance dialysis (HD), 10 patients with chronic renal failure (CRF) and 10 normal subjects (NS). Significant elevation in predialysis levels of sICAM, VCAM-1 and MCP-1 were observed in HD patients compared with controls [MsSE] (544±27 vs 261±24 ng/ml, p<0.001; 2045±151 vs 1026±39 ng/ml, p<0.0001; 754±69 vs 129±16 pg/ml, p<0.0001 respectively). There was no correlation between adhesion molecules or cytokine levels and type of the HD membrane or treatment with erythropoietin. MCP-1 levels had a correlation with sICAM-1 (p<0.003) but not with sVCAM-1 levels. Moreover, sICAM-1 was significantly increased in patients with vascular diseases (eg. cardiovascular, cerebrovascular and peripheral vascular disease) (p<0.03). Patients with CRF had increased levels of sICAM-1 (1867±54), VCAM-1 (1367±94) and MCP-1 (507±65) compared with controls (p<0.0001 respectively).

Results: Serum creatinine had a positive correlation with serum levels of sICAM-1 (r=0.21, p<0.02), VCAM-1 (r=0.2, p<0.03) and MCP-1 (r=0.24, p<0.006).

In conclusion, serum levels of adhesion molecules and cytokines are elevated in HD and CRF patients which probably reflect inadequate clearance as well as enhanced synthesis/release. Increased levels of sICAM-1 and MCP-1 may be related to the accelerated vascular disease in HD patients.

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CIRCULATING LEVELS OF ADHESION MOLECULES AND CYTOKINES IN DIALYSIS PATIENTS

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Abstracts

A NEW ARRHYTHMIA MONITORING SYSTEM TO IMPROVE THE OUTCOME OF PATIENT’S UNDERGOING HEMODIALYSIS
B. Schulteiss, J. Maiwald', G. Henning', G. Stein2
Tilmanau Technical University, 1 Department of Internal Medicine IV, Friedrich Schuller University of Jena, Germany

Cardiac arrhythmias are frequently documented in patients undergoing hemodialysis treatment and the population is known to suffer from an elevated frequency of sudden cardiac death. For a better understanding of the patient’s well-being and outcome during dialysis sessions, these events and their hemodynamic effectiveness should be considered.

Based on the ECG/ICG-measuring system multiscreen (medis, Germany) a new monitoring tool was developed allowing an online detection and classification of ventricular (VEB) and supraventricular (SVEB) ectopic beats as well as the assessment of their hemodynamic effectiveness. Analysing the heart rate variability an online arrhythmia detector was constructed. The system was applied in the clinical investigation of 110 patients (61 M, 49 F, mean age 63±13,1 years) undergoing intermittent hemodialysis treatment. Clinically significant ventricular arrhythmias (Lown II-IV) were found in 28 patients, while 20 patients showed an intermittent arrhythmia as well as 15 patients showed an arrhythmia perpetua. In these investigations up to 403 VEB per hour with no stroke volume (SV) and an elevating frequency during dialysis session were found. On the other hand VEB with normal SV were observed, too. The increased frequency of ectopic beats during hemodialysis sessions can be explained by changes of the circulatory system due to ultrafiltration, especially in patients with impaired cardiac function as well as diabetes mellitus.

In conclusion the proposed online analysis of the hemodynamic effectiveness of VEB and SVEB allows a more reliable estimation of the patient’s cardiac risk as well as a better dialysis management.

CERTIFICATION WITH ISO 9002 OF A HEMODIALYSIS UNIT: FROM THE INDUSTRY TO THE HEALTH SERVICES.
K. Stamate1ou, I. Kleopas, D. Valis.
Hemodialysis Unit, Hygeia, Athens Greece.

The need for quality control and improvement in the health care services has led to the application of quality assurance (QA) initiatives and the introduction of industrial quality standards in the health sector. However, due to the unique characteristics of the health sector, a different implementation process is required for the quality system to be settled and viable in the long term.

The purpose of our study was to implement a quality process that would lead to ISO 9002 certification of our hemodialysis unit, which was in fact achieved by the end of 1999. The quality system implementation phases included: 1. Formulation of Quality Plan of the Unit, consisting of quality policy, quality targets and writing of quality manual.

2. Description and analysis of all unit procedures, medical, nursing, communications, water purification, machinery service as well as optimization procedures.

3. Determining staff required skill mix, responsibilities and inter-team interaction.

Avoiding staff perception of the quality process as punitive and maintaining staff morale was perhaps the most difficult point of the implementation process.

ISO 9002 certification can help in increasing credibility and assuring customer/patient satisfaction through conformance to the proclaimed organisational standards. A specialist team working with unit staff was required for the introduction of QA.

Strong commitment of the unit management to the quality process is essential for establishing a successful and viable quality process and achieving ISO certification.

PLASMA CYTOKINE IMBALANCE IN HD PATIENTS WITH CARDIOVASCULAR DISEASES
Department of Clinical Medicine and Applied Biotechnology, S. Orsola University Hospital, Bologna, Italy.

