

뇌 나트륨 이뇨 펩티드와 복막 투석 중인 소아에서의 고혈압과의 관계

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Brain Natriuretic Peptide in Pediatric Patients with Hypertension on Peritoneal Dialysis

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Purpose : Hypertension is one of the major risk factors for cardiovascular disease which emerges as the leading cause of death in most end-stage renal disease mortality statistics including children. The pathophysiology of hypertension in patients with chronic kidney disease is largely attributed to chronic volume overload, but it is difficult to estimate the ideal weight of an oliguric or anuric infant or child. Brain natriuretic peptide (BNP) is a cardiac neurohormone which is secreted from the cardiac ventricles in response to ventricular volume expansion, pressure overload and resultant increased wall tension. The aim of this study was to assess the relationship among blood pressure, volume status and blood BNP levels in pediatric patients with hypertension on peritoneal dialysis (PD).

Methods : There were 38 patients who were below 19 years old and were on PD between March 2005 and February 2009. Among them, 13 patients who had one or more episodes of severe hypertension were enrolled. Body weight, systolic blood pressure (SBP), diastolic blood pressure (DBP), blood BNP levels and cardiothoracic ratio (CTR) on chest x-ray in a posteroanterior view were measured when hypertension was detected and after blood pressure was controlled. Echocardiography was performed. We increased ultrafiltration volume to reduce body weight if initial BNP level was high.

Results : Initial SBP and DBP were 163.2 ± 20.2 (136–210) and 108.0 ± 16.8 (84–150) mmHg respectively. Initial CTR was 58.6 ± 11 (42–82)%. Follow up SBP and DBP were 114.8 ± 16.1 (90–140) and 72.9 ± 14.2 (45–94) mmHg after reduction of $8.3 \pm 5.6\%$ (1.3–16%) of body weight. CTR decreased to 51.9 ± 10.5 (39–77)%. All 13 patients had increased initial BNP levels ($4,075.4 \pm 8,916.8$, 128–33,028 pg/mL) which subsequently decreased to 62.9 ± 56.8 pg/mL (2–181 pg/mL). On echocardiography, concentric left ventricular hypertrophy was noticed in 6 patients, decreased ventricular function in 5 patients and pericardial effusion in 4 patients. The amount of changes in BNP were significantly correlated with changes in systolic blood pressure ($p < 0.001$), diastolic blood pressure ($p = 0.014$) and pulse pressure ($p = 0.010$).

Conclusion : BNP is a useful biomarker to estimate the volume status in pediatric patients with chronic renal disease. We recommend that BNP level might be routinely checked in patients on PD especially those with hypertension and that patient's weight must be controlled to keep BNP levels below 100 pg/mL.

Key Words : 뇌 나트륨 이뇨 펩티드, 고혈압, 복막투석

Brain Natriuretic Peptide, Hypertension, Peritoneal