Nephrology Dialysis Transplantation 30 (Supplement 3): iii257–iii275, 2015
doi:10.1093/ndt/gfv180.3

DIALYSIS. PERITONEAL DIALYSIS - 1

FP551 INTERSTITIAL FIBROSIS RESTRICTS OSMOTIC WATER TRANSPORT IN ENCAPSULATING PERITONEAL SCLEROSIS

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Introduction and Aims: Encapsulating peritoneal sclerosis (EPS) is a rare but severe complication of peritoneal dialysis (PD) characterized by an extensive fibrosis of the peritoneum leading to bowel encapsulation and obstruction. Changes in peritoneal water transport have been suggested to precede EPS, but the mechanisms and potential predictive value of that transport defect have not been investigated.
Methods: Among 234 end-stage renal disease patients who initiated PD at our institution over a 20-year period, we evaluated changes in peritoneal transport over time on PD in 7 patients who subsequently developed EPS and in 28 matched controls, using 3.86% glucose peritoneal equilibration tests. We next assessed the molecular and structural mechanisms of impaired water transport in EPS using expression, structural and biochemical analyses of the peritoneal membrane.
Results: As compared with long-term PD controls, patients with EPS showed an early loss of UF capacity and sodium sieving before the onset of overt EPS. Multivariate analysis revealed that loss of sodium sieving was the most powerful predictor of EPS in this cohort. The EPS peritoneum showed a thicker submesothelial fibrosis, with increased collagen density and greater amount of thick collagen fibers, as compared with long-term PD controls and uremic patients. Reduced osmotic conductance strongly correlated with the degree of peritoneal fibrosis, but not with vasculopathy. Peritoneal fibrosis was paralleled by an excessive upregulation of vascular endothelial growth factor and endothelial nitric oxide synthase, while the expression of endothelial aquaporin-1 water channels was unaltered.
Conclusions: Our findings suggest that an early and disproportionate reduction in osmotic conductance during the course of PD is an independent predictor of EPS. This functional change is linked to specific alterations of the collagen matrix in the peritoneal membrane of patients with EPS, thereby validating the serial three pore membrane/fiber matrix and distributed models of peritoneal transport.