



Shaping Tomorrow's Nephrology: Insight-Driven Kidney Care

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Accuracy of Bioimpedance Analysis-Based Dry Weight and Its Association With Intradialytic Hypotension in Chronic Hemodialysis

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Objectives : Accurate estimation of dry weight (DW) is critical in hemodialysis patients. Bioelectrical impedance analysis (BIA) is widely used to guide DW assessment, but discrepancies with clinically determined DW are common and their clinical significance remains unclear. This study evaluated the association between BIA-derived DW deviation and intradialytic hypotension (IDH).

Methods : We retrospectively analyzed maintenance hemodialysis patients at Chung-Ang University Hospital (October 2016–October 2023). BIA (InBody S10) was performed at 6-month intervals after midweek dialysis. Weight deviation was defined as post-dialysis weight minus BIA-derived DW. IDH was defined as nadir SBP <90 mmHg (pre-dialysis SBP <160) or <100 mmHg (pre-dialysis SBP ≥160). Agreement was assessed by Bland–Altman analysis and ICC, and the association between weight deviation and IDH was evaluated using a generalized linear mixed model (GLMM).

Results : Of 931 sessions from 180 enrolled patients, 814 sessions from 158 patients were analyzed (57.0% male; mean age 68.2 ± 12.6 years; median follow-up of 3 sessions [IQR 1.0–8.0]). Clinical and BIA-derived DW showed high agreement (Pearson $r=0.990$; ICC = 0.989), but Bland–Altman analysis revealed individual-level deviations (bias −0.41 kg; 95% LOA: −3.63 to 2.82 kg). IDH occurred in 81 sessions (9.9%). The optimal weight deviation cutoff for predicting IDH was −0.1 kg (AUC 0.64; sensitivity 0.679, specificity 0.523). GLMM analysis demonstrated a significant negative association between weight deviation and IDH (OR 1.96; 95% CI 1.37–2.78; $p < 0.001$). In subgroup analysis of sessions with weight deviation ≤ −0.1 kg, ICW, ECW, ECW ratio, and phase angle differed significantly between IDH and non-IDH groups.

Conclusions : Excessive fluid removal beyond the BIA-estimated DW was significantly associated with an increased risk of IDH, even after accounting for inter-individual variability. These findings suggest that BIA-guided reassessment of DW may help identify patients at high risk for IDH and support the development of individualized fluid management strategies.

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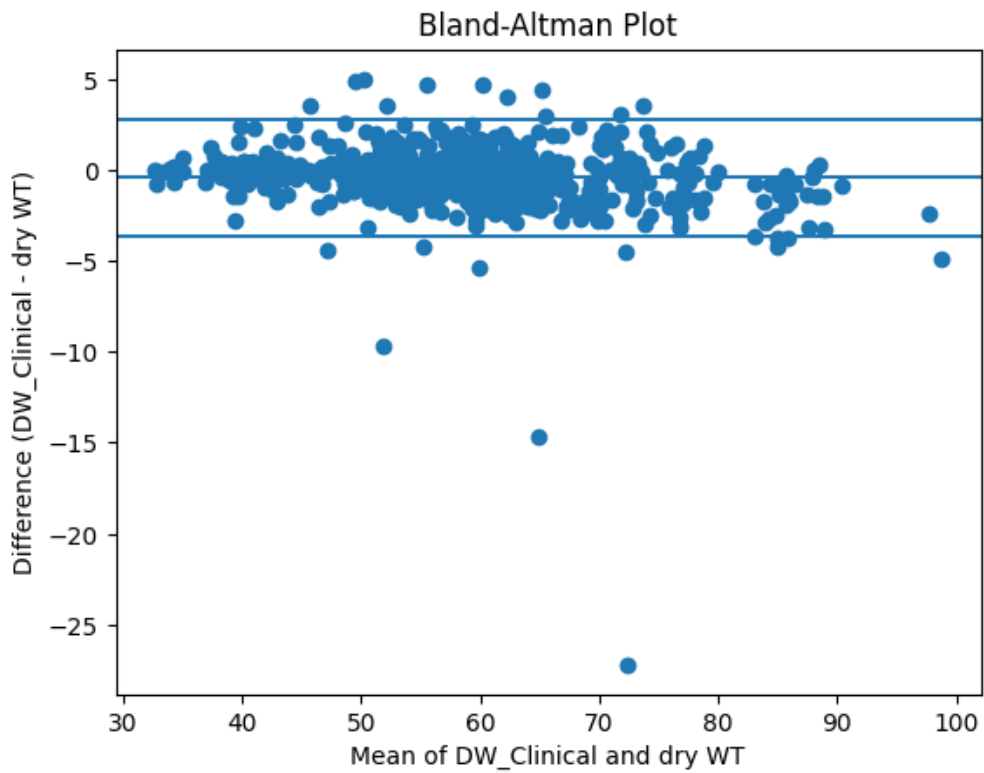
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