LETTERS TO THE EDITOR

Assessment of body composition in ESRF

To the Editor: We read with interest the recent article of Cooper et al, in which they proposed hand-to-feet bioelectrical impedance analysis (BIA) as an accurate and very useful surrogate marker for total body water (TBW) in patients with end-stage renal failure (ESRF) [1]. Despite this assertion, the authors also acknowledged that a great variation existed between TBW assessed by BIA compared to the gold standard (deuterium oxide) technique (−10.9 to 8.4 L). This wide variation is in agreement with our very recent findings (unpublished data), in which we also found a significant discrepancy between TBW assessed by multifrequency BIA and deuterium oxide (−3.4 to 20.3 l) in 18 patients with hemodialysis, and that BIA tended to underestimate TBW.

This discrepancy between TBW and isotope dilution techniques found by various authors is in contradition with the agreement between TBW assessed by BIA and isotope dilution techniques found in healthy controls and, as recently published by our group, in patients who have had renal transplants [2].

Interestingly, in hemodialysis patients, we found a significant correlation between a marker of the hydration state of the body (TBW/body weight) and the discrepancy between TBW as assessed by BIA and deuterium oxide (r = 0.74). As already suggested by Zhu, Schneditz, and Levin, at least part of this discrepancy is due to the fact that TBW in the trunk is almost never measured by standard hand-to-feet BIA measurements [3]. The water in the trunk of an overhydrated patient is unlikely to be adequately predicted by a method that only takes the resistance of the extremities into account. The use of the sum of segmental resistances, which includes a separate measurement of the trunk, might present a solution to this dilemma. However, this technique still must be validated against gold standard techniques with regard to the assessment of absolute values of TBW in renal patients.

We propose that BIA measurements that do not take into account the resistance of the trunk with a separate measurement are unlikely to predict absolute values of TBW accurately in patients with large abnormalities in fluid status and should not be used as a surrogate marker for TBW in patients with ESRF.

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REFERENCES


Reply from the authors

In response to the letter by Kooman et al with regard to our recently published article on the assessment of body composition in end-stage renal failure (ESRF), we agree that measurement of total body water (TBW) using bioelectrical impedance analysis (BIA) in patients with renal disease is associated with high limits of agreement and is subject to greater variability than the same method performed in normal healthy subjects. This is stated clearly in our article [1]. It is, however, indisputable that our BIA results were more accurate than TBW derived by other commonly used methods. Kooman et al have suggested that segmental BIA assessment of TBW may be a more accurate method. The paper they cited to support their argument [2] compared standard whole body BIA (as used in our study) with segmental BIA in patients undergoing hemodialysis. Equilibration between fluid compartments was not considered in their experiments. Measurements were performed in both the sitting and supine positions. In this dynamic setting segmental BIA produced a more accurate mean estimate of TBW. However, the limits of agreement were similar to those of the whole body technique. The inaccuracies of whole body BIA in measuring TBW in situations in which fluid shifts are occurring have previously been reported [3–6]. What is not clear is whether the segmental BIA technique is superior to whole body BIA in patients with ESRF with inherent differences in TBW. A confirmed gain in accuracy produced by this technique must be established to offset the increased complexity and time required performing and analyzing the results. There-