Abstract M269 – Table

	LF polysulfone		HF CT 210G		HF FX 100	
	group A	group B	group A	group B	group A	group B
Apo-CIII (mg/dl)	17.2±6.3	18.0±5.4	14.0±4.8 (p=0.001)	14.0±5.3 (p=0.001)	13.8±4.5 (p=0.001)	13.4±4.4 (p=0.004)
TG (mg/dl)	214.4±140.6	256.4±152.4	173.6±91.6 (p=0.020)	211.6±115.4 (p=0.023)	168.9±91.0 (p=0.020)	187.9±85.6 (p=0.005)
RLP-chol (mg/dl)	16.9±15.9	20.1±18.6	11.7±6.9 (ns)	12.1±8.1 (p=0.004)	10.6±10.4 (p=0.001)	10.7±6.7 (p=0.005)
ox-LDL (U/L)	46.5±9.9	41.4±14.1	41.3±9.6 (ns)	36.2±10.2 (ns)	39.0±8.5 (p=0.008)	34.2±9.0 (p=0.008)

HD, which is reflected by the strongly reduced levels of TG. RLP-Chol was reduced by HF-HD, but ox-LDL only by HF FX dialysis.
The results of this study demonstrate a positive effect firstly of HF-HD on uremic dyslipidemia and secondly of the synthetic membrane (Helixone) on ox-LDL, an indicator of oxidative stress, thereby potentially reducing the atherogenic risk for dialysis patients.

M270 APOLIPOPROTEIN A-I (ApoA-I),APOLIPOPROTEIN B(Apo-B) AND ApoB/ApoA-I RATIO IN HEMODIALYSIS (HD) PATIENTS-CORRELATION WITH CORONARY HEART DISEASE (CHD)

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Low ApoA-I, high ApoB as well as high B/A-I ratio are important risk factors for the development of CHD(common in HD patients)
In a large population of 519HD patients(pts) (308M,211F),mean age 63,2±14 years and undergoing HD for 47,8± 44,5 months, ApoA-I and ApoB(IRMA), after 10-16 hours fasting period as well as B/AI ratio, were estimated.
ApoAI levels were low (<110mg/dl M, <125mg/dl F) in 85 M (27,59%)and 87 F(41,23%).In those pts the percentage of CHD was 30,58% and 22,99% respectively. ApoB levels were high (>140mg/dl M,>125mg/dl F)in 22M(7,14%) and 48F(22,75%) with a percentage of CHD 59,1%M and 27,1%F respectively. High B/AI ratio(>1 M,>0,9 F) was found in 64M(20,78%)and 62F(29,38%).Those pts had CHD in a percentage of 42,18% and 25,8% respectively.
In conclusion a)ApoAI, ApoB and B/AI ratio abnormalities were common in our HD pts and b)These parameters could possibly contribute to their high incidence of CHD.

M271 PLASMA LIPIDS AND LIPOPROTEINS DURING ATORVASTATIN (ATVS) UP-TITRATION IN HEMODIALYSIS PATIENTS WITH HYPERLIPIDEMIA: A PLACEBO-CONTROLLED STUDY

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The efficacy of increasing doses of ATVS in reducing plasma lipids was assessed in hemodialysis patients with hyperlipidemia. They often have elevated plasma triglycerides (TG), very low density lipoproteins (VLDL) and intermediate density lipoproteins (IDL). LDL-C can also be increased.
Design: Randomized, double-blind, placebo-controlled study in 42 patients (23 ATVS, 19 placebo) over 12 weeks, with forced up-titration of ATVS (10-20-40 mg od, given at start, week 4 and week 8, respectively). Lipids and apolipoproteins were measured in plasma and lipoprotein fractions.
Results: At week 4, 10 mg ATVS decreased total cholesterol (TC) (-25%; p<0.001) and LDL-C (-34%; p<0.001); plasma apo B and apo E levels were also reduced. At weeks 8 and 12, ATVS 20 and 40 mg further decreased TC (-29% and -33%) and LDL-C (-36% and -43% versus baseline), as well as plasma apo B (p<0.001). In addition, the higher doses of ATVS also reduced TG (-16.5% and -12% at weeks 8 and 12; p≤0.01), and apo C-III. ATVS treatment significantly reduced lipids in the VLDL and IDL+LDL fractions (week 12 vs baseline p<0.01). In addition, at week 12, the fraction of small dense (sd) LDL was decreased (from 23% at baseline to 18%; p=0.002), and IDL+LDL-apo B decreased to the level of LDL-apo B (45.6-45.9 mg/dl), indicating an almost complete removal of IDL from plasma. The lipids and apo composition of HDL remained unchanged. ATVS did not affect post-heparin lipoprotein lipase and hepatic lipase at any dose. Elevated SGOT (126 U/l) was seen in one patient at week 12 on ATVS.
Conclusion: In hemodialysis patients, ATVS 10 mg is effective in reducing TC, LDL-C and apo B. Up-titration to higher doses has additional benefits, as it lowers TG and leads to a decrease in the most atherogenic fractions (sdLDL and IDL).

Dialysis: Complications – I

M272 EFFECT OF CLONAZEPAM ON THE HEMODIALYSIS-ASSOCIATED MUSCLE CRAMPS

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Muscle cramps are common complications of hemodialysis treatments. This problem often results in early termination of hemodialysis session and is therefore a frequent cause of underdialysis and increase mortality. A randomized double blind clinical trial study was performed to determine the frequency of muscle cramps in 6 patients (5 male and 1 female) with frequent hemodialysis-associated muscle cramps. The subjects were assigned to therapy with 1 mg of clonazepam 1 hour before beginning for 16 dialysis sessions, after 2 weeks washout period the subjects were assigned to placebo for another 16 dialysis sessions.
The mean number of muscle cramps in the placebo group was 12.3 [±SD 4.1] of 16 hemodialysis sessions and was 3 [±SD 2] in the clonazepam group. This result indicates that clonazepam is effective (p<0.0001) in reducing hemodialysis-associated muscle cramps so it can be used as a safe prevention practice.

M273 CREATINE MONOHYDRATE TREATMENT ALLEVIATES HEMODIALYSIS ASSOCIATED MUSCLE CRAMPS

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Background: Dialysis associated muscle cramp is a common complication of hemodialysis. The exact mechanism of this complication is still unknown. One of the possible mechanisms of hemodialysis associated muscle cramp is disturbed muscle energy metabolism. Creatine monohydrate can enhance muscle energy metabolism. We evaluated the clinical effect of creatine monohydrate on hemodialysis associated muscle cramps.

