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IMPROVEMENT OF THE PURIFICATION WITH MUSCULAR MOBILIZATION DURING DIALYSIS

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Aim: In previous studies it was observed that in the haemodialyzed patients, a moderated physical activity, carried out either during the dialytic treatment or in the interdialytic days, determines considerable physical and psychological benefits. The aim of the study was verifying the hypothesis that a muscular mobilization, voluntary or electrostimulated, during the haemodialytic session could determine an improvement of the dialytic efficiency.
Methods: The research was led on 20 volunteer patients in conventional haemodialytic treatment (11 M, 9 F; mean age 48.5±11.1). The study planning was concerned with three observation phases of two weeks each. The first phase basal line (BL), during which the patients had muscular rest sittings, the second phase (E1) during which the patients practised a muscular mobilization by voluntarily physical isotonic exercises, and the third phase (E2). during which the patients had passively muscular mobilization by electrostimulation. For every dialytic session were recorded the urea curve (time 0, 120, 240 and 270 minutes), the pressure profile, the Kt/V, the Protein Catabolic Rate (PCR) and the bioelectrical impedance measurements.
Statistical analysis was performed using ANOVA and Student t test.
Results: Kt/V: BL=1.29±0.13, E1=1.40±0.15, E2=1.37±0.16; PCR: BL=1.13±0.19, E1=1.18±0.18, E2=1.18±0.16; Post dialytic rebound (%): BL=6.17±2.44, E1=1.18±0.18, E2=1.18±0.16.
Conclusions: The intradialytic muscular activity improves the dialytic efficiency, causing an improvement of the urea clearance, an improvement of the Kt/V and a decrease of the post-dialytic rebound.

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LEAKAGE CURRENT MAY BE A RISK FOR PATIENTS IN HEMODIALYSIS (HD) IF THE DEVICES ARE DEFECT

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Background: If a difference in (electrical) potential between patient and HD-machine occurs during HD the result will be a leakage current (LC). If LC is high enough this could be a risk for the patient. Notable is that the HD-machines are classified: class I type B (def. for non-patient connected device). This *in vitro* study investigated if LC in priming fluid or blood at entry into the patient constitutes a risk for the patient (>80 µA) during dialysis to examine the safety situation for the patient.
Method: LC was measured in single fault condition (SFC). Priming fluid (NaCl) was circulated through a conventional tubing set and HD-device connected to a HD-machine (Fresenius 2008C). 8 different dialyzers of the same brand were tested (120 GFS plus, Gambro). In addition analyses were performed with whole blood from 8 different donors using the same dialyser. The dialysate was connected with the dialyzer (by an electrode) not allowing change of the priming fluid or blood during the HD. Electrodes were placed at different positions including at the tip of a central venous catheter (CDC, Optiflow, 34 cm, Medcomp) and from the needle-position at the venous side. Dialysate flow was either off (Doff) or on (Don) and blood flow put on 80 ml/min (Bon). A safety measure using a Metron QA-90 electrical safety analyzer was performed. Testmode was set to class I, CF according to IEC 60 601-1 (equipment allowed to be connect close to the heart).
Results: The LC test-step 'mains on applied part' (SFC), at the end of the CDC, was lower for NaCl than for blood when the blood pump was stopped (34.5 versus 476 µA, $p<0.001$) but higher for NaCl with the blood pump on (Bon: 1009 versus 610 µA, $p<0.001$). The LC was higher at the needle site compared to the end of the CDC ($p=0.006$).
Conclusion: If a defect in another device connected to the same patient develops, current flow may be high enough to be a risk for arrhythmia for the patient especially when using a CDC. Observe that the limit is 50 µA. for CF but class I type B (dialysis machines) has no limit. This indicates that HD-machines should be classified: class I type CF.

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MINIMIZED WEIGHT GAIN BETWEEN HEMODIALYSIS MAY CONTRIBUTE TO A REDUCED RISK FOR DEATH

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The risk for death is increased for dialysis patients compared to age-matched subjects. The main reason is cardiovascular. This prospective study investigated if the extent of ultrafiltration (UF) need was of importance for the outcome.
Material and Methods: 88 hemodialysis patients were included and followed prospectively. The outcome was registered in regard to death, acute myocardial infarction or coronary vascular intervention. The extent of UF needed at dialysis was calculated as a mean during the observation period as were other variables. The mean extent of UF was compared for patients who had survived without end-points (group 1, n=53) versus those who reached any end-point during the period (group 2, n=35).
Results: In total, 40% of the patients reached end-point during the observation period. There was no difference at baseline between the groups in regard to age, prevalence of diabetes mellitus or history of previous cardiovascular disease, KT/V, residual renal function, UF-need, C-reactive protein, s-albumin, cholesterol, LDL-cholesterol, HDL-cholesterol, appetite or wellbeing, while triglyceride was lower in group 2 ($p=0.035$). The observation period for group 1 was at a mean 24.7 months (SD 13.1) and for those in group 2 at a mean 13,8 (±11.7 months, $p<0.0001$). Patients representing group 1 at 24 and 30 months had less need of ultrafiltration than those did in group 2. Thus, the need of ultrafiltration was about 27% lower at 24 months (for 29 persons in group 1: 3.63±1.93 versus 4.97±1.70 weight% for 9 patients from group 2, $p=0.046$) and 46% at 30 months (for 18 from group 1: 3.48±1.95 versus 6.45±1.55 for 3 from group 2, p 0.030). C-reactive protein did not differ between the groups during the period.
Conclusion: After a prolonged period of 24 months the extent of UF-need seems to be important for the outcome of the patients. Thereby those with higher UF-need had worse prognosis. It seems important to motivate patients to reduce the extent of volume gain between dialysis to prolong survival.

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EVIDENCE FOR RELEASE OF BARIUM SULPHATE RADIOGRAPHIC CONTRAST MATERIAL FROM STANDARD TEMPORARY HEMODIALYSIS CATHETERS

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Background: Recently it was shown that barium sulphate (BS) in conc. < 0.5 g/L is able to significantly inactivate stimulated phagocytic cells. BS is added as contrast agent to hemodialysis catheters. We hypothesized that BS released from the catheter surface could lead to local depression of phagocytic activity when challenged, and evaluated BS release during use.
Methods: Clinical study with conventional (CC) and surface-coated (SC) polyurethane catheters. The coating consisted of a microdomain-forming, surface-smoothing, low-thrombogenicity polymer supposed to prevent BS release. CC and SC were randomly applied in 8 intensive-care patients acc. to clinical routine. Catheters were removed after <= 1 week as clinically indicated. Tips with side holes were cut off, rinsed, and fixed in 2% glutardialdehyde. For scanning electron microscopy, the tips were freeze-dried to preserve morphology, and coated with carbon-gold for surface conductivity.
Results: CC features: (1) Unhomogeneitis (range 1-10 µm) due to mechanical processing during manufacture (2) BS moieties at the surface covering approx. 10-20% (3) Approx. 20-30 pores/500 µm^2 surface with diameters of 0.1-1 µm after use (4) Pores are likely to be generated by BS removal, as deduced from combined surface and cross-section analysis. SC features: (1) Smooth surface due to the 10-30 µm coating. (2) Complete masking of BS moieties. (3) Reduced deposition of blood components and clots compared to CC.
Conclusions: (1) BS can be released from CC during use. (2) Coating prevents BS release during contact with blood. (3) Further investigations need to show whether presence of BS in catheters results in suppressed local phagocyte activity upon challenge at the site of vascular access *in vivo*.