Micronutrient loss during renal replacement therapy for acute kidney injury

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Introduction
1. The prevalence of malnutrition in acute kidney injury (AKI) is high1.
2. Patients with AKI may require renal replacement therapy (RRT), which could result in loss of water-soluble micronutrients.
3. Little is known about these losses in RRT and whether they differ between types of RRT.
4. This study aims to quantify micronutrient losses during RRT in patients with AKI and to compare them in three different RRT modalities: continuous veno-venous haemofiltration (CVVH), intermittent haemodialysis (IHD) and sustained low-efficiency dialfiltration (SLEDf).

Conclusion
1. Micronutrients are lost during RRT in patients with AKI stage 3.
2. RRT modality determines the extent of micronutrient loss.
3. There is a high prevalence of malnutrition in patients with AKI stage 3.
4. The significance of these findings will need to be confirmed in a larger patient cohort.

Results
1. A total of 30 patients have been recruited (10 IHD; 10 CVVH; 10 SLEDf).
2. 73.5% of patients were malnourished.
3. Prevalence of malnutrition highest in CVVH group (82%) but similar in IHD (69.2%) and SLEDf (70%) groups.
4. The total adjusted AA losses in the effluent are highest in the CVVH group (Figure 1).
5. Baseline plasma AA levels are highest in the CVVH group (Figure 2).
6. Plasma AA levels are reduced during RRT in the CVVH and the SLEDf group but not in the IHD group (Figure 2).
7. The total unadjusted trace element losses were highest in the CVVH group (Figure 3).
8. The total baseline plasma concentration of trace elements were similar in all three RRT groups (Figure 4).
9. The plasma concentration of trace elements were reduced during RRT in all three modalities (Figure 4).

Methods
1. A prospective observational study is conducted at the adult renal unit and general intensive care unit in a large university teaching hospital.
2. Patients with AKI stage 3 requiring RRT are eligible to participate. A total of 30 patients with AKI stage 3 (10 IHD, 10 SLEDf, 10 CVVH) have been recruited.
3. A clinical assessment of the patient’s nutritional status was undertaken using the Subjective Global Assessment (SGA) tool.
4. Samples of blood and RRT effluent were obtained at baseline, mid and end-session from each participant during their first RRT treatment.
5. Samples were processed and stored at -80°C for subsequent analysis of amino acids by high performance liquid chromatography and trace elements by inductively coupled mass spectrometry after derivatization from physiological fluids.
6. Micronutrient losses were calculated by multiplying mass-corrected concentrations by total volume of RRT effluent, adjusted for baseline plasma concentrations and RRT dose.
7. Data were analysed by restricted maximum likelihood estimating equations (Genstat v16, VSNi Ltd, UK).

Reference