The aim of this study was to check the possible alterations of both anergic (M-CSF, IL-6) and antiatherogenic (TGF-β) cytokines in HD patients and see whether any correlations exist either both with acute phase markers or the severity of coronary, cerebral and peripheral artery involvement. 122 patients on RDT for over 12 months were selected for the study. All patients underwent the bicarbonate HD, heparin as anticoagulant, with PE or PS (low and high flux) hollow-fiber as dialyzer. 52 patients (Group A) had a previous history (clinical and instrumental) of coronary artery disease (CAD) or severe arteriopathy while 70 (Group B) had neither CAD nor peripheral arterial vasculopathy. 42 healthy volunteers (Group C) were studied to provide control data. We measured TGF-β1, M-CSF, IL-6 and Lp(a) by Elisa, CRP by an immunoassay system. Blood samples were taken at the start and end of dialysis. In dialysis patients the TGF-β1 basal levels were significantly lower than controls (p<0.001). In Group A TGF-β1 was significantly lower than both Group B (p<0.001) and Group C (p<0.001) and correlated with the severity of CAD (r=0.78). M-CSF and IL-6 were significantly higher in Group A than Group B and C (p<0.01). M-CSF was positively correlated with the number of the vascular districts involved. In Group A TGF-β1 resulted in a positive correlation with Lp(a) (r=0.56) and CRP (r=0.68 and 0.58 respectively). The present results suggest that some imbalance between M-CSF, IL-6, and TGF-β serum levels may be involved in cardiovascular diseases of dialysis patients together with the well known risk factors.

TO BE OR NOT TO BE: ISOLATION OF HCV PATIENTS IN A HEMODIALYSIS UNIT?
Department of Medicine, Division of Nephrology King Khalid University Hospital, Riyadh, Saudi Arabia.

HCV is the major viral hepatitis among patients on maintenance hemodialysis. HCV patients are not commonly isolated from the seronegative patients. 42 patients were undergoing chronic hemodialysis in our unit for the last 5 ±3.2 years [range 14-1, median 5 years]. At the initiation of HD 23 patients were infected with HCV [prevalence about 60%], one patient with HBV and 18 were seronegative for both. We started isolating our patients with HCV infection for the last 10 years observing the same precautions as HBV patients. Only two seronegative patients [one dialyzed for 3 years and other for 7 years] converted to HCV positive most likely while being dialyzed at other center [HCV patients are not isolated there] during vacation. Elevated liver enzymes were the initial indication of seroconversion. Our annual incidence of only 0.2% with a prevalence of HCV of 60% is much less than reported annual incidence of 35.5% (1). We suggest that even though the HCV genome is of varied nature, isolating such patients will significantly decrease the seroconversion to HCV in seronegative patients.

A SOFTWARE TOOL FOR DIALYSIS SYSTEM PERFORMANCE ESTIMATION
A. Wüppel, J. Vienken, M. Krämer
Universitätsmedizin Göttingen, Germany

The aim of the investigation was to develop a software tool that allows to predict the performance of the dialysis system, expressed as effective whole blood clearance, for any given treatment condition.

A mathematical model was developed that includes aspects of the theoretical analysis by Waniewsky et al. describing aqueous clearance for combined diffusive and convective mass transfer in hollow fiber dialysers. The concept of effective blood water flow, depending for every single marker on the contribution of erythrocytes, is used to transfer aqueous clearance to whole blood clearance. To obtain effective clearance, values can be corrected for recirculation.

In an in vitro setup clearance data for solutes sodium (used as surrogate for urea), creatinine, vitamin B12, insulin and cytochrome c were obtained under HD, predilution HDF and postdilution HDF conditions. Experimental data showed excellent agreement with model predictions. Comparison of clinical data with predicted whole blood clearances showed good agreement within the range of error of the measurements. More than 270 clinical clearance data for urea, creatinine, phosphate and beta-2-microglobulin obtained with F40, F60 and HDF100 were analyzed.

Input values of the software are the treatment conditions and the patient’s hematocrit, recirculation and weekly treatment time.

Output values are the effective clearances and weekly cleared volumes of urea, creatinine, phosphate and beta-2-microglobulin and of non-bound toxins in the molecular weight range of vitamin B12 and insulin.

This tool allows to obtain easily the efficacy of a specific treatment condition.

RESOURCE ALLOCATION FOR END-STAGE RENAL DISEASE (ESRD) IN ROMANIA
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Romania’s Renal Replacement Therapy Programme (RRTP) has been operating on a low budget by the standards of the developed world. As a result of recent structural changes to the country’s health care system, further budgetary constraints are in prospect.

The aim of this research is support health care decision-makers by providing an evidence-based evaluation of options for the management of end-stage renal disease in Romania, drawing on epidemiological and health services research. The objectives are: to estimate the burden of conditions leading to end-stage renal disease; to estimate the burden of regional need for renal replacement therapy; to review current provision in the light of national and local policies; and to estimate the resource implications of providing services in different modalities, at different volumes and in different contexts. Both primary data sources (national key persons interviews, local key persons interviews, centre questionnaires) and secondary sources (national health survey, National Renal Registry and EDTA Registry) are used.

Results from National Health Survey (1997) give the following point prevalence rates for the main conditions leading to a need for ESRD: hypertension (HT) 15.7%; primary renal disease (PRD) 2.9%; and EKodes (DM) 2.55%, with local variations from 1.45 to 16.7%, PRD from 2.55% to 3.44% and in DM from 1.9% to 3.2%, (N=4,561). In 3 sampled ESRD treatment centres the main groups of patients treated were: PRD 73.1% (of which glomerulo-nephritis was 33.8%, interstitial nephropathies 17.9%, and other renal 21.4%); HT 6.9%; DM: 4.1% and unknown aetiology 15.9%.

Currently people aged 65+ are under-represented in Romanian ESRD treatment centres. For this age group the Romanian rate for 1997 was 27% of the UK rate in 1991 [95% CI 20% to 34%] whereas in other age bands figures in Romania were higher than in the UK. There appear to be marked geographic inequities; for example, in the north-eastern districts SSR=0.51, 95% CI 0.43 to 0.59.