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Methods: Ten patients with frequent muscle cramps during hemodialysis were randomly separated into two groups. Creatine monohydrate 12 mg or placebo was given before each dialysis session for 4 weeks. The incidence of muscle cramp during hemodialysis was compared between the creatine and placebo groups. We continued to observe and compare the patients during the 4 weeks of washout period to insure the effect of creatine monohydrate.
Results: The frequency of symptomatic muscle cramps significantly decreased by 60% in treatment group (6.2 ± 0.8 Vs 2.6 ± 1.8 time/4 weeks, $p<0.05$) during the observation period. The effect of decreasing muscle cramp incidence disappeared in the washout period in the creatine group (6.6 ± 1.1 time/4 weeks). There was no difference in muscle cramp incidence in placebo group. The hematocrit, KT/V, serum albumin and hemodynamic parameters remained unchanged in both groups in either treatment or washout period. Serum creatinine increased slightly after creatine monohydrate treatment (10.7 ± 3.2 Vs 12.4 ± 3.2 mg/dL, $p<0.05$). No adverse effect was found in both groups during treatment and washout periods.
Conclusion: These data suggests that creatine monohydrate can reduce the incidence of hemodialysis associated muscle cramps. It may be a safe agent for treatment of hemodialysis associated muscle cramps.

M274 HEMODYNAMIC RESPONSE TO LONG-TERM NOCTURNAL HEMODIALYSIS

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In the dialysis population, hypertension is an independent risk factor for cardiovascular morbidity. Nocturnal hemodialysis (NHD) is a novel renal replacement therapy. We recently found that long-term NHD results in lower clinic blood pressure (BP) and regression of left ventricular hypertrophy. Our objective was to determine the hemodynamic mechanism underlying these cardiovascular changes. We determined 24 hour ambulatory BP, cardiac output and stroke volume (echocardiography) and total peripheral resistance before and 1 month after conversion from conventional hemodialysis (CHD) (4 hours, 3 sessions per week) to NHD (8 hours, 6 nights per week) in 7 dialysis patients (mean age ± SD: 38 ± 9 years). Within-subject differences were analyzed by paired t-test. The number of antihypertensive drug classes required fell from 1.7 ± 1.1 to 0 per patient ($p= 0.001$). Conversion to NHD results in a clinically important reduction in ambulatory 24 hour BP, mediated through a fall in peripheral resistance rather than a reduction in preload. The magnitude of this response permits withdrawal of antihypertensive therapy.

Variables	on CHD	on NHD	p
24 h mean arterial BP (mmHg)	102±19	89±14	0.02
24 h systolic BP (mmHg)	138±28	120±13	0.02
Total peripheral resistance (dynexsxcm^{-5})	1553±551	1246±412	0.02
Heart rate (beats/min)	77±11	74±15	0.6
Stroke volume (mL)	80±18	82±14	0.73
Cardiac output (L/min)	5.71±1.4	5.96±1.2	0.5

These findings suggest that the BP normalization of NHD and its beneficial effects on left ventricular architecture are mediated through more effective clearance of vasoconstrictors than to a reduction in intravascular volume.

M275 STUDY OF THE EFFECTS OF SERUM IONIZED CALCIUM (iCa) AND MAGNESIUM (iMg) ON THE BLOOD PRESSURE (BP) RESPONSE DURING HEMODIALYSIS (HD)

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We studied the intradialytic effects of iCa and iMg on systemic hemodynamics in 8 HD patients. Each patient underwent 4 midweek HD treatments consecutively, using, during each HD session one of the following four dialysate formulations, in randomized order, which differed only with regard to dialysate Ca (dCa) and Mg (dMg) concentrations: dCa =1,75 and dMg = 0,75 mmol/l (Group I), dCa =1,75 and dMg = 0,25 mmol/l (Group II), dCa =1,25 and dMg = 0,75 mmol/l (Group III), dCa =1,25 and dMg=0,25 mmol/l (Group IV). Before HD and at four 60' intervals during the HD sessions, BP measurements and other hemodynamic parameters, using bioelectical impedance, were obtained. Pre- and post-HD blood samples were obtained for determination of iCa and iMg.

Parameter	Group I	Group II	Group III	Group IV	ANOVA
SPB%	-9,7±5,9	-6,7±4,7	-9,1±5,7	-17,7±10,5	p<0,05
MAP%	-6,3±4,1	-4,7±3,3	-5,9±4,1	-14,6±8,7	p<0,05
CI%	-3,4±2,7	-1,3±1	0,3±0,7	-12,3±7,2	p<0,05
SI%	-6,3±4,2	-6,2±3,9	-3,5±3,0	-16,3±9,9	p<0,05

SBP = systolic BP; MAP = mean arterial pressure; CI = cardiac index; SI = stroke index

BP dropped to a significantly greater extent in group IV than in the three other groups, due to a parallel decrease in myocardial contractility. The percent changes (post-HD to pre-HD values) in iCa/iMg ratio correlated with the corresponding changes in SBP ($r=0,75$; $p<0,05$) and MAP ($r=0,73$; $p<0,05$), while changes in CI ($R^2=0,81$; $p<0,05$) could be predicted independently by both changes in iCa (b= 0,89) and iMg (b= -0,42).
In summary, intradialytic alterations of both iCa and iMg, having opposing effects on SBP and cardiac output, emerged as major determinants of the cardiovascular response during HD. Thus, patients treated with low dCa and dMg run a higher risk of developing intradialytic hypotension.

M276 ACUTE DECREASE OF PLASMA K^+ AT COMPLETION OF HEMODIALYSIS (HD) SESSION AUGMENTS BLOOD PRESSURE: REBOUND HYPERTENSION?

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Hypokalemia contributes in the development of hypertension,partly by inducing peripheral vasoconstriction*. HD may induce acute hypokalemia at the completion of HD session by reducing plasma potassium (K^+). To investigate the possible relationship between hypokalemia and hypertension at the end of HD session, we designed a study considering 8 HD patients who underwent three consecutive 4-hour HD sessions using, at first,a dialysate K^+ concentration (Kd) of 3.2 mEq/lt and then in another three sessions,using a Kd of 1.9 mEq/lt. Plasma K^+ and blood pressure (BP) were measured at the beginning, completion and 30′ post HD. Independently of Kd, plasma K^+ was found to be similar at the beginning of all HD sessions. In contrast,plasma K^+ was found significantly lower at the completion and at 30′ post HD,when Kd 1.9 mEq/lt was used (3.48±0.40 vs 4.00±0.49 mEq/lt, $p=0.000$ and 3.75±0.41 vs 4.15±0.41 mEq/lt, $p=0.002$, for Kd 1.9 and 3.2 mEq/lt, at completion and 30′ post HD, respectively). Systolic, diastolic and mean BP was decreased at completion of HD session, reaching its initial level at 30′ post HD, when Kd 3.2mEq/lt was used. Mean BP (mmHg): 108.0±17.0, 98.9±13.4, 104.1±15.0 for pre HD, completion, 30′ post HD respectively, p=NS for all comparisons. In contrast, when Kd 1.9 mEq/lt was

