Plasma Atrial Natriuretic Peptide Levels in Continuous Ambulatory Peritoneal Dialysis Patients

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Dear Sir,

The cardiothoracic ratio (CTR) as determined from the chest x-ray is a simple and noninvasive method for determining the presence of volume overload, although it is not consistently reliable. The present study showed the plasma level of atrial natriuretic peptide (hANP) to be a more reliable method for determining the volume overload status in patients undergoing continuous ambulatory peritoneal dialysis (CAPD).

We studied 73 CAPD patients (46 males, 27 females) aged 15-68 years (mean 45.2) without overt edema or uncontrolled hypertension (mean blood pressure ≥ 110 mm Hg). The duration of CAPD ranged from 2 to 64 months (mean 25.6). All patients received standard peritoneal dialysis fluid (Dianeal® PD-2; Baxter Healthcare), 1.5, 2.5 or 4.25%, and four exchanges of 2 liters of dialysate daily. None of the patients had peritonitis at the time of the study or in the previous 4 weeks. Dietary sodium intake was restricted to 7 g/day.

Blood samples were collected in the morning for plasma hANP assay from the 73 CAPD patients and from 39 age-matched healthy control subjects (26 males, 13 females) after they had rested in the supine position for approximately 30 min. Plasma hANP was measured by a specific and sensitive radioimmunoassay [1]. Recovery of synthetic hANP by this method was 96.7%.

Results are presented as the mean $\pm$ SD. The significance of differences was analyzed by Student's t test for unpaired data. A level of $p < 0.05$ was accepted as statistically significant.

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Fig. 1. Correlation between CTR and plasma hANP level. a CAPD patients with a CTR < 50%. b Healthy controls.

patients with a CTR < 50%, however, were > 30 pg/ml (fig. 1), while those of the healthy subjects were < 30 pg/ml. Among the patients with a CTR < 50%, no significant difference in CTR was observed between the CAPD patients with a plasma hANP levels = 30 pg/ml and those with a higher plasma hANP level.

Plasma hANP levels in the 44 CAPD patients with a CTR < 50%, and in the 29 patient with a CTR ≥ 50% were 28.9 ± 2.8 and 42.2 ± 5.3 pg/ml, respectively, whereas those in the healthy subjects were 14.6 ± 3.5 pg/ml. There was no significant difference in the CTR between CAPD patients with a CTR < 50% and the healthy subjects. Plasma hANP levels in 26% of the CAPD

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Secretion of hANP from the atrial car-diocytes occurs in response to stretching of the atria by expansion of the extracellular fluid volume [2]. An increase in circulating plasma volume induces an increase in plasma hANP levels in CAPD patients [3]. Approximately one-fourth of our CAPD patients whose CTR was < 50% showed relatively high plasma hANP levels, suggesting the possibility of volume overload, despite the normal CTR in these patients. Plasma hANP levels may also rise due to the im-

paired cardiac function accompanied by an increase in the plasma renin level [4]. In the present study, however, the plasma renin levels in CAPD patients with CTR < 50% and high plasma hANP levels, were lower than those in the patients with CTR < 50% and low plasma hANP levels, probably due to an increase in circulating blood volume.

In conclusion, to maintain an ideal circulating blood volume during CAPD, water balance should be controlled to keep the plasma concentration of hANP < 30 pg/ml.

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361