Optimization of Profiling Hemodialysis : Sodium Balance of Sodium Profiling Hemodialysis (SPHD) and Combination of Ultrafiltration Profile (UFP)

인하대학교 의과대학 내과학교실, 인하대학교 의과학연구소

송준호 · 박근호 · 이선영 · 이승우 · 김문재

Purpose : Profiled dialysis is a current approach to avoid intradialytic hypotension (IDH) by pre-established modulation of dialysate sodium or ultrafiltration rate. The benefit of SPHD in preventing IDH has been consistently reported but the adverse effect from excessive sodium gain had been also reported as one of important complications. Our recent study has been reported the sodium balance (SB; dialysate to serum sodium) of SPHD is directly related to intradialytic diffusive sodium gain. The purpose of the study is to find out an optimal sodium balance of SPHD and evaluate the benefit of UFP combination in prevent IDH and sodium load at the same time.

Methods : We underwent 2-phase prospective crossover trial evaluating 8 protocol including 4 SPHD alone [standard HD (Time-averaged dialysate sodium 138 mEq/L), sodium balance positive step-down (SP; 143 mEq/L), SB neutral step-down (SN; 138 mEq/L), SB neutral alternating SPHD (SNA)] and 4 those with UPF [UF alone, SP+U, SN+U, and SNA+U] in the selected subjects showing IDH >30% of session (n=11).

Results : In 1st phase study, SP, SP+U, SN+U, SNA+U decreased significantly the HD failure rate (defined as Kt/V <1.1, %UF achieved <70% or termination of session within 1st 3 hour) among 8 protocols (based on total 298 sessions). These protocols were enrolled into 2nd phase study. Hemodynamic parameters, dialysis dose, IDH rate, and HD failure rate were significantly improved with all 4 protocols (based on 33 sessions for each). Sodium gain was significantly increased with SB positive SPHD (SP and SP+U). %UF achieved were improved with all protocols but excessive weight gain offset this benefit in SP and SPU. Interestingly, subjective discomforts was significantly high during the session with SNA+U. Interdialytic subjective discomforts were significantly high with SP and SP+U. Patients scored "satisfactory" in 63.6, 60.6, 63.6, 42.4% of SP, SP+U, SN+U, and SNA+U as compared to 24.2% in C ($p<0.05$).

Conclusion : SB neutral SPHD prevented IDH successfully without sodium gain when it was combined with UFP. As expected, SB positive SPHD prevented IDH well but inevitably caused excessive sodium gain. We conclude SB neutral SPHD combined with UFP is the most ideal maneuver to maintain the quality of dialysis for IDH-prone patients. Among SB neutral SPHD, patients seems to feel more comfortable with stepdown type than with alternating type.