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Long-term Safety of High-Volume HDF using CDDS through Inflammatory Markers : Comparative Study with Conventional Hemodialysis

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Objectives: High-volume hemodiafiltration (HDF) requires a large volume of substitution fluid, making microbiologic purity important, especially when it is produced using a central dialysate delivery system (CDDS). Previously, we reported the microbiologic safety of substitution fluid produced using CDDS via culture and endotoxin assay. This follow-up study aims to compare the long-term safety of high-volume HDF using CDDS-produced dialysis fluid and substitution fluid with conventional hemodialysis (HD).

Methods: A single-center, retrospective cohort study was performed. HD (n=48) and HDF (n=29) patients were analyzed over a period of 3 years (December 2019 to December 2021). Baseline characteristics were similar between two groups, with age 65.1±13.6 versus 68.6±15.4 (HDF vs HD, $p>0.05$), male gender 48.2% and 50% ($p>0.05$), and duration of dialysis at 93±52.6 versus 93±63.2 months ($p>0.05$). During the study period, we investigated laboratory parameters of inflammation such as high-sensitivity C-reactive protein (hs-CRP), albumin, and white blood cell (WBC) count, and clinical parameters such as febrile episodes and intradialytic hypotension (IDH). Linear mixed modeling was used to analyze for variations over time and between HD and HDF cohorts.

Results: Analysis of laboratory parameters showed no difference in WBC, albumin, and hs-CRP value between HDF and HD groups. Hs-CRP was not significantly different between groups and over time. Albumin, a negative acute phase reactant, increased by 6.36% and 5.73% in HDF and HD cohorts, respectively. WBC showed a 5.02% increase only in the HDF cohort, but was not clinically significant. Analysis of clinical parameters showed no differences in febrile episodes or incidences of IDH.

Conclusions: High-flux HDF and conventional HD using dialysis fluid and substitution fluid produced by CDDS shows no concerns for safety with regards to inflammatory markers.

Figure 1. Laboratory parameters