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유지혈액투석 환자에서의 심박변이

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Heart Rate Variability in Maintenance Hemodialysis Patients

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Purpose: Sudden cardiac death (SCD) is a common cause of death in maintenance hemodialysis (HD) patients. Heart rate variability (HRV) is sensitive indicator of cardiac autonomic dysfunction. In patients with diabetic or cardiac diseases, decreased HRV predicts high risk of death, particularly SCD. However, there is a little data in the literature regarding the HRV in HD patients. Commercial equipment to analyze HRV in short-term ECGs (time-domain and frequency-domain) has been considered as standard measurement. Therefore, we measured the HRV and various risk factors (nutrition, inflammation, comorbidity, volume state, cardiac function) in stable maintenance HD patients. We compared the HRV in HD patients with healthy control, and analyzed the influencing factors to HRV in HD patiens.

Methods: Fifty-two patients (M:F=32:20, age=60 11years, diabetes 67%) with stable maintenance HD therapy at our hospital were studied in July 2011. We measured the MIS (malnutrition-inflammation score), Charlson comorbidity index (CCI), Body Composition Monitoring (BCM; Fresenius Medical Care, Bad Homburg, Germany), aortic calcification scores (L-spine lat, chest PA), HRV (BMF-5000; Medi-core, Seoul, Korea) and other routine laboratory tests. We analyzed the SDNN (standard deviation NN interval) in time domain and LF/HF (low frequency/high frequency) ratio in frequency domain among various HRV parameters.

Results:

1. HRV in HD patients (n=52) was lower than healthy people (n=60) who visited our healthcare center.
2. HRV was decreased in HD patients with diabetes. Corrected calcium (R=-0.29, p=0.04) and phosphorus (R=-0.35, p=0.01) were correlated with SDNN. Corrected calcium (R=-0.39, p=0.01), hs-CRP (R=-0.39, p=0.01) and erythroid stimulating agent dose (R=0.43, p=0.01) were associated LF/HF ratio.
3. Diabetic HD patients (n=35), CCI (R=0.43, p=0.01) correlated with SDNN. Serum albumin (R=-0.40, p=0.02), hs-CRP (R=0.41, P=0.02) correlated with LF/HF ratio.

Conclusion: Our study showed that maintenance HD patients have very low HRV. Diabetes is an important factor on HRV in HD patients. Serum Ca, P, albumin, hs-CRP, comorbidities may be influencing factors on HRV in HD patients.

Key Words: 심박변이
Heart rate variability