The variation in annual costs per patient of different therapies is quite small by type of provider (Teaching Centre $10,130.4; District Centre $9,738.3) and by mode of therapy (teaching haemodialysis (HD) 10,604.9 vs. district HD $10,386.3 and teaching continuous ambulatory peritoneal dialysis (CAPD) 9,655.9 vs. district CAPD $9,090.3). A mathematical model to explore different combinations of treatment options is being developed.

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INFLUENCE OF A PRECEDING ICODEXTRIN EXCHANGE ON PERITONEAL EQUILIBRATION TEST RESULTS
T. Llasi, M. Haag-Weber1, E. Ditrigh, H. Puttenger1, B. Schneider1, W.H. Horl1, A. Vychytil1
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The peritoneal equilibration test (PET) is an important tool for evaluating peritoneal membrane characteristics and for individualisation of dialysis prescriptions in peritoneal dialysis patients. Icodextrin is a polymeric glucose polymer (MW 16800 D) which induces ultrafiltration due to colloid osmotic pressure through the small pores of the peritoneal membrane. Therefore, it is especially effective during long dwell times. The main indications for icodextrin solutions are daytime dwell in patients on automated peritoneal dialysis (APD) and nighttime exchanges in continuous ambulatory peritoneal dialysis (CAPD) patients. In the latter group of patients PET is started immediately after the icodextrin exchange.

Therefore, we performed two PETs in each of 15 peritoneal dialysis patients. PET “glucose” was done immediately after a preceding exchange with 2L 1.36% glucose dialysate solution (dwell time 10 hours). PET “icodextrin” was started immediately after a preceding exchange with 2L 7.5% icodextrin solution (dwell time 10 hours).

The D/P creatinine and phosphate during PET “icodextrin” was significantly higher than during PET “glucose” at 1, 2, 3, as well as 4 hours of dwell time. D/Do was significantly lower in PET “icodextrin” as compared to PET “glucose” at 1, 2 and 4 hours of dwell time. Curves of PET “icodextrin” tended to be steeper than those of PET “glucose” during the first hour of dwell time, whereas both curves were parallel between 1 and 4 hours of dwell time. The course of D/P curves of urea nitrogen, protein and albumin was nearly identical between PET “icodextrin” and PET “glucose”. There was also no significant difference in dialysate outflow volumes between PET “icodextrin” and PET “glucose”. Such a post-hoc analysis of the observed differences remains unclear and requires further study. CAPD patients using icodextrin solution during nighttime should perform their night exchange before the PET with conventional glucose solutions.

MODE OF PRESENTATION: WHAT CAN WE LEARN?

1 University of Aberdeen, Scotland.

Mode of presentation for first dialysis affects early health outcomes. We aimed to test if differences in mode of presentation existed between centres in different countries.

Based on kidney size, previous creat, presence of renal insult, pre-dialysis follow up (none, non-nephrology, nephrology) and urgency of first dialysis, an algorithm produced 7 categories ranging from least planned (New presentation possibly acute but no recovery) to most planned (Followed by nephrologist, planned 1st dialysis). All 274 patients commencing chronic dialysis during a 16-month period in 9 centres in 7 European countries were included. Patient data were collected prospectively and differences in mode of presentation between centres were analysed using the Pearson $\chi^2$ test ($p<0.001$).

The proportions of the modes of presentation were significantly different between the centres ($p<0.001$). The 7 modes of presentation were also significantly associated with: first dialysis modality ($p=0.025$); household income ($p=0.015$); primary renal diagnosis ($p=0.01$) and albumin ($p=0.01$). Sex, age/co-morbidity, distance from centre, age and GFR at initiation (Cockroft & Gault) were not associated with mode of presentation. Although household income was significantly associated with mode of presentation there was no evidence that higher (or lower) income was associated with a more planned presentation. There was a significant trend between higher albumin and more planned first dialysis ($T^2=0.016$). Mode of presentation was significantly different between centres, perhaps reflecting differences in pre-dialysis care and organisation between countries. By defining and quantifying the problem of why first dialysis has been unplanned, better judge if 2 populations are comparable in their individual studies. The algorithm may also, at a population level, help focus efforts to improve pre-dialysis care.
L-ARGININE DOES NOT IMPROVE ARTERIAL ENDOTHELIAL FUNCTION IN RENAL FAILURE

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University College London, UK.

Reduced activity of the nitric oxide (NO) pathway has been implicated in the endothelial dysfunction that occurs in patients with renal failure. NO is generated from L-arginine by NO synthase, and certain uremic toxins including asymmetrical dimethyl-L-arginine (ADMA), known to accumulate in renal failure, inhibit NO synthase and might contribute to endothelial dysfunction predisposing this group to atherogenesis. We hypothesised that exogenous L-arginine might improve endothelial function in patients with renal failure by overcoming the effects of uremic toxins.

Endothelial function of the forearm resistance vasculature was assessed using plethysmography to measure the dilator response of the forearm to intra-arterial acetylcholine (25-100 nmol/min). Endothelial function of the radial and brachial arteries was assessed using vascular ultrasound to measure the dilator response to flow during reactive hyperaemia (flow-mediated dilatation; FMD). Studies were done before and after administration of L-arginine by intra-arterial infusion (50 μmol/min) in 5 patients or by intravenous infusion (10 gm over 30 min) in 18 haemodialysis patients. Dilatation (mean±SEM) was expressed as the % change from basal conduit diameter or the area under the dose-response curve to acetylcholine.

