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Theme : Dialysis Adequacy and Residual Renal Function

Dialytic phosphate removal: A new measure of PD adequacy in APD patients?

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Objective:

Although hyperphosphatemia is one of the few established risk factors for cardiovascular mortality in dialyzed patients, the relationship between PD prescription and dialytic phosphate removal is largely unexplored.

Methods:

We analyzed 56 24h clearance and PET studies performed in 35 children aged 0.1-17 yrs on automated PD with 3-13 night-time exchanges, 998 ± 110 ml/m² fill volume and 6.07 ± 1.96 L/m²/day total dialysate turnover. Twenty-eight children had a daytime dwell, and 7 were anuric.

Results:

Mean total weekly Kt/V urea was 3.02 ± 1.03 . Dialytic phosphate clearance averaged 3.9 ± 1.6 (range 1.8-9.4), urine phosphate clearance 2.4 ± 2.5 (0-10) ml/min/1.73m². Serum phosphate ranged from 0.92-2.66 mmol/L. The comparison of subjects with phosphate levels above (n=25) and below the upper normal limit for age (n=31) revealed significantly lower dialytic phosphate clearances in the hyperphosphatemic compared to the normophosphatemic patients (3.3 ± 1.2 vs. 4.3 ± 1.8 , $p < 0.05$), whereas urinary phosphate removal did not differ and daily phosphate binder intake was even higher in the hyperphosphatemic patients. Dialytic phosphate clearance was correlated with 2h- and 4h-D/P phosphate (both $r = 0.52$, $p < 0.0001$), but not D/P creatinine or D/D0 glucose measured in the PET. The 24h dialytic phosphate clearance was correlated with total dialysate turnover ($r = 0.64$, $p < 0.0001$) and the number of exchanges ($r = 0.59$, $p < 0.001$), but not with the fill volume per dwell. A significantly higher dialytic phosphate clearance was associated with > 6 night time exchanges and a total dialysate turnover of > 6 L/m²/day.

Conclusions:

We conclude that dialytic phosphate clearance is an important determinant of serum phosphate control. It can be predicted from the equilibration rate of phosphate but not of creatinine or glucose in the PET, and is a function of the prescribed number of PD cycles and total dialysate turnover. We postulate that in patients on APD, dialytic phosphate removal may be a more relevant marker of PD adequacy than creatinine or urea clearances

Figure:

Fig. 1

[IMAGE]

Fig. 2

[IMAGE]