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Confirmation of the electrolytes concentration in the dialysate supplied through central concentration dialysis fluid delivery system (CDS) and single patient dialysis fluid delivery system (SPDDS).

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Introduction
The supply method of hemodialysis is classified into Single Patient Dialysate Delivery System (SPDDS), which uses individual dialysis fluid, and Central Delivery System (CDS), which supplies dialysis fluid centrally. CDS is classified into Central Concentrate Delivery System (CCDS) that supplies acidic A Concentrate from the center and connects bicarbonate B solution directly to the hemodialysis machine, and Central Dialysate Delivery System (CDDS) that supplies both A and B solution from the center. Theoretically, the electrolyte concentration of A solution of SPDDS and A concentrate of CCDS is same, but since there is no study that measured and analyzed the electrolyte concentration of actual dialysis fluid.
Method
In an artificial kidney room using CCDS (Yemidam Nursing Hospital, Cheongjusi, Chungcheongbuk-do, Republic of Korea), during hemodialysis through CCDS, 10cc of dialysate was obtained in 77 cases before entering the dialyzer. During hemodialysis in 40 cases through SPDDS using individual dialysis A solution (HemosysAG, ©BORYUNG), in the same artificial kidney room on a different day, the same way as the dialysate collection of CCDS, 10cc of dialysate was obtained. The obtained dialysates were requested to the Department of Laboratory Medicine, Keimyung University Dongsan Hospital (Deagu, Republic of Korea) and Na^+, Mg^{2+}, Cl^-, Ca^{2+} and K+ were measured.
Result
The results of electrolyte concentration of the dialysate through SPDDS and CCDS are shown in the figure below. There was statistically significant difference from the standard concentration (Na^+:140mmol/L, Mg^{2+}:2mmol/L, Cl^-:110mmol/L, Ca^{2+}:6mmol/L, K^+:2mmol/L) in all electrolytes measured in both groups (IBM SPSS 29.0, one-sample T-test, significance level 0.05). In both groups, the ratio of standard deviations to the average was higher in the order of Ca^{2+}, Mg^{2+}, K+, Cl^-, and Na^+
Discussion
Through this study, a significant difference between the standard concentration and the measured electrolyte concentration was confirmed, but the reason is not clear. In SPDDS group, it is necessary to consider whether the performance of the pump can vary among individuals even in the same model. In CDS group, it is necessary to consider the difference in concentration that can occur each time the powder is diluted and the difference in distance of the pipe that A concentrate has moved to reach each machine.
Conclusion
It should be recognized that the standard concentration of dialysate and the actual electrolyte concentration may differ in both the SPDDS and CDS. Further research, including a multicenter study, is needed to identify the cause of the difference in electrolyte concentration and to reduce the difference in concentration.

Figure 1