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used, at 30′ post HD, BP was significantly increased comparing to that of the beginning and completion of HD session (rebound hypertension?). Mean BP (mmHg):104.9±14.8, 102.7±16.0, 109.1±15.5 for beginning, completion, 30′ post HD respectively,p=0.03 for 30′ post HD vs beginning and completion of HD.
Conclusion: An acute reduction of plasma K^+ concentration at completion of HD session augments BP, probably in part, by hypokalemic vasoconstriction. **Dolson G M et al: A J Kidney Dis 1995; 26:331*

M277 ROLE OF NITRIC OXIDE IN HAEMODIALYSIS HYPOTENSION IN CHILDREN

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Hypotensive episodes during hemodialysis impose a major problem in children with end-stage renal disease. To investigate the possible involvement of nitric oxide (NO), a major regulator of cardiovascular hemodynamics, in hemodialysis hypotension, pre and postdialysis plasma samples from 17 children (9 M) were analyzed for the stable end products of NO, nitrite + nitrate (NO2 + NO3), and the results were compared with age-matched healthy controls. Systolic and diastolic blood pressures (BP) were measured at 30-min intervals during HD in all children. There was no statistically significant difference in the predialysis (116.5±191.6 uM), postdialysis (103.2±137.4 uM) and 17 age-matched controls (84.4 ± 92.9 uM) NO levels. In 7 of the patients, postdialysis values increased markedly (from 34.3±16.4 to 213.7±160.9 uM), whereas in others the change was not significantly important. Depending on the NO increase ratio patients were divided into 2groups; group A (n = 7 where NO increase ratio was >50% and B (n = 10 where NO increase ratio was <50%). While the mean predialysis NO values between groups A and B did not differ significantly, postdialysis NO levels in group A was significantly higher than group B(P =0.002).In group A, interdialytic weight gain and ultrafiltration rate were higher than group B. Although the mean systolic, diastolic and mean arterial pressure were not different before dialysis, In group A,the mean systolic blood pressure decrease in group A was higher than group B (40.8 mmHg compared with 17.2 mmHg,P=0.013).Our results show that enhanced NO production may be involved in acute hypotension during dialysis in children, and suggest the possible involvement of NO in the pathogenesis of chronic hypotension associated with maintenance haemodialysis.

M278 RELATIONSHIP BETWEEN HYPOTENSION AND NITRIC OXIDE LEVELS IN HEMODIALYSIS PATIENTS

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Hypotension is one of the frequent complications in hemodialysis patients. The precise mechanism of hypotension pathophsyology has not been defined clearly. Increased nitric oxide (NO) would likely be cause of hemodialysis related hypotension. We want to evaluate the role of NO in the pathophssiology of hypotension in hemodialysis patients. Two groups of hypertensive (n=10) and normotensive (n=10) hemodialysis patients were included in the study plasma levels of nitrat and nitric oxide synthase activity were measured. In hypertensive group mean plasma nitrat concentration was 141.27±13.76 mikro mol/lt before dialysis and was 151.73± 13.52 mikro mol/lt after dialysis. Mean NOS activity level was 7.06±0.63 nmoles/min./ml before dialysis and 7.55 ±0.65 nmoles/min./ml after dialysis. In normotensive group ean plasma nitrat and NOS activity concentration were 144.57±21.97 mikro mol/lt and 7.36 ±1.11 nmoles/min./ml, respectively. After dialysis, nitrat and NOS were 143.02±10.51 mikro mol /lt and 7.27±0.52 nmoles/min./ml, respectively. Before and after dialysis we did not find any significant difference in two groups relating nitrat and NOS (p>0.05). In conclusion, nitrat and NOS do not appear to have a critical role in the dialysis associated hypotension.

M279 SEASONAL VARIATION OF BLOOD PRESSURE IN HEMODIALYSIS PATIENTS; DIFFERENCES IN VARIATION BETWEEN DIABETICS AND ADPKD EXPLAINED BY AUTONOMIC NEUROPATHY?

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Seasonal variation (SV) of blood pressure (BP) has been reported in dialysis populations. BP in dialysed patients is mainly determined by volume status. We hypothesized that SV of BP is related to underlying disease and that others factors especially the autonomic nervous system might have an additional influence on this biological rhythm. We investigated the presence of SV of BP in our whole population and analysed different subgroups.
During a nine-year period (1991-2000) all dialysis sessions were registered. Patients on hemodialysis longer than 3 months were included. Pre- and postdialysis systolic and diastolic BP (SBP and DBP) were recorded. 338 Patients with a total of 101,635 sessions were recorded. Predialysis SBP (pre-SBP) in January was 145.5 (±26.1) mmHg, pre-SBP in July was 143.0 (±25.7) mmHg. Difference is 2.5 (95% CI 1.71 to 3.29). Mean pre-DBP in January was 78.6 mmHg (± 13.2) and 77.1 mmHg (±12.9) in July. Difference is 1.5 (95% CI 1.10-1.90). 15% of the dialysis sessions were done in diabetics and 5,3% in ADPKD patients. No SV in BP was present in the diabetics: mean pre-SBP was 149.3 (±25.7) mmHg in January and 148.8 (±25.6) mmHg in July, difference is 0.5 mmHg (95% CI of -1.50 to 2.50). SV was present in the ADPKD group: mean pre-SBP was 146.4 (±21.8) mmHg in January and 140.1 (±23.6) in July, difference is 6.30 mmHg (95% CI 3.25 to 9.35). After 3 years of dialysis we paradoxically found SV to be present again in the diabetic population: pre-SBP 147.3 (±19.6) mmHg in January and 139.3(±23.8) in July, difference is 8.0 (95% CI 4.2 to 11.8). We conclude that: 1. There is a small but significant SV of BP in the general dialysis population. 2. SV is absent in diabetics and present in ADPKD patients. This might suggest an influence of autonomic neuropathy on the appearance of SV of BP. 3. After long-term dialysis treatment SV reappears in the diabetic population.

M280 EFFECT OF ALBUMIN INFUSION ON VASCULAR REFILLING WITH SEVERE HYPOALBUMINEMIA DURING HEMODIALYSIS (HD)

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The effect of albumin infusion on vascular refilling and blood pressure was quantified in a patient with extremely low plasma albumin levels, severe edema and hypotension complicated by acute hemorrhage and anemia (1st run), and one month later after re-established hematocrit (hct) (2nd run).
400 mL of 20% albumin were infused during HD within 2 h to reach an estimated albumin concentration (A) of 25 g/L. A, absolute blood volume (V), colloid osmotic pressures (π) and hct were determined at the beginning (pre) and at the end of HD (post). V was measured by a newly developed on-line HDF dilution technique using the blood volume monitor (BVM, FMC Deutschland GmbH, Bad Homburg, Germany).
Infusion of albumin increased A and π in both the 1st and the 2nd run (Tab. 1). Pre and post V were larger with the 2nd run whereas albumin-induced increases in V were identical (14%) with both runs in spite a UF of 1 L/h. Mean arterial blood pressure (64±4 vs. 76±3 mm Hg) and heart rate (103±8 vs. 100±5 min-1) remained stable throughout both treatments. Normalization of hct led to an increase in total RBC volume (from 0.77 to 1.48 L) and V (Tab. 1), but to a decrease in plasma volume (from 3.0 to 2.5 L). From the 80 g of albumin infused approximately

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20 g escaped from the vascular space already during HD. A returned to pre-treatment concentrations within one week after infusion.

