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Clinical effects of a novel medium cut-off dialyzer (THERANOVA®) in hemodialysis patients

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Objectives: Recently, a novel medium cut-off (MCO) dialyzer (THERANOVA®) is introduced in hemodialysis (HD) treatment, which is designed to remove large middle molecules up to 45kDa compared to high-flux (HF) dialyzer. We have experienced MCO dialyzer for more than a year and analyzed a clinical effect of MCO dialyzer.

Methods: A total of 20 patients was enrolled for final analysis in a retrospective observational study and those patients were treated using MCO dialyzer at least for 12months. We compared clinical and laboratory data between before and after using MCO dialyzer (M0 vs. M12).

Results: Mean age was 67.2±14.0 years (65% male), and dialysis vintage was 6.4±3.1 years. Hemodynamic parameters were not different between M0 and M12 (SBP, 148.7 vs 154.8 mmHg; DBP 75.1 vs. 74.5 mmHg; $P > 0.05$). MCO-HD didn't show significant changes of laboratory results including β_2 microglobulin, hemoglobin, platelet, potassium, ferritin, and transferrin saturation. Contrary to our apprehension, serum albumin was not decreased (albumin; M0 [4.200, IQR 3.925~4.300] vs. M12 [4.195, IQR 3.803~4.530] mg/dL; $P = 0.522$). Phosphorus and intact parathyroid hormone (iPTH) were increased (Phosphorus, M0 [3.900, IQR 3.125~5.000] vs. M12 [4.705, IQR 4.048~5.958 mg/dL], $P = 0.011$; iPTH, M0 [218.5, IQR 142.1~334.0 pg/dL] vs. M12 [373.5, IQR 185.4~476.9 pg/dL], $P = 0.048$). However, corrected calcium was not different between M0 and M12. Additionally, weekly dose of erythrocyte stimulating agent (Darbepoetin) was not changed after start of MCO-HD (19.42, IQR 14.42~24.62 vs. 21.73, IQR 11.83~24.62 mcg, $P > 0.05$).

Conclusions: MCO dialyzer is relatively safe in terms of concern of hypoalbuminemia irrespective of larger pore size. Interestingly, through changes in the serum levels of phosphorus and parathyroid hormone, we suggest that MCO membrane might be related to mineral bone disorder in hemodialysis patients. Further study is needed to uncover the effect of MCO membrane in the area of CKD-MBD.