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Evaluating the Pleth Variability Index as an Objective Indicator of Dry Weight Setting

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Objectives : The adequacy of the dry weight (DW) setting has been evaluated by several methods. Recent studies have shown that the pleth variability index (PVi) measured by pulse oximetry can reflect the cardiac preload and is useful for infusion management. Therefore, PVi may also be used to monitor the fluid volume status in hemodialysis (HD) patients. The objective of the present study was to determine whether PVi can serve as an objective indicator of the DW setting by comparing the PVi with h-ANP and the parameters measured by bioelectronic impedance analysis.
Methods : A total of 21 patients receiving maintenance HD were included in this retrospective study. PVi was measured using a pulse oximeter on the index finger of the arm opposite the one with the arteriovenous fistula before and after dialysis. After dialysis, the blood levels of h-ANP and the ratios of the total body water to fat-free mass (TBW/FFM), extracellular water to FFM (ECW/ FFM), and intracellular water to ECW (ICW/ECW) were estimated.
Results : The post-dialysis PVi was significantly higher than the pre-dialysis PVi ($p=0.003$) and was significantly associated with the h-ANP levels ($r=-0.579$, $p=0.019$). Post-dialysis PVi was significantly associated with the ECW/FFN and ICW/ECW ($r=-0.644$, $p=0.001$ and $r=0.586$, $p=0.005$, respectively), but not with the TBW/FFM. The removal of fluid through dialysis resulted in an increase of the PVi. This increase in PVi was considered as reflecting a decrease in the extracellular fluid volume, as the PVi was significantly correlated with the h-ANP, ECW/FFN and ICW/ECW. Therefore, PVi measured at the end of dialysis can be used to assess the adequacy of the DW setting.
Conclusions : Post-dialysis PVi measured with a pulse oximeter is useful to evaluate the adequacy of the DW setting in chronic HD patients.