

Multiple and single frequency bioelectrical impedance (BIA) methods are not interchangeable for the prediction of body fluid volumes in overweight individuals

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Background – Although (BIA) is a popular technique for assessment of fat and fat-free mass, the use of the technically more complex multi-frequency BIA (MFBIA) is widely considered necessary if prediction of body water compartments is required. Nevertheless, one study has shown the two methods to be in close agreement for this purpose, at least, in healthy normal weight individuals.

Objective - To determine the level of agreement between BIA and MFBIA methods for predicting body fluid volumes in overweight individuals.

Design – As part of the ECHO (Effects of Chitosan on Health and Obesity) weight loss trial, whole body (wrist to ankle) BIA and MFBIA data were obtained at 3 monthly intervals for 167 (33 M:131F) overweight subjects (mean BMI 34.0 kgm⁻²) aged between 19 and 79 yr and used to predict total body water (TBW), extra- and intracellular water (ECW and ICW respectively) volumes. BIA and MFBIA data were compared statistically by concordance correlation and limits of agreement analysis.

Outcomes – The methods agreed poorly for prediction of TBW ($r = 0.74$; mean difference, 17 %; limits, 9 to 26%) and ICW ($r = 0.48$; mean difference, 34 %; limits, 18 to 52 %) but were in good agreement for ECW ($r = 0.995$; mean difference, 0.8 %; limits, 2 to 4 %).

Conclusions- BIA and MFBIA are not interchangeable methods for prediction of body fluid volumes. On theoretical grounds and by comparison with “gold standard” methods MFBIA remains the preferred method for estimation of body fluid volumes in overweight subjects.