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말기신부전 환자에서 혈액투석 후 혈청 치오레독신의 증가

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Elevation of Blood Thioredoxin after Hemodialysis in ESRD

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Purpose : Thioredoxin, one of the regulators of cellular redox balance plays a protective role for oxidative stress via direct (antioxidant) and indirect (regulation of signal transduction) effects. Also blood thioredoxin is elevated in the condition of oxidative stress. Brain Natriuretic Peptide (BNP) is a natriuretic hormone secreted from ventricular cells in response to the high ventricular filling pressure, and elevated in heart failure, renal failure, the old age. It is not well known that hemodialysis (HD) can cause oxidative stress caused by interdialytic volume change. We decided to study the oxidative stress and left ventricular strain during HD by measuring interdialytic changes of thioredoxin and BNP in the same patients.

Methods : Blood thioredoxin and BNP levels were determined in 54 HD patients before and after a regular 4 hours of HD. Thioredoxin was measured with sandwich ELISA kit (Redox Bioscience Inc, Kyoto, Japan) and BNP with chemiluminescent immunoassay method (Bayer, U.S.A.). We also followed the changes of thioredoxin and BNP depending on age, sex, presence of ischemic heart disease, duration of HD, and many biochemical parameters.

Results : Post-HD thioredoxin level was significantly increased from 9.98±2.3 ng/mL to 10.93±3.0 ng/mL ($p<0.01$), but post-HD BNP level was slightly increased from 370.80±513.1 pg/mL to 385.87±542.1 pg/mL without statistical significance ($p=0.636$). Thioredoxin levels were significantly increased after HD in the patients with diabetes ($p<0.05$), elevated C-reactive protein (CRP) ($p<0.01$), and more than 5 years of maintenance HD ($p<0.01$). BNP level showed no significant difference.

Conclusion : Blood thioredoxin levels were significantly increased after HD in the patients with end stage renal disease, and increased in the patients with diabetes, longer duration of HD, elevated CRP. Blood thioredoxin level can reflect oxidative stress and vascular inflammation in the HD patients. We suggest that HD can cause oxidative stress to the patients with end stage renal disease.