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Nitrogen, urea, protein and non-urea non-protein nitrogen loss in patients with acute kidney injury and chronic kidney disease treated with two forms of continuous renal replacement therapy

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Objectives: Patients treated by any form of renal replacement therapy are in greater risk to lose nutrient during dialysis treatment. Thus, this study aimed to assess nitrogen, urea, protein, non-urea non-protein nitrogen loss in patients with AKI receiving CRRT and CKD receiving CAPD and factors affecting these losses. So, any discrepancies between the current nutritional guidelines and the nutritional losses in this study can be addressed.

Methods: This is a pilot project with cross-sectional study design. 104 effluent samples were collected from patients with AKI receiving CRRT and 125 samples from CKD patients treated with PD. Total nitrogen losses measured by the chemiluminescence analysis, while urea was measured by colorimetric based assay using diacetyl monoxime and thiosemicarbazide. Dialysate protein loss was determined using a modified Lowry protein assay.

Results: Patients on PD had significantly higher nitrogen loss (PD: 0.64(0.16-2.02) mg/mL; CRRT: 0.45(0.02 mg/mL); $p < 0.0001$), urea (PD 0.817(0.10-1.94) mg/mL; CRRT: 0.55(0.002-2.21) mg/mL; $p < 0.0001$), protein (PD: 0.09(0.003-0.31) mg/mL; CRRT: 0.04(0.003-0.35) mg/mL; $p < 0.0001$). Serum albumin was also found higher in patients receiving PD (39(29-46) g/L) compared with CRRT patients (32(10-89) g/L), $p < 0.05$. Total nitrogen intake was found correlated with protein loss in CRRT patients ($r = -0.468$; $p < 0.0001$), but not in PD patients.

Conclusions: Total nitrogen, urea, protein and non-urea non-protein loss were found varied widely in both groups. This could indicate that the losses might be affected by dialysis method characteristics (i.e. total fluid exchange and blood pump speed) and total nitrogen intake in CRRT samples. While in PD samples, losses may be related to serum albumin and total nitrogen intake. Thus, nutrition intervention should be given tailored to patient's conditions.