	A-pre g/L	A-post g/L	π-pre mm Hg	π-post mm Hg	V-pre L	V-post L	hct-pre %
1st run	9	25	8.7	15.1	3.72	4.26	21.6
2nd run	11	25	8.6	15.2	4.01	4.57	36.8

High-dose albumin has an immediate beneficial effect on vascular refilling, edema mobilization, and blood pressure stability in state of severe hypoalbuminemia, however, half life is considerably reduced and the long-term benefit must not be overestimated.

M281 SYMPTOMATIC HYPOTENSION: COMPARATIVE STUDY OF FIVE PREVENTION METHODS

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Symptomatic hypotension (SH) is considered the most common adverse effect of haemodialysis (HD) patients. A variety of methods have been tested in order to prevent hypotension episodes during HD sessions, but no conclusive results have been drawn yet. The purpose of this study is to assess the efficacy of 5 different HD methods on reducing the frequency and severity of intradialytic hypotension episodes.
Twenty-five HD patients (12 men) with a history of frequent hypotension episodes were recruited. Initially, all patients underwent standard dialysis, consisting of 3 sessions of 4 hours/week, dialysate sodium 140mEq/L and dialysate temperature 37° C. Then, each patient was subjected for 1 week to one of the following methods of HD: (1) high sodium dialysate containing 144mEq/L Na, (2) sodium profiling, in which the concentration of sodium dialysate declined gradually from 152mEq/L to 140mEq/L during the session, (3) one hour of isolated ultrafiltration following by three hours of standard dialysis, (4) cool temperature dialysis (T:35°C) and (5) combination of sodium profiling and low temperature dialysis (in 15 patients). The number and the severity of hypotension episodes during each session of all the five tested protocols were examined. Weight loss was identical in all methods tested. No statistical significant differences were found among the tested strategies that could suggest one of them as the method of choice in managing the SH of HD patients. Statistically the worst results regarded the isolated ultrafiltration method, where us low temperature dialysis and it's combination with sodium profiling proved to have the lower number of hypotension episodes.
This study has not found that any of the five experimental protocols is superior in handling the SH during the HD sessions.

M282 THE INFLUENCE OF SODIUM PROFILING ON HEMODIALYSIS RELATED SYMPTOMS

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Hemodialysis related symptoms are still encountered during and after the hemodialysis sessions. The aim of our study was to investigate the effect of Na profiling in decreasing these symptoms. 16 patients (8F:8M, mean dialysis age:77 + 42y) all of whom were on chronic maintenance HD programme 3/week and have been documented to be symptomatic in the intradialytic period were included in the study. All patients received standard bicarbonate dialysis with the following 3 different Na profiling protocols each for 2 weeks:1-Conventional Dialysate Na (140mEq/L), 2-Dialysate Na 150 mEq/L (for the first 3 hours), 135mEq/L (last hour);3-Step wise decrease in diaysate Na from 150mEq/L to 135mEq/L through the session.Intra- and interdialytic symptoms and need for nurse's interventions were recorded during all three protocols. Systolic and diastolic ABP were measured every 30 minutes during the dialysis session.Patients were symptomatic at 25%, 15% and 11% of the dialysis sessions during the 1st, 2nd, and 3rd protocols respectively($p<0.001$). For interdialytic period, patients reported to be symptomatic 23%, 19% and 9% with 1st, 2nd and 3rd protocols respectively($p<0.0001$). Hypotensive episodes in intradialytic period were detected in 75%, 63% and 53% of the sessions with the 1st, 2nd and 3rd protocols respectively (1 vs 3 $p<0.02$). Need for nurse's interventions were observed in 33% in the 1st protocol, in 18,7% in the 2nd protocol and in 18,55% in the 3rd protocol. The mean ABP were significantly different between 1st and 3rd protocols starting from 90th minute and between 1st and 2nd protocols starting from 120th minute.In conclusion, Na profiling can be effective in decreasing dialysis related symptoms in both intra- and inter dialytic periods.

M283 BIOFEEDBACK CONTROLLED HAEMODIALYSIS (BF-HD) REDUCES SYMPTOMS AND INCREASES BOTH HAEMODYNAMIC TOLERABILITY AND DIALYSIS ADEQUACY IN NON-HYPOTENSION PRONE STABLE PATIENTS

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It is now possible to link relative blood volume (RBV) measurements to a software loop designed to actuate a biofeedback response. This allows changes in RBV to determine constant alterations in both ultrafiltration rate and dialysate conductivity. This system has been demonstrated to markedly reduce intradialytic hypotension in unstable patients. We have applied this treatment to stable, non-hypotension prone HD patients.
We prospectively studied all 15 patients in a dedicated four station minimal care treatment area. Patients were studied for three weeks of standard HD, to understand the morphology and response to RBV in that individual. BF-HD was then instituted for a similar period (after a two week optimisation period). Treatment data were extracted from downloaded files. Dialysis adequacy was assessed with equilibrated Kt/V measurements and urea mass removed in spent dialysate.
We studied 263 treatment sessions. There was a reduction in symptomatic episodes (per patient over three weeks) from 3 ± 0.5 (0-9) to 0.13 ± 0.13 (0-2) with BF-HD, $p< 0.001$. Administration of saline fell from 1.4 ± 0.6 (0-6) to 0.13 ± 0.13 (0-2) episodes, $p<0.001$. Reductions in systolic BP >40% fell from 1.4 ± 0.4 (0-4) to 0.46 ± 0.16 (0-2). Episodes of RBV falling > 10% fell from 6.3 ± 0.85 (1-13) to 1.13 ± 0.27 (0-4) with BF-HD, $P<0.001$. Interdialytic weight gains fell from 2.08 ± 0.05 (0.35-3.8) kg to 1.82 ± 0.06 (0-3.7) kg. Equilibrated Kt/V increased from 1.01 ± 0.03 (0.61-1.35) to 1.13 ± 0.03 (0.7-1.5), $p=0.01$, and mass removed of urea increased from 24.9 ± 3 (12.8-45) g to 32.7 ± 1.9 (17.3-48-5) g.
In conclusion, this is the first report of BF-HD increasing tolerability, reducing interdialytic fluid gains and enhancing urea clearance (reduced peripheral urea sequestration) in non-hypotension prone chronic HD patients.