Intra-arterial L-arginine did not increase the dilator response of the forearm resistance vessels (AUC pre 1439±565, post 890±268; P=0.02) or FMD of the radial artery (4.0±1.8% pre, 5.2±0.8% post; P=0.8). Systemic L-arginine did not improve FMD of the brachial artery (4.1±1.1% pre, 3.0±1.1% post; P=0.07). These data show local or systemic administration of L-arginine does not improve endothelial function in resistance or conduit arteries of patients with chronic renal failure. The results suggest that competitive inhibition of NOS by ADMA is not the principal reason for impaired endothelial dilator function in chronic renal failure.

ARTIFICIAL INTELLIGENCE ANALYSIS OF MORTALITY RISK FACTORS IN CHRONIC HEMODIALYZED (CHD) PATIENTS (PTS)

RTCA adroguet and ∗Favaloro University, Argentina.

The aim of this study was to analyze the influence of several parameters on the mortality risk (MR) in a population on CHD with the use of an artificial intelligence technique called Self-Organized Maps (SOM). Age, Body Weight (BW), median arterial pressure, Creatinine, Hematocrite (HT), Ca++, K, PO4, Albumin, Ferritin and Erythrocyte Sedimentation rate (ESR), were used. 48 PTS. (Diabetes 34%, mean age: 53±25 years; mean time on HD 15.4±6.97 months) inlet during the period 01/01/97-31/12/99 with 3 months or more on CHD were selected for the study. SOM, a Neural model which by an unsupervised learning process find relationships between the input data (PTS) and represent them in an ordered map of neurons. In this way, after the training process, is possible to relate clusters of neurons in the map to characteristics in the input space. By visual inspection of the distribution of the learned parameters over the map was possible to visualize or infer the contribution of the different parameters to cluster formation. The SOM net was trained with all the data of each measurement period. PTS were pulled together, losing in that way the time information. After the training process the attributes of the surviving PTS at 24 months were presented to the net to see which neuron were activated in order to be compared with the location of the last attributes available for the non-survival PTS. In that way was possible to find those parameters with the strongest influence on the separation of the non-survival from the survival PTS on the map, which were ESR, Ferritin, BW and HT. We conclude that: 1. SOM is a promising tool in the follow up of the evolution in CHD PTS. 2- ESR, a common clinical laboratory test, emerge in this preliminary study as a MR indicator parameter at least in the first period of treatment. More data should be collected to confirm these findings.

THE COST OF CHRONIC DIALYSIS THERAPY ACROSS EUROPE

S Wordsworth, A Ludbrook1, A MacLeod1, F Caskey1, I Khan1, T Ben, F de Charrro, C Delcroix, V Dobronravrov, I Henderson, E Kokolina, M Luman, D Tsakisiris, H van Hamersvelt, and the EURODICE group.
1University of Aberdeen, Scotland.

This paper examines the resource use and associated costs of haemodialysis (HD) and peritoneal dialysis (PD) and is part of the EURODICE study comparing costs with outcomes within ten participating centres in eight European countries. Detailed information on resource use (capital, staffing, consumables and overheads), for a cost per HD session and per PD week, was collected by a combination of health economists and clinicians at the dialysis level and local unit costs were attached. The results show that the mix and grade of staff vary significantly between countries and have an associated cost impact. The Western European centres have essentially nursing led dialysis units and the Eastern European centres have greater input from clinicians. The choice of high rather than low flux dialysers can produce up to 250% difference in consumable costs and the choice of supplier for PD fluids can have up to a 60% difference. The use of EPO, intravenous iron and extraneal fluids can all have significant influence on the total cost of treatment, and the relative costs of HD and PD can be altered substantially by policy decisions on their use. In conclusion, the costing part of the EURODICE project has shown that there are differences in the level of resource use and associated costs for HD and PD throughout Europe. On completion of collecting clinical outcomes and quality of life data, the study will test for any differences in outcome being associated with the level of resources used. These additional results will provide information for the discussion of whether there is the potential to improve the quality of care of patients with ESRD in Europe, within existing budgetary constraints.
ERECTILE DYSFUNCTION IN HD PATIENTS - CASE STUDIES ON THE USE OF SILDENAFIL. INITIAl EVALUATION. Letachowicz W., Weyde W., Rychlewskas B., Klingier M., Krajewska M.

Dept. of Nephrology, Wroclaw University of Medicine, Poland

Erectile dysfunction, which is common complication of CRF (this concerns also hemodialysed patients), impairs a patient’s quality of life, self-esteem and relationship with his partner. The aim of the study was the analysis of sexual activity of hemodialysed men (1st step anonymous questionnaire and 2nd short version of International Index of Erectile Function-IIEF-5), and results of treatment of erectile dysfunction using sildenafil. We investigated 22 hemodialysed men, aged 37-68 years (mean age 50.7±9.04), dialysed 7 to 237 months (mean 166.3±63.66). Causes of ureaemia were chronic glomerulonephritis (13 cases), chronic pyelonephritis (2 cases), polyctystic kidney disease (2 cases), hypertonic nephropathy (4 cases) and nephropathy of unknown origin (1 case). Bad general condition, regular treat-ment with nitrates, hypotension (<90/60mmHg) or hyperten-sion (>170/100mm Hg) and penile anatomical deformities were exclusion criteria of sildenafil treatment. 16 of 22 patients returned questionnaires IIEF-5. 11 patients reported an IIEF - 5 score of 21 or less (3 of them had no any sexual activity at last 6 months). 5 patients had no any erectile dysfunction (an IIEF-5 score of 24-25). 8 pts with more serious erectile dysfunc-tion (an IIEF-5 score of 16 or less) were included to sildenafil treatment. The starting dose of sildenafil was 50 mg. All pa-tients receiving sildenafil demonstrated significantly improved erectile function - mean 5.9 points before and 22.2 points after sildenafil treatment. Adverse effects related to treatment: flushing 3 pts, headache 2 pts, decrease of BP and weakness 1pt. All patients receiving sildenafil complained of erectile dysfunction. 2. In our evaluation sildenafil is an effective and well tolerated treatment for erectile dysfunction in hemodialysed patients.

