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Clinical relevance of fluid volume status assessment by bioimpedance analysis using BCM in children on maintenance dialysis.

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Objectives: Bioimpedance analysis has been used as a noninvasive method to evaluate body fluid volume status in dialysis patients. However, reports in pediatric patients about the effectiveness of this method are rare. We asked if there is a correlation in the results of bioimpedance analysis and clinical characteristics and if there is a subsequent therapeutic change in patients with overhydration based on bioimpedance analysis.

Methods: Medical records of children on maintenance dialysis who underwent bioimpedance analysis between January 2016 and December 2018 were reviewed. Their first result of bioimpedance analysis was evaluated and overhydration status was correlated with hypertension, number of antihypertensive medication and left ventricular hypertrophy. In patients with overhydration, change of dialysis prescription and clinical characteristics over time was evaluated.

Results: Among the 42 patients (M:F 25:17, HD:PD 12:30) with a median age of 13.3 years, 12 children were overhydrated with the proportional overhydration relative to extracellular water more than 15%. However, overhydration status was not significantly correlated with blood pressure, number of antihypertensive medication or left ventricular hypertrophy. 10 out of 12 overhydrated children changed their dialysis prescription to reduce their target body weights and 9 of them achieved weight reduction after one month. Subsequent bioimpedance analysis revealed a significantly decreased amount of fluid overload (initial: median 22.7%, follow-up: median 12.7%). However, their blood pressure did not significantly change.

Conclusions: Bioimpedance analysis is a useful and noninvasive method to assess fluid status in dialysis children, although correlation with clinical characteristics and clinical benefit were unclear in our study. Long-term follow-up and correlation with the more objective clinical indicator of overhydration such as left ventricular hypertrophy or serum brain natriuretic peptide would be necessary to assess the clinical relevance of bioimpedance analysis in pediatric dialysis patients.