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High Glucose Exposure from Peritoneal Dialysis Fluid Is Associated with All-Cause Mortality and Dialysis Failure in Patients Undergoing Peritoneal Dialysis

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Objectives : Chronic exposure of high-glucose containing peritoneal dialysis (PD) fluid leads to histologic changes in the peritoneum, resulting in impaired peritoneal function. Although harmful effects caused by hypertonic PD solutions are widely known, large-scale studies on the relationship with clinical course are still needed. In this study, we investigated the mortality and PD failure according to the amount of PD glucose exposure. And whether there is difference according to the presence or absence of diabetes mellitus (DM).

Methods : This study was conducted using information on 7792 PD patients from Fresenius Medical Care Korea. Patients were divided into four groups according to the amount of exposed PD glucose. Glucose exposure was based on the average exposure for one month. All-cause mortality, cardiovascular mortality, and the incidence of PD failure according to PD glucose exposures were compared.

Results : The mean age of the study subject was 61.4 ± 14.2 years, 4370 (56.1%) patients were male. Among all patients, 3593(46.1%) patients had DM. Patients with low-PD glucose exposure (Q1) were older ($P < 0.001$) and this trend was constant regardless of DM (DM, $P < 0.001$; non-DM, $P < 0.001$). On the other hand, the prevalence of DM tended to increase with increasing exposure to PD-glucose ($P < 0.001$). A Kaplan-Meier plot showed that the highest PD-glucose exposure groups showed a significantly higher rate of incident PD failure ($P < 0.001$) regardless of the presence of DM. In multiple Cox regression analysis, PD-glucose exposure was independently associated with all-cause mortality [log 1 increase: hazard ratio(HR), 1.61; 95% CI, 1.24 - 2.10; $P < 0.001$], and cardiovascular death (HR, 2.19; 95% CI, 1.45 - 3.32; $P < 0.001$) as well as the incident PD failure (HR, 3.55; 95% CI, 2.60 - 4.85;$P < 0.001$) after adjustment for confounding factors.

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Conclusions : In this analysis using a large group of PD patients, the greater the PD-glucose exposure was, the more likely it was related to PD failure and death. In addition, this tendency was related to the presence of DM. Therefore, careful consideration of the physicians will be needed to use hypertonic PD solution.

Keywords : Peritoneal dialysis, peritoneal dialysis failure, glucose exposure, death