

N-terminal Pro-B-type Natriuretic Peptide and Proadrenomedullin Reflect Volume Status in Hemodialysis and Peritoneal Dialysis Patients

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Objectives: Although control of normal hydration state is a key parameter for cardiovascular mortality in dialysis patients, the question for biomarkers of volume excess continues. Body composition monitor (BCM; Fresenius Medical care, Bad Homburg, Germany) has been proven as a non-invasive and quantitative method for measuring intracellular and extracellular fluid spaces. In addition, N-terminal pro-B-type natriuretic peptide (NT-proBNP), myeloperoxidase, copeptin and proadrenomedullin are associated with cardiac dysfunction and systemic blood volume. Present study investigated the relationship between body fluid status and volume markers in dialysis patients.

Methods: Cohorts of pre-dialysis (pre-D), hemodialysis (HD) and peritoneal dialysis (PD) patients and age- and gender-matched healthy Korean individuals were recruited in the study (N=80). In all patients BCM and standard echocardiography were performed. Also NT-proBNP, myeloperoxidase, cepetin and proadrenomedullin as volume markers were measured. Clinical overhydration was defined as an overhydration-to-extracellular water ratio of >15%.

Results: No difference was found the groups in terms of total body water, extracellular water and intracellular water. Overhydration and clinical overhydration were more prevalent in HD and PD patients compared to control and pre-D patients significantly. This was associated with significantly ($p<0.001$) higher NT-proBNP and proadrenomedullin levels in HD and PD patients than in the control and pre-D groups. However, no significant difference was found in levels of myeloperoxidase and copeptin in the study groups. Clinical overhydration was associated with cardiac dysfunction markers (LV mass index, LV dimension and ejection fraction, left atrial diameter and E/E' ratio). In multivariate models, clinical overhydration was directly related to NT-proBNP and proadrenomedullin concentrations in the study population ($r=0.454$ [$p<0.001$] and $r=0.505$ [$p<0.001$], respectively).

Conclusions: Taken together, these data suggest that NT-proBNP and proadrenomedullin levels increase in association with systemic blood volume in HD and PD patients with cardiovascular disease, in contrast, myeloperoxidase and copeptin are not volume markers.

Key Words: Pro-BNP, Proadrenomedullin, BCM