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Clinical significance of dialysate phosphate removal in patients with peritoneal dialysis

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Objectives: Hyperphosphatemia is a well-recognized predictor of cardiovascular and all cause mortality in patients with peritoneal dialysis(PD). A recent study suggested that PD results in higher phosphate retention due to reduced clearance compared to hemodialysis. Phosphate retention increases as residual renal function declines, which may increase the prevalence of hyperphosphatemia in anuric PD patients. Peritoneal phosphate clearance plays a major role in achieving phosphate homeostasis in anuric PD patients. The aim of this study was to investigate that the factors which influence the dialysate phosphate removal in PD patients.

Methods: The study group included 41 patients with peritoneal dialysis (Age; 51±11 years), including 28 on continuous ambulatory peritoneal dialysis (CAPD) and 13 on automated peritoneal dialysis (APD). We evaluated dialysate volume, dialysate phosphate and sodium, 24 hour urine volume, 24 hour urine phosphate and sodium, peritoneal permeability (D/P Cr 4h, D/D0 Glu 4h) and dialysis adequacy parameters including total weekly clearance of urea and creatinine. RRF(mL/min/1.73 m^2) was calculated as the average of creatinine clearance and urea clearance in a 24 hour urine collection. We compared the dialysate phosphate removal with hyperphosphatemia and PD parameters in PD patients.

Results: Total and dialysate phosphate removal correlated with residual renal function. The dialysate phosphate removal was related to serum phosphorus level and dialysate volume (r=0.72 and r=0.41). There is no significant correlation in the dialysate phosphate removal with dialysate sodium removal, peritoneal permeability. There is no significant difference in dialysate phosphate removal between CAPD and APD group.

Conclusions: These results suggest that dialysate phosphate removal during PD is related with serum phosphorus level and the dialysate volume. The monitoring of dialysate phosphate removal may be helpful in managing in hyperphosphatemia in PD patients.