A SENSITIVE LIQUID CHROMATOGRAPHY-MASS SPECTROMETRY METHOD FOR THE QUANTIFICATION OF Ne-(CARBOXYMETHYL)LYSINE IN DIALYSIS PATIENTS J Usami, T Miwa, S Otsuka, H Odani and K Maeda

Dept. of Nephrology, Toyohashi Municipal Hospital, Dept. of Internal Medicine, Daiko Med. Ctr., Nagoya University, Nagoya, Japan.

Ne-carboxymethyllysine (CML) is one of the major advanced glycation end products (AGEs) which are the result of the non-enzymatic Maillard reaction linking a protein amino group with a glucose-derived aldehyde group.

Recent studies demonstrated that, in diabetes and uremia, AGES are increased and are associated with a variety of tissue disor-ders including vascular damage, chronic complications of dia-betes, and hemodialysis-associated amyloidosis. CML has been traditionally quantified by gas chromatography-mass spectrometry (GC/MS). We recently demonstrated that by using liquid chromatography-mass spectrometry (LC/MS), which is very useful for rapid and sensitive identification of low molecular weight materials, advanced glycation end products such as pyrraline and imidazolium crosslinks accumulate markedly in the serum of patients with end-stage renal failure. In this study, we attempted to identify and quantify CML in serum proteins of uremic patients by using the LC/MS method. Here we could rapidly detect CML and find its levels were markedly increased (2-3-fold, P<0.001) in uremia compared to healthy subjets. We conclude that this LC/MS method is very useful for quantifying AGES because of its rapidity and sensitivity, and it thus may contribute to AGE research.

LONG-TERM SPIRONOLACTONE AND CARDIAC FUNCTION IN CHRONIC UREMIC. U Høst, M Egliordon, E Holm, B Jespersen, H Lakkegaard, K Skagen, H Kelbaek.

Medical Dept.s B and P, Copenhagen University Hospitals Herlev and Rigshospitalet, Denmark.

Chronic uremic patients suffer increased cardiovascular morbidity and mortality; and frequently exhibit high plasma aldosterone, which has recently been associated with development of left ventricular hypertrophy and myocardial fibrosis. Our present study was undertaken to evaluate the extrarenal cardiovascular effects of spironolactone in patients with a minimal residual renal function, on chronic hemodialysis.

Methods: 32 chronic uremic patients were allocated in a double blind study to receive spironolactone, (Spirix®, Nykomed Pharma, DK (SPI)) 100 mg daily or placebo (PLA) for 12 months. At inclusion, the patients were matched for age, sex, duration of uremia, and history of arteriolar hypertension. Left atrial diam-eter, left ventricular cavity and wall dimensions, parameters of left ventricular filling, blood pressure, heart rate and body weight were recorded in addition to biochemical markers of fluid and electrolyte homeostasis before and after hemodialysis, at baseline and at 12 months.

Results: At inclusion, similar left ventricular cavity and wall dimension, and left ventricular filling parameters were recorded in both groups. At follow up, left ventricular cavity diameter before dialysis was 13% lower in SPI (52 ± 6 mm) than in PLA (60 ± 6 mm) group (p<0.05), while left ventricular wall thickness and filling parameters were unchanged. No effect of spironolactone was found on blood pressure, heart rate and diuresis. However, in spite of a similar predialysis plasma K of 4.9 mm in both groups at inclusion, predialysis plasma K was higher in the SPI group at month 4, 6 and 10, rising to an average of 5.4-5.5 mm (p<0.05). Persistent hyperkalemia above 6.5 mm lead to cessa-tion of treatment in 3 SPI and 1 PLA patient.

Conclusion: Spironolactone treatment for 1 year, resulted in a lower left ven-tricular cavity diameter prior to dialysis, with an unchanged body weight. In the absence of a diuretic effect, the suggested mechanism was a redistribution of body water volume from the central vascular compartment towards peripheral capacitance vessels. This may imply a decrease in left ventricular wall stress and oxygen demand, and an increased tolerance to overhydration between hemodialysis sessions.

UREMIC SERUM AFFECTS CULTURED HUMAN ENDOTHE-LIAL CELLS Esposito C, Fasoli G, Plati AR, Bellotti N, Conte MM, Foschi A, Mazzullo T, Semeraro L, Dal Canton A.

Unit of Nephrology, IRCCS Policlinico S. Matteo and University of Pavia, Pavia, Italy.

Uremic patients are characterized by accelerated atherosclerosis and increased prevalence of cardiovascular complications. The pathogenesis of the vascular changes induced by uremia is not yet clear. Endothelium plays a central role in the vessel wall homeostasis and is deeply involved during the first phases of the atherosclerotic process. The aim of the present study was to evaluate the effect of uremic serum on cultured human endothelial cells (ECs).

