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## **Estimation of precise dry body weight using bioimpedance analysis in patients with hemodialysis**

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**Objectives:** Accurate dry body weight (DBW) setting is very important in chronic hemodialysis patients and bioimpedance analysis (BIA) guided DBW had been expected as promising in decreasing all-cause mortality. However, recent studies showed disappointing results. In the previous studies, BIA estimates DBW, targeting extracellular water per total body water ratio (ECW/TBW) as 0.385. In most cases, increase in ECW/TBW was resulted by increase in ECW. However, it can also be affected by intracellular water decrease which is associated with malnutrition and old age. Thus, target ECW/TBW needed modification according to each patient's condition. This study is aimed to evaluate formulas assessing personalized ECW/TBW target.

**Methods:** We retrospectively collected BIA data of euvolemic patients with normal renal function that were checked in the outpatients' clinic of rehabilitation medicine. We excluded patients with lymphedema and myopathy. Univariable and multivariable analyses were done to make regression formulas.

**Results:** A total of 2,045 patients were included and 57.0% of the patients were male. Their mean ages were  $58.6 \pm 16.2$  years and serum creatinine level was  $0.9 \pm 1.12$  mg/dL. The mean ECW/TBW was  $0.397 \pm 0.013$  in females,  $0.395 \pm 0.015$  in males and it was significantly affected by skeletal muscle mass, fat mass and age. The regression formulas were as follows:  $0.4082 + 0.0002 \times \text{age} - 0.0045 \times \text{skeletal muscle mass index} + 0.0001 \times \text{percent body fat}$  for females;  $0.4109 + 0.0002 \times \text{age} - 0.0047 \times \text{skeletal muscle mass index} + 0.0001 \times \text{percent body fat}$  for males. When we performed inner validation test using train and test sets, adjusted  $R^2$  was 35.69% and RMSE was 0.012 in males and 22.87% and 0.011 in females

**Conclusions:** ECW/TBW ratio was diverse in euvolemic patients and skeletal muscle mass, fat mass and age were the non-volume determinants of it. Personalized ECW/TBW target needed to be used for more precise estimation of DBW using BIA.