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Fluid Status as a Determinant for Pulse Pressure and Endothelial Function in Peritoneal Dialysis Patients

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Objectives:

As endothelial cells play a role on homeostasis of cardiovascular system, endothelial dysfunction induce cardiovascular disease. Thus, assessment of endothelial dysfunction has been emphasized for prediction of cardiovascular outcome.
To explore the relationship between central blood pressure and endothelial function according to fluid status, fluid status was determined by bioimpedance (Body Composition Monitor, BCM). Iontophoresis with laser-Doppler flowmetry and pulse wave velocity (carotid to femoral) were performed for assessment of endothelial function and arterial stiffness. Brachial blood pressure and central blood pressure were measured on the same day as other tests.

Methods:

In this cross sectional study, we evaluated 30 asymptomatic prevalent peritoneal dialysis patients. Measured variables were analyzed using Pearson's correlation coefficient analysis and multivariate regression model were used to define the association between central blood pressure and fluid status.

Results: Endothelium-dependent vasodialtion was significantly associated with both brachial pulse pressure(r=-0.396, p=0.030) and central pulse pressure(r=-0.398, p=0.029) rather than systolic or diastolic blood pressure(Fig 1,2). Pulse wave velocity was related to both brachial pulse pressure(r=0.416, p=0.022) and central pulse pressure(r=0.284, p=0.025)(Fig 3). Both pulse pressure increased according to degree of over-hydration(Fig 4). Of note, after multiple adjustment including age, gender, diabetes, serum phosphorus, calcium, triglyceride, cholesterol, intact parathyroid hormone, multiple regression models showed that fluid status was independent predictor for both pulse pressure(Table 1). When we added a use of anti-hypertensives as a confounder in the model in addition to the previously included confounders, fluid status was still remained to predict for central pulse pressure(r^2=0.642, β=3.432, p=0.028).

Conclusions: As both brachial and central pulse pressure were related to pulse wave velocity and reflect endothelial function rather than blood pressure, monitoring of pulse pressure is needed. Pulse pressure was determined by fluid status, in addition, volume status assessment is essential for managing peritoneal dialysis patients.