ECs were prepared from umbilical cords by collagenase diges-tion (0.1%), cultured in RPMI containing FCS (20%) and used for the experiments up to passage 4. Serum was collected from uremic patients and from healthy volunteers. PBMCs were isolated from healthy volunteers using a Ficoll-Hypaque centrifugation gradient. ECs were treated with uremic or control serum (5%) for definite time intervals. Cell proliferation was evaluated by cell counting using a Neubauer chamber. Apoptosis was determined on cell lysate by ELISA using antinucleosomal antibodies. The adhesion assay was performed by incubating confluent ECs, treated with uremic or control serum, with 1.5 x 10^5 PBMCs for 1 h at 37 °C. After extensive washing adherent PBMCs were counted.

Uremic serum did not induce changes in EC proliferation com-pared to control serum. Uremic serum-treated endothelial cells showed an increased apoptosis (116 (41 vs 282 (82 arbitrary unit, control and uremic serum respectively, p<0.005). The adhe-sion of PBMCs to the endothelial cell monolayer was signifi-cantly enhanced by uremic serum (1.9 x 10^10 (1.6 x 10^10 to 2.9 x 10^10 (2.7 x 10^10 cells/cm^2) p<0.005). Increased adhesion of PBMCs and apoptosis induced by uremic serum in human endothelial cell cultures may be key mecha-nisms in the pathogenesis of the accelerated atherosclerosis charac-teristic of uremic patients.
THE PREVALENCE OF ERECTILE DYSFUNCTION AND THE EFFICIENCY OF SILDENAFIL TREATMENT IN HEMODIALYSIS (HD) PATIENTS
* Selcuk University Medical Faculty Urology Dep. and **Internal Medicine Dep., Konya, ***Istanbul Medical Faculty Internal Medicine Dep., Istanbul

Hemodialysis treatments extend the life expectancy and do the better life condi-
tion in the chronic renal failure. Although the use of sildenafil in the erectile dysfunction is increased, there is not enough experience in the patients with uremia. The goal of this study is to determine the prevalence of the patients with erectile dysfunction and the effects of sildenafil in HD patients.

This study consists of 35 patients (age 20-70) undergoing chronic hemodialysis programme and having a regular partner. In order to analysis erectile function in the patients, The International Index of Erectile Function (IIEF) form was used. By using this form, questions 1, 2, 3, 4, 5 and 15 were asked to the patients and total score was 30. If patient has below 25 score, he was considered as erectile dysfunction. The cause of end stage renal failure was diabetic nephropathy in 2 patients. Five patients were being applied erythropoietin treatment. Twenty four patients (68.5%) of 35 hemodialysis patients were found to have erectile dysfunction. Due to contraendication 5 patients were not taken to sildenafil treatment. 50 mg sildenafil has been applied to the to 13 patients twice a week for two weeks. If the patient did not give the response to the sildenafil, sildenafil treatment was increased to 100 mg dose.

Table:

<table>
<thead>
<tr>
<th>HD (n=13)</th>
<th>CAPD (n=7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td>48.7 ± 9.5 (36-67)</td>
</tr>
<tr>
<td>Hb (g/dl)</td>
<td>12.6 ± 1.9 (10-16)</td>
</tr>
<tr>
<td>Hct (%)</td>
<td>38.2 ± 6.0 (31.2-47.5)</td>
</tr>
<tr>
<td>IIEF score (before sildenafil)</td>
<td>7.6 ± 5.0 (0-20)</td>
</tr>
<tr>
<td>IIEF score (after sildenafil)</td>
<td>23.1 ± 9.5 (0-30)</td>
</tr>
</tbody>
</table>

Three of 13 patients did not give response to sildenafil treatment. Two of these patients had diabetic nephropathy. The IIEF score was significantly increased (p=0.007) after the sildenafil treatment. In conclusion it was found that 68.5% of chronic HD patients had erectile dysfunction and sildenafil treatment was highly effective in these patients.

BONE BIOPSY AND BONE MINERAL DENSITY DURING GROWTH HORMONE TREATMENT IN CHILDREN WITH CHRONIC RENAL FAILURE
M Panczyk-Tomaszewska, H Ziólkowska, A Zuworska, A Debinski, J Przedlacki, M Szczepanska, M Roszkowska-Blaim Warsaw, Silesian, Gdansk University Medical School, Poland

The aim of the study was to estimate the bone status during growth hormone treatment in children with chronic renal failure (CRF). Thirty three children aged 10.7 ± 2.9 of which 24 were dialysed and 9 on conservative treatment were included in the study. All children received rhGH in a dose of 1-1.1 IU/kg/week for 12 months. In all children bone mineral density of total body (TB BMD), lumbar spine (LS BMD) by dual-energy X-ray absorptiometry (DEXA) and serum PTH level were measured at start of rhGH and after 6 and 12 months of treatment. Bone biopsies were performed at onset and after 12 months of rhGH therapy. Results: The frequency of renal osteodystrophy (ROD) before and after rhGH treatment (%)

<table>
<thead>
<tr>
<th>Bone biopsy</th>
<th>Before rhGH</th>
<th>After 12 mo of rhGH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Bone</td>
<td>27.3</td>
<td>48.5</td>
</tr>
<tr>
<td>Hyperparathyroidism</td>
<td>39.4</td>
<td>30.3</td>
</tr>
<tr>
<td>Mixed Lesion</td>
<td>12.1</td>
<td>9.1</td>
</tr>
<tr>
<td>Adynamic Bone Disease</td>
<td>15.2</td>
<td>9.1</td>
</tr>
<tr>
<td>Osteomalacia</td>
<td>6.0</td>
<td>3.0</td>
</tr>
</tbody>
</table>

The mean SDS of TB BMD before and after 12 months of treatment was -0.94 ± 1.02 and -1.1 ± 1.0 respectively; the mean SDS of L2-L4 BMD was -1.05 ± 1.26 and -0.78 ± 1.16 respectively. In 76 % of patients the dose of alaphcalcidol had to be increased during rhGH treatment.

