

A new option in measuring bioimpedance in congestive heart failure

To the Editor: We read with particular attention the interesting article of Tang and Tong¹ concerning the measurement of impedance for assessing volume status in heart failure (HF). This technology is useful in detecting subclinical congestion and predicting future HF events. However, the authors have focused their attention only on central fluid overload. To this proposal, we would briefly discuss about a new promising method, not mentioned in the critical review, able to measure whole-body overload. The bioelectrical impedance analysis (BIA) is a reproducible, inexpensive, patient-bed method used specifically to assess with high accuracy hydration state in heart diseases and in other illness. Recently, the international literature have focused their concentration on this emerging diagnostic tool for its simplicity, rapidity, noninvasiveness, ability to detect whole-body fluid accumulation, and work operability independent from mathematical models using only raw data: a combination of resistance (Rz) and reactance (Xc). In the standard whole-body tetrapolar BIA, electrodes were on the dorsum of the hand and on the dorsum of the foot of the right side. According to the R-Xc graph method of vector BIA by Piccoli et al,² the impedance measurement, standardized for the height, establishes rapidly the systemic hydration state. This new methodological approach is particularly valuable in acute and also chronic HF where comparisons of direct impedance measurements of a patient with reference values are more useful than equations predicting average body compartments that are influenced by sampling error of regression coefficients, race, and diseases. Moreover, BIA, contrary to the band electrode method or implanted device-based method, is not limited by the presence of some comorbidity (renal failure and liver diseases) and is not to be implanted because it is simply applicable at the patient's bed.

Paterna et al³ used BIA safely in monitoring hospitalized patients with refractory congestive HF treated with high-dose intravenous furosemide and hypertonic saline solutions. Castillo Martínez et al⁴ demonstrated, instead, the cross-inverse correlation between the fluid overload estimated with BIA and New York Heart Association functional class. Our team has validated this tool in differentiating acute dyspnea due to HF in emergency room; in that work, it was demonstrated as the cross-inverse correlation of BIA measures with B-type natriuretic peptide levels.⁵ Furthermore, we also demonstrated the utility of BIA in monitoring body hydration in exerciser patients with compensated congestive HF.⁶

In conclusion, BIA is a suitable technique in clinical practice for detecting not only pulmonary but also whole-body fluid overload. A concealed or bad-assessed systemic fluid accumulation is a crucial joint in HF management, which frequently remains undiagnosed or not appropriately treated, determining recurrent hospital readmission and disease progression. For these reasons, BIA represents, in our mind, the present and the future of HF assessment and needs more careful consideration and research efforts.

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Daniele Torres, MD
Gaspere Parrinello, Prof
Salvatore Paterna, Prof
Pietro Di Pasquale, Prof
Alessia Torres, Mrs
Caterina Trapanese, MD
Giuseppe Licata, Prof
Biomedical Department of Internal
and Specialist Medicine
Heart Failure Unit
Policlinico "Paolo Giaccone"
University Hospital of Palermo, Palermo, Italy
E-mail: daniele_torres@libero.it

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