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Heart rate variability according to electrolyte changes during hemodialysis in ESKD patients

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Objectives: Autonomic neuropathy commonly arises as a long-term complication in end-stage kidney disease(ESKD) and can be diagnosed from heart rate variability (HRV), calculated from electrocardiogram (ECG) recordings. There is limited data about HRV using real-time ECG according to electrolyte levels during hemodialysis in ESKD

Methods: Total of 50 patients (62.1±10.7 years) with ESKD underwent continuous real-time ECG monitor (237.4±15.3 mins) for HRV using remote monitoring system and checked electrolyte levels before/after hemodialysis. And we compared HRV according to electrolyte levels.

Results: During the monitor, we checked total 2374 times of ECG and electrolyte level simultaneously of all patients. Both time and frequency domain HRV were higher when the patients had lower K^+ level change before/after hemodialysis (<0.5mEq/L) as compared with those with higher K^+ level change (>0.5mEq/L) in Table. In addition, there were higher incidence of arrhythmic events including atrial/ventricular premature complexes, even though no difference of mean heart rate in patients with lower K+ level change group (P<0.001).

Conclusions: Poor controlled K^+ level was independently associated with higher HRV in patients with DM. This is further substantiated by independent continuous associations between real-time measures of K^+ level and higher HRV. These data strongly suggest that cardiac autonomic dysfunction can be caused by lower change before/after hemodialysis alone.

Table 1