Conclusion: Bone lesions of ROD do not worsen on rhGH treatment when alaphcalcidol dose is increased.

THE COMPARISON OF HEMODIALYSIS (HD) AND CONTINUOUS AMBULATORY PERITONEAL DIALYSIS (CAPD) PATIENTS IN RESPECT TO ERECTILE DYSFUNCTION AND EFFECTIVENESS OF SILDENAFIL TREATMENT
* Selcuk University Medical Faculty Urology Dep. and **Internal Medicine Dep., Konya, ***Istanbul Medical Faculty Medical Genetic Dep., Istanbul

The erectile dysfunction in the uremic patients is very common problem. There are not enough document for the use of sildenafil in the patients with chronic renal failure. The aim of this study is to determine the prevalence of the patients with erectile dysfunction and the effects of sildenafil in HD and CAPD patients.

This study consists of 35 HD patients and 15 CAPD patients (age 20-70) undergoing chronic dialysis programme and having a regular partner. In order to analysis erectile function in the patients, The International Index of Erectile Function (IIEF) form was used. By using this form, questions 1, 2, 3, 4, 5 and 15 were asked to the patients and total score was 30. If patient has below 25 score, he was considered as erectile dysfunction. The cause of end stage renal failure was diabetic nephropathy in 4 patients. Eight patients were being applied erythropoietin treatment. Twenty four patients (68.5%) of 35 HD patients and twelve patients (80%) of 15 CAPD patients were found to have erectile dysfunction. Due to contraendication 5 HD patients and 3 CAPD patients were not taken to sildenafil treatment. 50 mg sildenafil has been applied to the to 13 HD patients and 7 CAPD patients twice a week for two weeks. If the patient did not give the response to the sildenafil, sildenafil treatment was increased to 100 mg dose.

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</tr>
</tbody>
</table>

Three of 13 HD patients and 2 of 7 CAPD patients did not give response to sildenafil treatment. Three of these patients had diabetic nephropathy. The IIEF score in HD patients and CAPD patients were significantly increased after the sildenafil treatment (p=0.007 and p=0.042, respectively). In conclusion about two-third HD and CAPD had erectile dysfunction and sildenafil treatment was highly effective in the most of dialysis patients.

BONE MINERAL DENSITY DURING RECOMBINTANT HUMAN GROWTH HORMONE TREATMENT
Ziolkowska H, Panczyk-Tomaszewska M, Przedlacki J, Zuworska A, Szprynger K, Roszkowska-Blaim M. Warsaw, Silesian, Gdansk University Medical School

The aim of the study was to evaluate changes in bone mineral density (BMD) during recombinant human growth hormone (rhGH) treatment. Thirty children aged 6-16 years (mean 10.9) on renal replacement therapy were observed. rhGH was given for a year in a dose 1-1.1 IU/kg/week. Fourteen children continued therapy for a second year. Alaphcalcidol doses were adjusted to PTH levels. Total body (TB) and lumbar spine (LS) BMD was compared at onset of treatment and after 12 and 24 months of rhGH. BMD was compared at one year between children with better and worse height velocity. Results: 1. No difference was observed in mean SDS to TB and LS BMD in children treated with rhGH at onset or after 12 or 24 months of therapy. Table 1

<table>
<thead>
<tr>
<th>Onset</th>
<th>12 months</th>
<th>24 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB BMD n = 30</td>
<td>-0.83±1.0</td>
<td>-1.16±1.04</td>
</tr>
<tr>
<td>n = 14</td>
<td>-0.93±1.95</td>
<td>-1.22±0.8</td>
</tr>
<tr>
<td>LS BMD n = 30</td>
<td>-0.93±1.47</td>
<td>-0.93±1.4</td>
</tr>
<tr>
<td>n = 14</td>
<td>-1.18±1.08</td>
<td>-0.66±0.8</td>
</tr>
</tbody>
</table>
| The mean ΔSDS for height after one-year of rhGH treatment was 0.39. In table 2 the results of 15 pts with ΔSDS < 0.39 (group 1) and 15 pts with ΔSDS > 0.39 (group 2) are shown (mean±SD)* p<0.05

Densitometry Alaphcalcidol (µg/kg/week) PTH (pg/ml) LS BMD (SDS) TB BMD (SDS)

| 1. n=15 | 0.08 ± 0.04 | 248.32±21 | -1.51 ± 1.4 | -1.66 ± 0.88 |
| 2. n=15 | 0.12 ± 0.05 | 160.5 ± 3123 | -0.14 ± 1.37 | -0.27 ± 3.14 |

Conclusion: In children on renal replacement therapy treated with rhGH bone status measured by densitometry remain stable when alaphcalcidol doses is increased adjusted to PTH level.
VISCERAL FAT SYNDROME IN HEMODIALYSIS (HD) PATIENTS

T Yamauchi1,2, T Kuno1, H Takada2, K Mishima2, Y Nagura1, S Takahashi1, K Kanmatsuse1
2nd Dept. of Internal Medicine, Nihon University1 and Dept. of hemodialysis, Toshima chuo hospital2, Tokyo, Japan.

