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신질환이 있는 소아환아에서 체성분분석기를 이용한 체내 수분분포와 임상양상

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Fluid Status and Clinical Features in Children with Renal Diseases using the Body Composition Monitor

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Background: Overhydration (OH) is among the leading causes of mortality in patients with renal diseases, adult and children alike. The body composition monitor (Fresenius Medical Care, Bad Homburg, Germany; BCM) has been used as a tool to evaluate OH. The aims of this study were to investigate the fluid status of children with renal diseases using BCM and to determine whether BCM could correctly assess OH in children.

Methods: We assessed fluid status of 30 children (age 14.3±5.1) with renal diseases using BCM. Patients were divided into two groups according to the presence or absence of OH (relative hydration status ≥15%) by BCM. Clinical features and laboratory findings were compared between two groups. To assess reliability of BCM, we compared weight changes with the degrees of overhydration by BCM in 10 children.

Results: The underlying renal diseases of our patients were end-stage renal disease in 24, nephritic syndrome in 3, and SIADH or cerebral salt wasting in 3. Nine patients (30%) were overhydrated according to BCM, while the others were normo-hydrated. Four patients with ESRD on HD and PD had 28.8% and 18.7% of relative OH, respectively, 3 patient with nephrotic syndrome had 21.1% of relative OH, and 3 patient with SIADH or cerebral salt wasting had 22.4% of relative OH. However clinical features such as age, gender, percentile of height, weight, body mass index, blood pressure, and the number of antihypertensive medications between two groups were not different between those with OH and normo-hydration. Laboratory findings did not differ significantly either. For ten patients with weight change by fluid removal with either hemodialysis or albumin infusion in NS, mean degree of OH measured by the BCM was 1.9±1.4 L, and mean weight change was 1.6±1.5 kg after fluid removal, indicating that BCM measurement of hydration status were applicable in children.

Conclusions: This is the first report of applying body composition monitor to assess fluid status in Korean pediatric patients with renal disease. Since this is a preliminary data, comparisons with other indicators such as BNP or echocardiography were not done. However, this study showed there was a positively correlated trend between weight changes and the degrees of OH by the BCM. Further study with chronological comparison as well as other indicators is required to determine whether this method could be used as a useful tool to assess OH in children with renal diseases.

Key Words: 바이오임피던스, 소아, 신질환
Bioelectric impedance, Children, Kidney diseases