M284 LESS INTRADIALYTIC COMPLICATIONS WITH BLOOD VOLUME CONTROL

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With a frequency of up to 20% of hemodialysis sessions intradialytic hypotension still is a burden for patients and medical staff. The influence of blood volume control (BV ctl) on cardiovascular stability during hemodialysis was investigated in a multicenter-study.
The multiple cross-over design comprises alternating phases with treat-

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ments either with standard ultrafiltration rate or with ultrafiltration rate controlled by a Blood Volume Monitor (Fresenius Medical Care) according to an individually set relative blood volume limit.
60 patients were enrolled, preliminary results of 1 717 hemodialysis sessions of 38 hypotension-prone patients are presented. The enclosed patients had a mean age of 67.4±12.8 years, 55% were female, 58% had diabetes mellitus.
Data of per-protocol analysis are listed in the table: Systolic and diastolic blood pressures (sBP, dBP) at dialysis start and end (in mmHg), as well as the number of hypotensive episodes (HE) per hemodialysis session (all values in mean±SD):

	sBPstart	dBPstart	sBPend	dBPend	HE/session
No BV ctl	139±24	71±10	119±18	63±9	0.88±0.65
BV ctl	140±25	71±10	125±20	65±10	0.67±0.60
Sign.	ns	ns	p<0.01	p=0.02	p<0.01

By blood volume control the blood pressure is significantly better preserved and the frequency of hypotensive episodes decreased by 24%.

PLASMA ADENOSINE LEVELS DO NOT MODULATE BLOOD PRESSURES DURING HEMODIALYSIS

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There is preliminary data to suggest that plasma adenosine levels get elevated when blood pressure (BP) drops during a hemodialysis (HD) session. We investigated whether there is any correlation between plasma adenosine levels and BPs during HD and whether plasma adenosine levels are altered during hypotensive episodes.
Twenty-nine adult patients on HD using F5 Fresenius dialyser and acetate buffered dialysate were studied. Dialysate temperature, conductivity and sodium levels remained unchanged during the procedure. Blood samples for estimating plasma adenosine levels were drawn from the venous sampling port at the start of HD, at 2 hours and at 4 hours. In patients developing symptomatic hypotension (BP <90mm systolic or a fall of >30 mm systolic from the predialysis recording) plasma adenosine samples were drawn just prior to infusion of normal saline and after the hypotensive episode resolved and symptoms subsided. Plasma was stored and analysed for adenosine levels using HPLC.
In 29 patients without episodes of hypotension during HD session, there was no correlation of plasma adenosine levels with BPs recorded at 0,2 and 4 hours of HD. When 8 patients with HDs complicated with hypotensive episodes were compared with their control HD sessions not associated with hypotension, plasma adenosine levels at 0, 2 and 4 hours of starting dialysis were not statistically different. There was also no statistically significant difference in plasma adenosine levels before and after correction of the hypotensive episode. Changes in plasma adenosine levels did not correlate with changes in BP, duration of hypotension or the volume of normal saline infused to correct the hypotension.
We conclude that changes in plasma adenosine levels do not modulate blood pressure during HD sessions in patients with and without dialysis associated hypotension.

M286 EFFECT OF SERTRALINE HYDROCHLORIDE ON AUTONOMIC DYSFUNCTION OF PATIENTS WITH HEMODIALYSIS HYPOTENSION

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In previous study, we have shown that sertraline, a selective serotonin reuptake inhibitor, is effective to prevent hypotensive episodes during hemodilaysis. In order to evaluate the effects of sertraline on cardiac autonomic functions, the prospective study was designed.
Ten hemodialysis patients (M: 5, F: 5; age:43,5±11,9) with hemodialysis hypotension. and 10 hemodynamicaly stable hemodialysis patients (M: 7, F: 3; age: 40,8±14,3) who need a serotonin reuptake inhibitor due to psychiartic reasons were participated to the study. All of the patients were treated with sertraline 50mg per day for 4 weeks. Pre-treatment and post-treatment heart rate variabilities (HRV) in supine and tilt position were performed. The ratio of low frequency and high frequency (LF/HF) band was considrered to reflect sympathovagal balance. To evaluate the autonomic response to tilt position, DLF/HF was calculated as DLF/HF=(LF/HF during tilt position)-(LF/HF during supine position).
Pre-treatment supine HRV parameters were similar in two groups. However the response to tilt position was parodoxical in hypotension prone patients (DLF/HF were -1,86±2,06 in hypotension- prone group and 2,00±5,66 in control group; p<0,05). After sertraline treatment, no significant change was observed in the patients without dialysis hypotension. In spite of the supine position HRV parameters in pre and post-treatment were also similar in the patients with hemodialysis hypotension; the paradoxical sympathetic response to tilt position improves significantly after sertraline treatment (DLF/HF were -1,86±2,06 and 0,562±2,34 in the pre and post-treatment, p<0,01).
Sertraline prevents hemodialysis hypotension via improvement of the autonomic dysfunction described as paradoxical withdrawal of sympathetic response to hypovolemia.

M287 THE EFFECTS OF DIALYSIS MODALITIES ON CARDIAC AUTONOMIC DYSFUNCTION IN END-STAGE RENAL DISEASE PATIENTS: A ONE YEAR PROSPECTIVE STUDY

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Cardiac autonomic dysfunction (CAD) is common problem in patients with end-stage renal disease (ESRD) and may contribute to the risk of cardiac mortality. It is not clear about the long term effects of dialysis modalities on CAD in ESRD patients. In this one year prospective study, we studied the effects of dialysis modalities on CAD in ESRD patients.
The study consisted of 20 ESRD patients who had the indications of starting dialysis therapy (13 pts for hemodialysis and 7 pts for CAPD) and 15 healthy controls (M/F:5/10; age 30±4). In all the subjects, first at the beginning of study (in patient group just before starting dialysis therapy) and then after 12 months we studied 24 hours ECG-Holter monitoring and heart rate variability parameters (time and frequency domain analysis parameters; SDNN: standard deviations of nn intervals, rMSSD: Square root of the median of standard deviation, HRVI: Heart rate variability index, LF/HF: Low Frequency/ High Frequency) were examined.
In ESRD patients, before dialysis therapy, all the parameters of time domain analysis were significantly lower compared to control group (p<0.01). In patient groups, after dialysis therapy (on the 12th month), significant improvement was observed in time domain analysis parameters (p<0.01). When dialysis modalities were compared, the increase in the time domain analysis parameters was significantly greater in the CAPD group compared to those of the HD group (p<0.05). The results are shown in the Table.

