

Abstract No. : A342

Theme : Peritoneal Transport and Ultrafiltration

The Cellular Contribution to Effluent K⁺ and its Relation to Free Water Transport during Peritoneal Dialysis

Coester, A.M., Struijk, D.G., Smit, W., de Waart, D.R., Krediet, R.T.; Academic Medical Center, Amsterdam, Netherlands

Long-term PD can lead to ultrafiltration failure (UFF), mostly associated with high transport rates of small solutes. It is also associated with decreased free water transport (FWT), suggesting aquaporin-1 (AQP-1) dysfunction. We questioned whether apoptosis of peritoneal cells could be causative for AQP-1 dysfunction. In apoptosis, cells undergo massive K⁺-efflux. During PD, both diffusion and release from cells determine effluent K⁺. Objectives: Therefore, we analyzed the cellular release (CR) of K⁺ to total K⁺-removal, possible relations with duration of PD, the presence of late UFF, and FWT. **Methods:** 3.86% glucose based standard peritoneal permeability analyses were investigated in three stable patient groups. Group I: 19 patients <1year on PD. Group II: 20 patients >4years on PD without UFF and group III: 19 patients >4years on PD with UFF. CR-K⁺ was calculated from diffusion-transportlines. FWT was calculated as the maximal dip in dialysate over plasma (D/P) ratio of Na⁺ and from Na⁺-kinetics. **Results:** Group III showed the lowest values for parameters of FWT (p<0.01). Both MTAC-K⁺/MTAC-creatinine, so correcting for increased diffusion rates in UFF, and CR-K⁺ were also lower in group III (p<0.01). A significant correlation was present between CR-K⁺ and FWT (I r=0.26 p<0.05, II r=0.69, p<0.01), but not in group III (r=0.0 p>0.5). The same was true for the relationship between MTAC-K⁺/MTAC-creatinine and the maximal dip D/P Na⁺. **Conclusion:** Cellular contribution to effluent K⁺ was related to parameters of FWT, except for the long-term patients with UFF. It suggests glucose induced hypertonic cell shrinkage as a physiologic phenomenon during PD. The absence of this relation in the long-term patients with UFF, either suggests a reduction or inhibition of K⁺ channels. Most likely, apoptosis is not reflected by CR-K⁺ in UFF and may not be causative for AQP-1 dysfunction. However, the MTAC-K⁺/MTAC-creatinine may be promising in detecting peritoneal changes.