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How to optimize volume status in pediatric RRT patients

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Fluid status is a critical issue to consider in patients receiving dialysis, but reliable end points for euvolemia are difficult to establish in routine clinical practice. Hypervolemia state is considered as the most important predisposing factor of hypertension and long-term complications in patients receiving dialysis. Traditionally, the volume status in dialysis patients is determined via clinical assessments such as inter-dialytic weight gain, presence of hypotension or hypertension, and edema. However, interpretation of clinical indicators is subjective and these indicators lack precision, while the degree of overhydration (OH) needs to be measured precisely to manage the dialysis patients adequately. Since some patients remain asymptomatic despite having volume overload (26) and volume overload is difficult to recognize by clinical assessments, even in the hands of experienced physicians, practical tools to objectively assess volume overload in patients receiving dialysis are needed. In this regard, bioimpedance has found widespread application in dialysis patients since it was first applied in 1963. Two methods of bioimpedance, bioimpedance analysis (BIA, ex) Inbody) or bioimpedance spectroscopy (BIS, ex) BCM), quantify the passive electrical properties of a biological tissue, which resists or impedes an applied electrical current. In patients receiving dialysis, several studies have analyzed the use of bioimpedance methods, reporting a role of bioimpedance in aiding clinical decision-making of volume assessments in dialysis patients or relationship between FO measured with bioimpedance and the overall survival.

For children, assessment of volume status is more complex because their body composition and body size are expected to change considerably along their growth. In a recent study performed in children, the change of measured fluid with bioimpedance showed a significant correlation with the change of body weight before and after hemodialysis in children. Other methods such as inferior vena cava collapsibility index, relative blood volume monitoring, N-terminal pro-brain natriuretic peptide (NT-proBNP), and lung ultrasound have been studied to measure fluid overload in children on dialysis as well.

In addition to measure fluid overload objectively, dietary sodium intake should be reduced, along with optimization of dialysis prescription to manage fluid overload.