Time domain parameters	HD (n=13)	CAPD (n=7)	Controls (n=15)
SDNN (0./12. Month) (ms)	68±25/88±22	71±41/112±33	145±25/135±9
RMSSD(0./12. Month) (ms)	17±9.5/20±10	19±9/25±7	24±6/25±7
HRVI (0./12 Month) (ms)	25±15/27±17	27±20/32±19	42±8/37±7
LF/HF (0./12. Month) (ms)	1.8±1/1.6±0.7	1.6±1.1/1.7±0.7	2±1/1.9±1

 # Author declined to present

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Our findings suggest that CAD is frequent in ESRD patients, a dialysis therapy of 12 months can cause significant improvement on CAD and the ameliorative effect of CAPD is better than HD.

M288 EVALUATION OF PERIPHERAL AND CENTRAL NERVE INTEGRITY IN HEMODIALYSIS AND RENAL TRANSPLANTATION

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Involvement of central and peripheral nervous systems in uremic states and their improvements after renal transplantation (RTX) have conflicting results. In this study we evaluated motor and sensory peripheral nerves by nerve conduction velocity (NCV) and central nerves by visual evoked potential (VEP) test in 17 stable hemodialysis (HD) patients (8 F and 9 M) and 16 stable renal transplanted (RTX) recipients (10 F and 6 M). Diabetics and amyloidosis were excluded. The average of motor NCV (AMNCV) for Median and Proneal nerves and the average of sensory NCV (ASNCV) for Median and Sureal nerves In HD were compared with the RTX group. The results of pattern shift of VEP in two angles, 17° and 34°,Also, were compared in the two groups. Analyses were performed by Pearson and non paired t tests. $P<0.05$ was considered significant.
The mean of AMNCVs were 47.3±7.44 m/sec and 6.2±1.5 m/sec for HD patients and RTX recipients ($p<0.01$). The mean of ASNCVs were 94.4±2.41m/sec and 49.1±2.2 m/sec, respectively ($p<0.01$). The average of delayed time wave for VEP at 34°, was 110±9.9 m/sec in HD and 103±5.2 m/sec in RTX group ($p<0.05$). When VEP performed at 17°, they were 120.8±14.1 m/s and 109.3±7.5 m/s, for HD and RTX recipients, respectively ($p<0.01$). The average of VEP wave amplitudes was 6.9μvolt in HD and 9.4 μvolt in RTX recipients (p=ns). There was not correlation of blood pressure, serum albumin, creatinine, hemoglobin, PTH, calcium, phosphorus, cholesterol, triglyceride and length of renal replacement therapy with the VEP impairment.
This study shows that delayed conduction velocity in HD patients, observed in both of the peripheral and central nervous systems, is a demyelization injury due to uremic milieu, which is reversible after RTX.

M289 EFFECT OF PARATHORMON ON HEART RATE VARIABILITY IN HEMODIALYSED PATIENTS

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Parathormon (PTH) is very potent uraemic toxin, which affects heart structure and function. PTH also plays the role in uraemic autonomic neuropathy (AN). The aim of the study was to investigate the relationship between high PTH level and AN assessed with frequency domain measures of heart rate variability (HRV). 24-hour ECG was performed in 40 HD (F=19, M=21) patients aged 49 ± 11 years, duration of HD therapy 37 ± 30 months. Frequency domain measures of HRV were obtained according to European Society of Cardiology recommendations. Total spectral power (TP), high frequency band (HF) and low frequency band (LF) were computed as indexes of: total autonomic nervous system, parasympathetic and sympathetic activities, respectively. LF/HF ratio was calculated. TP, HF, LF and LF/HF are expressed as natural logarithm. Patients were divided into 2 groups due to PTH level: PTH+ (PTH ± 275 pg/ml) and PTH- (PTH < 275 pg/ml). Results were as below (mean ± SD). We found relationship between PTH and lnTP (R=-0,49; $p<0,005$), PTH and lnLF (R=-0,34; $p<0,05$), and PTH with lnHF (R=-0,32; $p<0,05$).

	PTH(+) n=21	SD	PTH(-) n=19	SD	p
PTH (pg/ml)	820,0	610,1	191,8	188,8	<0,001
lnTP (msms)	6,58	0,76	6,99	0,44	<0,05
lnLF (msms)	4,91	0,99	5,33	0,65	0,06
lnHF (msms)	3,65	1,03	3,76	0,78	ns
lnLF/HF	1,26	1,03	1,57	0,65	ns

In conclusions, high PTH level deteriorates total autonomic activity. PTH may also exert effect on both: sympathetic and parasympathetic nervous system.

M290 LONG TERM FOLLOW UP OF URAEMIC NEUROPATHY IN CRF, HEMODIALYSIS AND CAPD

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Although Uraemic Neuropathy is well known as one of the most common complications of Chronic Renal Failure, its evolution during a long period of time and in same patients treated with different type of dialysis is not well established yet.
The purpose of the study was to evaluate the presence and severity of the injury of the Peripheral Nervous System in same patients with Chronic Renal Failure before they started Regular Hemodialysis Treatment, than during HD, and finally after at least one year since they were transferred to CAPD.
24 patients (8 males and 16 females) were included in the study. The study was held over 9 years period of time. Mean duration of HD was 69.65 months (from 13 to 143 months). Mean period of CAPD was 30.22 months (from 12 to 72 months). Nerve Conduction Velocity (NCV), Distal and Proximal Latency and Amplitude of Muscle Response of Peroneal and Posterior Tibial Nerve were repeatedly studied in all patients. Before the start of Dialysis Treatment 18 (75%) of the patients showed ENG signs of presence of peripheral neuropathy. During the HD treatment peripheral nerve function deteriorated (nonsignificantly) mainly in patients with severe anemia. Changes in Nerve Conduction Velocity were registered in 21 (87.5%) of the patients. More remarkable was the reduction of the Amplitude of the Muscle Response, which was not due only to neuropathy but to muscle hypotrophy as well. After changing the method of treatment from HD to CAPD the ENG signs showed a tendency of slight improvement regarding mainly NCV.
We conclude that:
1.Most of the patients show ENG signs of Uraemic Neuropathy at the start of dialysis treatment.
2.Dialysis prevents further injury of peripheral nerves but cannot improve their function.
3.Once developed, Uraemic neuropathy does not change significantly after transferring the method of treatment from HD to CAPD.

M291 CHANGES IN THE INTRA-CORTICAL EXCITABILITY INDUCED BY HAEMODIALYIS

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DDS is caused by cerebral edema that occur in patients with chronic uraemia after the dialysis. Symptoms and signs include headache, dizziness, myoclonus, tremor and seizures. This clinical picture could be related to a cortical hyperexcitability induced by haemodialyisis.
Twelve chronic uraemic patients on haemodialyisis treatment and ten age matched healthy subjects were selected for the purposes of our study. We exclude patients with a significant CNS involvement. Several measures of

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cortical excitability were tested before and after haemodialyisis treatment and on the following day.
The TMS protocol consisted of paired pulse inhibition and facilitation at short intervals; evaluation of cortical and peripheral silent period and paired pulse inhibition at long intervals. The electrophysiological findings were compared with urea, creatinine, intracellular magnesium (platelets and eritrocites),plasmatic electrolytes and clinical findings. Intracortical facilitation was found to be increased after dialysis and went down to baseline values in the following day (Anova). The amount of intracortical facilitation was related with the drop of urea levels in the blood induced by dialysis. Several animal studies have suggested that haemodialyisis removes urea more slowly from the brain than from the plasma creating an osmotic gradient that results in cerebral oedema (reverse urea hypothesis). This is the first study in humans that have shown a correlation between the drop of urea plasma levels with changes in the intra-cortical excitability. The increase in the amount of facilitation after dialysis may underlie the cortical hyperexcitability seen in uremic patients and thus explain the occurrence of epileptic seizures in DDS.

