

Use of Bioimpedance Spectroscopy (BIS) to estimate haemodialysis patients' dry weights and its impact on blood pressure and dialysis adequacy

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Abstract

Background: Most chronic kidney disease (CKD) patients on haemodialysis (HD) have hypertension. To prevent intradialytic hypotension, most patients are advised to avoid taking antihypertensive medications before dialysis. Ideally, post-dialysis blood pressure (BP) should be closer to a normal range, with patients achieving the recommended clearance (Kt/V).

Methods: This retrospective cross-sectional study included 83 adult HD patients with hypertension on their scheduled dialysis day at Groote Schuur Hospital. Routine monthly HD blood samples were collected alongside BP readings. Ultrafiltration goals were determined using the most recent dry weights, based on clinical criteria and Body Composition Monitor (BCM) outcomes. Dialysis adequacy was assessed from blood sample results. Data was analysed using R-statistical software version 4.4.1 for Windows and data analysis included simple linear regression modelling.

Results: The average age of the patients was 40 (± 10) years, with 51% being female. There was no significant difference in pre-dialysis systolic BP (SBP) and diastolic BP (DBP) between genders, with averages of 155 (± 20) mmHg and 91 (± 15) mmHg, respectively ($p > 0.79$). The median post-dialysis SBP and DBP were 149 (interquartile range (IQR) (134, 159)) over 86 mmHg (IQR: 79, 97) in females and 153 (IQR: 139, 165) over 87 mmHg (IQR: 82, 97) in males ($p = 0.37$). Females had an improved single-pool Kt/V (spKt/V) of 1.56 (± 0.21) compared to males 1.32 (± 0.23) ($p < 0.001$). Interdialytic weight gains (IDWG) were 1.98 (± 0.86) kg for females and 2.29 (± 0.9) kg for males ($p = 0.15$). There was a strong positive correlation between BCM-guided dry weights and post-dialysis weights ($r = 0.97$, $R^2 = 0.95$, $p < 0.001$).

Conclusion: Achieving BCM-guided dry weights was associated with improved dialysis clearance in females. No statistical difference was observed in BP measurements across the cohort.