Recently careful attention has been paid to multiple risk factor syndromes such as syndrome X, insulin resistance syndrome and visceral fat syndrome in terms of the development of coronary artery disease (CAD), which is also the major cause of death in HD patients. We focused on an analogy between metabolic abnormality in HD patients and the features of these syndromes. The purpose of this study is to evaluate the impact of visceral fat accumulation on these multiple risk factors in HD patients.

72 stable out patients (35 male, 37 female) participated in this study. After the determination of visceral fat area (V) and subcutaneous fat area (S) by CT scanning technique, they classified into 2 groups according to V/S ratio (0.28±0.10 vs. 0.82±0.33). %Fat was measured by body composition analysis method. Fasting blood samplings were drawn for the data of lipids and carbohydrates.

The results are shown below:

<table>
<thead>
<tr>
<th>Group</th>
<th>Number</th>
<th>BMI (kg/m²)</th>
<th>%Fat (%)</th>
<th>Glucose (mg/dl)</th>
<th>HOMA</th>
<th>TG (mg/dl)</th>
<th>HDL-C (mg/dl)</th>
<th>Atherogenic index</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low V/S</td>
<td>36</td>
<td>20.9±3.7</td>
<td>21.0±2.7</td>
<td>90.4±19.0</td>
<td>1.9±1.1</td>
<td>91.0±33.5</td>
<td>53.8±13.6</td>
<td>2.36±0.78</td>
<td></td>
</tr>
<tr>
<td>High V/S</td>
<td>36</td>
<td>21.6±5.6</td>
<td>23.7±1.1</td>
<td>108.1±40.1</td>
<td>&lt;0.05</td>
<td>126.4±71.1</td>
<td>44.±16.0</td>
<td>3.16±1.52</td>
<td></td>
</tr>
<tr>
<td>p</td>
<td></td>
<td>n.s.</td>
<td>n.s.</td>
<td>&lt;0.05</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td></td>
</tr>
</tbody>
</table>


group, irrespective BMI and %Fat. Moreover they had higher frequency of CAD history (30.6% vs. 5.6%; p<0.01). These findings are completely in accordance with visceral fat syndrome. Vice versa, so called characteristics of metabolic abnormalities in HD patients have disappeared among low V/S group.

In conclusion, since we could commonly find visceral fat syndrome in non-obese HD patients, uremic toxicity and/or HD procedure itself should promote the accumulation of visceral fat, resulting CAD. Further investigation should be required in this field.

THE IMPACT OF TRP64ARG MUTATION IN THE β3-ADRENERGIC RECEPTOR (β3AR) GENE ON HEMODIALYSIS PATIENTS

T Yamauchi1,2, T Kuno1, H Takada2, K Mishima2, Y Nagura1, S Takahashi1, K Kanmatsuse1
2nd Dept. of Internal Medicine, Nihon University1 and Dept. of hemodialysis, Toshima chuo hospital2, Tokyo, Japan.

For the management of dialysis patients, little attention is drawn on a mutation in the β3AR gene (Trp64Arg), which has been recently reported to be associated with body weight gain, visceral fat accumulation and features of insulin resistance syndrome. The purpose of this study is to evaluate the impact of mutation in the β3AR gene on several parameters for dialysis adequacy, body fat distribution, physical activity, lipid metabolism and insulin resistance in hemodialysis patients.

75 stable patients were studied after informed consent and classified according to genotype of the β3AR gene. %Fat was measured by impedance analysis method. Fasting blood samplings were drawn for the data of lipids and carbohydrates.

The results are shown below:

<table>
<thead>
<tr>
<th>Genotype</th>
<th>Frequency (%)</th>
<th>%Fat (g/kgBW/day)</th>
<th>Kt/V</th>
<th>Leptin (ng/ml)</th>
<th>HOMA</th>
<th>TG (mg/dl)</th>
<th>HDL-C (mg/dl)</th>
<th>*p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trp/Trp</td>
<td>61.3</td>
<td>19.3±7.6</td>
<td>1.21±0.18</td>
<td>14.4±18.9</td>
<td>2.6±1.4</td>
<td>108.3±62.4</td>
<td>50.5±18.0</td>
<td></td>
</tr>
<tr>
<td>Trp/Arg</td>
<td>33.3</td>
<td>21.8±6.7</td>
<td>1.29±0.17</td>
<td>14.4±12.6</td>
<td>2.3±0.9</td>
<td>121.2±46.0</td>
<td>48.0±12.2</td>
<td></td>
</tr>
<tr>
<td>Arg/Arg</td>
<td>5.3</td>
<td>27.3±2.5</td>
<td>0.98±0.15</td>
<td>14.4±11.2</td>
<td>2.9±1.6</td>
<td>136.3±108.4</td>
<td>37.5±11.2</td>
<td></td>
</tr>
</tbody>
</table>

%Fat was measured by impedance analysis method. Fasting blood samplings were drawn for the data of lipids and carbohydrates.

%Fat was measured by impedance analysis method. Fasting blood samplings were drawn for the data of lipids and carbohydrates.

HOMA; insulin resistance index (fasting glucose x fasting insulin /405) Significant differences were not found between the groups about fat distribution, plasma leptin concentration and HOMA. Whereas there was some tendency to obtain higher %Fat, lower physical activity, lower pcr, higher TG and lower HDL-C among the mutation groups, especially Arg/Arg group.

Our study suggests that mutation in the β3AR gene effects on at least fat accumulation and/or impairment of lipid metabolism. Careful attention had better be paid to the management of dialysis patients with this mutation.