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Original Article

Towards improved cardiovascular management: the necessity of combining blood pressure and fluid overload

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Abstract

Background. Hypertension and fluid overload (FO) are well-recognized problems in the chronic kidney disease (CKD) population. While the prevalence of hypertension is well documented, little is known about the severity of FO in this population.

Methods. A new bioimpedance spectroscopy device (BCM—Body Composition Monitor) was selected that allows quantitative determination of the deviation in hydration status from normal ranges (ΔHS). Pre-dialysis systolic blood pressure (BPsys) and ΔHS was analysed in 500 haemodialysis patients from eight dialysis centres. A graphical tool (HRP—hydration reference plot) was devised allowing ΔHS to be combined with measurements of BPsys enabling comparison with a matched healthy population ($n = 1244$).

Results. Nineteen percent of patients ($n = 95$) were found to have normal BPsys and ΔHS in the normal range. Approximately one-third of patients ($n = 133$) exhibited reasonable control of BPsys and fluids (BPsys <150 mmHg and ΔHS <2.5 L). In only 15% of patients ($n = 74$) was hypertension observed (BPsys >150 mmHg) with a concomitant ΔHS >2.5 L (possible volume-dependent hypertension). In contrast, 13% of patients ($n = 69$) were hypertensive with ΔHS <1.1 L (possible essential hypertension). In 10% of patients ($n = 52$), BPsys <140 mmHg was recorded despite ΔHS exceeding 2.5 L.

Conclusion. Our study illustrated the wide variability in BPsys regardless of the degree of ΔHS. The HRP provides an invaluable tool for classifying patients in terms of BPsys and ΔHS and the proximity of these parameters to reference ranges. This represents an important step towards more objective choice of strategies for the optimal treatment of hypertension and FO. Further studies are required to assess the prognostic and therapeutic role of the HRP.

Keywords: bioimpedance spectroscopy; fluid status; fluid overload; haemodialysis; hypertension

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