M292 PARAMETERS EFFECTING THE INCREASE OF CEREBRAL VOLUME AFTER FIRST HEMODIALYSIS IN END STAGE RENAL DISEASE

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The cause of disequilibrium syndrome is the increased brain water content followed by cerebral volume(CV) increase. But information concerning the extent of CV increase after the first hemodialysis(H) of patients with end stage renal dasease(ESRD) and factors effecting it can not be found. We studied 6 new patients with ESRD and 5 patients on chronic H. Medulla oblongata(MO) and medulla spinalis(MS) magnetic resonance imaging was performed immediately before and within 2 hours after the first H session lasting 2 hours. Then the identical cross-sectional areas(CSA) of MO and MS were measured. At the same time certain parameters were also studied. The increase of the CSA after 4-hours H in chronic patients was 3%, as it had been in one recent study. Thus, the increase of the CSA of MO and MS was considered to represent the total CV increase.
The increase in MO and MS of the new patients was 11,63%±4,33 and 9,48%±2.8, respectively ($p<0,01$,t-test). We found a significant(S) and strong positive correlation between serum albumin levels and increase of MO ($r=0.825$, $p<0.05$, Pearson corr. coef) and MS ($r=0.812$,$p<0.05$, Spearmen corr. coef.), and S negative correlation between ultrafiltration amount/predialytic weight ratio and increase of MO ($r = -0,860$, $p<0,05$, Pearson c.c.) and MS ($r= -0,884$, $p<0,05$, Pearson c.c.). Not significant moderate/strong positive correlation between MO/MS and hematocrit, Na, Ca and the time passed after H was found. A weak correlation with predialytic urea/postdialytic urea ratio and a negative moderate/strong correlation with predialytic urea was found. Thus, it was suggested that factors favouring the decrease of intravascular urea concentration (small ultrafiltration, high Na, Ca and oncotic pressure levels) increase the CV causing perhaps a large osmotic gradient between intravascular and intracellular space.

M293 EFFICACY OF ZALEPLON ON SLEEP QUALITY IN MAINTENANCE HAEMODIALYSIS (MHD) PATIENTS

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A recent survey has shown that insomnia is still a very common problem in MHD patients. Aim of the present study was to test the efficacy of ZAL on sleep quality of MHD patients with insomnia. ZAL is a new hypnotic drug not related to benzodiazepines, with a low protein binding, excreted as inactive metabolite by both liver and kidney. Sleep quality was assessed by the Pittsburgh questionnaire in 14 patients (7M/7F) on MHD with insomnia through a randomised double-blind crossover study vs placebo (PLA), which consisted of two washout periods and two treatment periods, each lasting 15 days. Inclusion criteria were: age between 25 and 70 years, absence of chronic concurrent diseases, plasma levels of PTH<400 pg/ml. Four patients dropped out from the study (1 on ZAL) because of persistence of insomnia. The analysis of covariance for repeated measures and the Fisher's "F" test were used for statistical evaluation. Treatment with ZAL significantly improved the total score of sleep quality ($p<0.03$ vs PLA). The analysis of the single components revealed that treatment with ZAL was associated with a higher subjective sleep quality ($p<0.01$ vs PLA), and a reduced sleep latency ($p<0.01$ vs PLA). Duration of sleep was not modified by ZAL, whereas a significant improvement was detected in habitual sleep efficacy ($p<0.05$ vs PLA). No peculiar side effect was recorded on ZAL. Blood parameters (measured at the end of the first washout and of both the experimental periods) did not change, nor differences were recorded in dialysis behaviour of patients (body weight gain, blood pressure, hypotensive episodes, necessity to change therapies). In conclusion, this study suggests that ZAL is an efficient and safe drug in MHD patients. The absence of side effects and its pharmacodynamic properties make ZAL a first choice drug in uraemic patients.

M294 THE EFFECT OF SYSTEMATIC EXERCISE ON BONE METABOLISM AND AEROBIC CAPACITY OF CHRONIC HEMODIALYSIS PATIENTS

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Exercise training in end-stage renal disease patients on hemodialysis has beneficial effects on their functional capacity because of the central and peripheral adaptations. However, there isn't information about the effects of training on bone metabolism in renal patients, which are well known to appear secondary bone diseases.
The purpose of this study is to examine the effects of 6-months physical rehabilitation program in 16 dialysis outpatients (Group A - mean age 51.4±12.5 years old) on the levels of special molecules that regulate the homeostasis of calcium (Ca) and inogranic phosphorus (Pi) and are related to the bone metabolism. Other 16 dialysis patients remain as untrained controls (Group B - mean age 50,2±10,9 years old).
The exercise program was taking place 3 times per week, on the non-dialysis days, lasting 60-90 min and including aerobic exercises, isometric exercises of upper and lower extremities, flexibility exercises and team games. Blood samples for measurements of Ca, Pi, parathyroid hormone (I-PTH), Calcitonin (CT) and osteocalcine (BGP) were obtained at the start and the end of the exercise programme.
Results: The aerobic capacity was increased from 16.3±3.4 to 28.4±3.9 ml O_2/kgr/min and the fatigue time was reduces per 40%. The data of the biochemical measurements is as following:

Parameters	I-PTH (pg/ml)	CT (pg/ml)	BGP (ng/ml)	Ca (mg/dl)	P (mg/dl)
Group A Before	197,9±59,0	66,80±12,1	18,8±5,9	8,1±0,3	6,6±1,3
After	189,0±70,1	72,0±10,1	16,0±5,1	8,4±0,5	6,0±1,2
Group B Before	190,8±65,6	71,0±10,8	15,5±5,0	7,8±0,3	6,1±1,0
After	189,±60,0	67,0±7,9	19,6±5,8	8,2±0,2	6,4±1,3

It is concluded that 6-months physical training was not significantly beneficial of bone metabolism of dialysis patients. However, the aerobic capacity was increased per 60%.

