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ESTIMATION OF BODY COMPOSITION AND WATER DATA DEPENDS ON THE BIOELECTRICAL IMPEDANCE DEVICE

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Rationale: Overweight,obese and chronic kidney disease patients have an altered and negative body composition.Bioelectrical impedance analysis (BIA) is an available method to evaluated body composition and water status.This study aimed to compare data from single-frequency (SFBIA) and multi-frequency spectroscopy bioelectrical impedance (BIS) devices applied in subjects with different body sizes,adiposity,and hydration status.

Methods: We evaluated 386 adult without chronic kidney disease (204 females and 182 males, 20-40 y, BMI from 17 to 40 kg/m2),30 patients in peritoneal dialysis (PD) and 95 in hemodialysis (HD).Both groups of patients were under treatment for at least 3 months,53 were females and 70 males,aged from 15 to 81 y.BIA,body composition,and body water data were assessed with SFBIA (Quantum II,RJL Systems,for the non-CKD group;TBW,Biodynamics,for CKD groups) and BIS (BCM,FMC), after 12 h fasting, with a drained abdominal cavity, and just after the mid-week HD session.BIA provided data of resistance (R) and reactance (Xc); intracellular water (ICW), extracellular water (ECW), total body water (TBW), fat free mass (FFM) and fat mass (FM) were estimated.Hyperhydration and dehydration were determined by over-hydration (OH) values of >1.1 L and <1.1 L.BMI was calculated and used for stratifying the non-CKD group.Differences (BIS-SFBIA; 95%CI) and agreement (Bland-Atman analyze) between devices were evaluated.The intraclass correlation coefficient (ICC) was used to measure the strength of agreement and Pearson's correlation to measure the association.Regression analyze was performed to test the association between device difference with BMI and OH.

Results: In the non-CKD group, SFBIA underestimated R, Xc, and FM, and overestimated ECW and FFM.For the underweight subgroup, the lowest agreement occurred for FM (ICC=0.07, r=0.27, bias=8.8±5.1) and the best agreement was for TBW (ICC=0.38, r=0.47, bias=-3.4±4.1) and ICW (ICC=0.45, r=0.44, bias=-0.4±2.5).For normal weight group, the lowest agreement occurred for FM (ICC=0.21, r=0.25, bias=3.6±8.3) and the best agreement for ECW (ICC=0.58, r=0.66, bias=-1.3±2.1), FFM (ICC=0.52, r=0.71, bias=-3.6±8.5) and TBW (ICC=0.51, r=0.62, bias=2.1).For overweight,the greatest agreement was for ECW (ICC=0.65, r=0.70, bias=-0.9±2.2) and the lowest agreement was for FM (ICC=-0.07, r=-0.13, bias=9.6±11).For obese, FM (ICC=0.16, r=0.61, bias=19±9.1) presented the lowest agreement and ECW (ICC=0.79, r=0.82, bias=-0.8±1.9) had the best agreement.For PD group,SFBIA underestimated FM and overestimated TBW, ECW, ICW and FFM.The best agreement occurred for ECW (ICC=0.59, r=0.75, bias=-4.2±4.2) and the lowest one for FM (ICC=0.14, r=0.44, bias=11±7.7).For the HD group, SFBIA underestimated R, Xc, and FM and overestimated TBW, ECW, and FFM.The greatest agreement was

for ICW (ICC=0.68, r=0.68, bias=-0.01±0.32) and the worst for FM (ICC=0.32, r=0.58, bias=11±8.2).The difference between devices was greater as BMI increased and was worse in the extremes of water imbalance.

Conclusion: In conclusion, data obtained with SFBIA and BIS were highly correlated with poor agreement; the devices cannot be used interchangeably and the agreement between the devices was worse as BMI and FM increased and in the extremes of OH.

Disclosure of Interest: None declared