S-B5

복막 투석 환자에게서 생체적합성을 향상시킨 투석액이 말초 혈액 단핵 세포의 염증 유도 사이토카인 분비에 미치는 영향

아주대학교 병원 신장내과

강은정, 정가영, 이화정, 박인휘, 김흥수, 신규태

The Effect of Biocompatibility of Peritoneal Dialysis Solutions on Pro-inflammatory Cytokine Secretion by Peripheral Blood Mononuclear Cells in Peritoneal Dialysis Patients

Eunjung Kang, Ka Young Cheong, Hwa Joung Lee, Inhwee Park, Heungsoo Kim, Gyu Tae Shin

Ajou University School of Medicine Department of Nephrology

Previous studies showed that in vitro exposure to biocompatible peritoneal dialysis (PD) solutions resulted in more pronounced secretion of pro-inflammatory cytokines by peripheral blood mononuclear cells (PBMC) compared to conventional glucose based lactate buffered solutions, and this observation was interpreted as improved host defense status. In this study, we investigated whether such in vitro effects are reproduced in PD patients.

We enrolled 32 ESRD patients on maintenance PD as well as 10 healthy controls. Of those patients, 16 patients (P-E-N group) were using bicarbonate/lactate buffered glucose solutions (Physioneal 40, Baxter), amino acid solutions (Nutrineal, Baxter) and icodextrin solutions (Extraneal, Baxter) and the other 16 patients (D-E group) were on lactate buffered glucose solutions (Dianeal, Baxter) and icodextrin solutions. PBMC were isolated using Ficoll-Paque gradient centrifugation, and then incubated with or without 100 ng/ml of lipopolysaccharide (LPS) for 24 h. Tumor necrosis factor-α (TNF-α) and interleukin-6 (IL-6) proteins were measured. In addition, healthy volunteer PBMC (n=4) were exposed to various PD solutions for 4 h and then incubated with 100 ng/ml LPS for 20 h to study the in vitro effect of PD solutions.

The P-E-N group and the D-E group were similar in clinical and laboratory data including serum CRP and Kt/V (table 1). Serum TNF-α levels were comparable between the patient groups, but these levels were significantly higher than the levels of controls (Fig. 1). Serum IL-6 levels were similar between two groups but the level of the D-E group was significantly higher than that of controls (Fig 2). There was no significant difference in unstimulated TNF-α and IL-6 levels, (Fig 3, 4) but, LPS stimulated TNF-α production was significantly higher in the D-E group compared to the P-E-N group and controls (Fig 5). Similarly, LPS stimulated IL-6 production was higher in the D-E group compared to the P-E-N group and controls (Fig 6). In vitro exposure of PBMC to PD solutions showed that exposure to Dianeal 1.36% did not lead to hyper-responsive secretion of TNF-α and IL-6 (Fig 7, 8).

PD patients on biocompatible PD solutions showed normal ex vivo function of PBMC in secreting pro-inflammatory cytokines in response to LPS, whereas patients on lactate buffered solutions showed hyper-responsiveness to LPS stimulation. In vitro exposure of PBMC to PD solutions showed discrepancies with ex vivo exposure results.

Key Words: 복막투석액, 생체적합도, 염증성 사이토카인
Peritoneal dialysate, Biocompatibility, Inflammatory cytokine