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M295 20 YEARS ON SHORT DAILY HEMODIALYSIS (ShDHD)

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We describe our longest survivor on ShDHD in order to overcome the doubts on its long-term feasibility/outcomes. Born on 1939, started 1977 November in-center HD 4hx3/w, 1980 March Home HD 4h alternate day, 1982 July low-efficiency ShDHD (90min x7/w, recycling 25 l dialysate)to improve his sexual impotence, November 1991 standard-eff. ShDHD (2hx6/w,with standard single-pass machines). HbsAg carrier since 1978. Within the 1rst month in spite of a significant increase of appetite the dry body weight decreased from 82 to 79.5 kg, within the 2nd month Hematocrit increase (25 to 42%) and normal sexual function; within the 3rd month blood pressure normalized enabling to stop all anti-hypertensives; progressive increase of dry weight (86 and 90 kg after 2 and 4 yrs). After 20 yrs on Sh-D-HD (plus 5 yrs on Standard HD) the average pre-HD levels of BUN and Creatinine are 40 and 10.5 mg/dl..Normal levels of total Cholesterol, Apo A and Apo B, slight increase of triglycerides. Steadily normal levels of Ca, P, PTH and Alcaline Phosphatase, with no evidence of hypertrophic parathiroids and only a modest osteopenia by bone densitometry. Ht 36% and Hb 12 gr/dl without EPO. Normal Biochemical (Tot Prot 7.2 and Alb 3.7 gr/dl, Pre-Alb 37) Antropometric and Bio-Impedenziometric parameters. Homocysteine steady within the normal range (<15 mmol/l), with small doses of Vit.B12 and B6 and Folic acid. BP steadily low (SBP < 110mmHg), normal ECG, only modest reduction of LV diastolic compliance on EchoCG, small area of reversible ischemia on Myocardial Scintigraphy. Diffuse but modest thickening of intima and media of carotids. Bilateral CTS, treated surgically, with relatively high levels of b2Microglobulin while on Cellulosic or PS membranes, reduced to10 mg/l after switching to Polyamide. During 25 yrs on HD, only a FAV failure occurred (low BP + High Ht + excess dehydration); FAV reconstructed 2 cm proximally.

Dialysis: Anemia & EPO

M296 GENE EXPRESSION PROFILING OF ERYTHROID PROGENITOR CELLS IN HEMODIALYSIS PATIENTS USING cDNA ARRAYS

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This study investigated the mechanism of poor response to recombinant human erythropoietin (rHuEPO) by analyzing the gene expression profiles of erythroid progenitor cells in hemodialysis (HD) patients. Twenty HD patients and ten healthy individuals were evaluated. The patients were divided into two groups: 10 poor responders (Group I) whose hematocrit (Hct) levels remained less than 25% even under rHuEPO therapy, the other 10 patients without rHuEPO therapy (Group II), whose Hct levels were greater than 30%. The circulating CD34+ hematopoietic stem/progenitor cells were separated by using a CD34+ cells magnetic sorting kit, and then CD34+ cells were cultured on serum free semisolid methylcellulose medium. After 14 days, burst forming unit-erythroid (BFU-E) colonies were scored and harvested under an inverted microscope. Total RNAs were isolated from the BFU-E. Using the SMART PCR cDNA synthesis kit in conjunction with the Advantage cDNA PCR kit, the labeled cDNA probes were hybridized to Atlas Human Cytokine/Receptor Array (CLONTECH). We have found that both number and size of BFU-E colonies from patients in Group I were significantly smaller than those in Group II and healthy individuals. The genes of cytokine/receptor could stimulate stem/progenitor cells into differentiation or proliferation (e.g. IL-1, IL-3, IL-9, IL-11) were significantly underexpressed in Group I. These results indicate that, in patients who show poor response to rHuEPO, hematopoietic stem/progenitor cells are in themselves suppressed, furthermore the hematopoietic cytokine/receptor genes are under-expressed.

M297 HEMOGLOBIN LEVEL INFLUENCES ACID-BASE STATUS IN DIALYSIS PATIENTS: DISPARATE EFFECTS IN ARTERIAL AND VENOUS BLOOD

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Hemoglobin (Hb), plasma proteins and phosphate are not only profoundly abnormal in chronic dialysis pts, but also physiological blood buffers. Especially, Hb in arterial blood is an acid, while in venous blood it is a base.
The effects of these variables on arterial and venous blood bicarbonate (HCO3-) levels were studied in pts dialyzed for at least 1 month. Arterial blood was obtained pre-HD from the a-v fistula (n=172), while venous blood (n=138) from the temporary HD cathether (n=38) or the peripheral vein in CAPD pts (n=100).
In the arterial group, HCO3- was 21.7±2.69 mEq/l, Hb 9.90±1.92 g/dl, total proteins 6.80±0.56 g/dl, albumin 3.81±0.44 g/dl, and phosphate 5.59±2.02 mg/dl. In the venous group, they were 22.8±2.96 mEq/l, 11.0±1.94 g/dl, 6.39±0.79 g/dl, 3.54±0.59 g/dl, and 4.86±1.50 mg/dl, respectively. HCO3- was inversely associated with Hb in arterial blood, and positively in venous blood.

	Arterial blood HCO3- (n = 172)	Venous blood HCO3- (n = 138)
Hemoglobin	r = - 0.168, p = 0.028	r = 0.197, p = 0.019
Total proteins	r = - 0.030, p = 0.697	r = - 0.475, p < 0.0001
Albumin	r = - 0.013, p = 0.867	r = - 0.410, p < 0.0001
Phosphorus	r = - 0.275, p = 0.0002	r = - 0.250, p = 0.003

In multivariable analysis, increased phosphate (p=0.0001) and Hb (p=0.004) independently predicted low HCO3- levels in arterial blood. In venous blood, low HCO3- was associated with high total proteins (p=0.0003), low Hb (p=0.005) and increased phosphate(p=0.014).
In conclusion, increased plasma phosphate and total proteins are associated with severe metabolic acidosis in dialysis pts. This is in line with their food intake-related, proacidotic effects, and in contrast to the natural blood-buffering properties. Hb levels should be regarded as physiological and clinically-important determinants of acid-base status also in chronic dialysis pts.

M298 SWITCH FROM CONVENTIONAL POLYSULFONE MEMBRANE TO THE NEW HIGH-FLUX POLYSULFONE MEMBRANE IMPROVED THE ANEMIA OF HAEMODIALYSIS PATIENTS

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The effect to the anemia of high-flux dialysis is the point where there are many discussions. So we investigated whether or not the anemia improved by changing into the new high-flux polysulfone membrane (APS-E, Asahi MEDICAL, Japan) from the usual polysulfone membrane (BS, Toray, Japan) at the haemodialysis patients.
We planned whether the use of a new highly porous polysulfone membrane (APS-E) for a 16-week follow up improves anemia in haemodialysis patients in comparison with the use of conventional polysulfone membrane. 10 chronic haemodialysis patients stable in regard to BS high-flux dialysis treatment were included. We selected these patients without other known factors affecting uremic anemia. The average age of the 10 patients is 60 years. In the mean duration of dialysis treatment, it is 13.8 years.

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