Electrolyte alterations during hemodialysis is irrelevant with improved heart rate variability parameters in patients with end-stage renal disease

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Introduction: Heart rate variability (HRV) is a predictor for ventricular arrhythmia (VA) occurrence in end stage renal disease (ESRD) patients under hemodialysis (HD).The purpose of this study is to evaluate the alterations of electrolytes with components of time and frequency domain HRV parameters on ESRD patients before and after HD.
Materials and methods: There were 52 ESRD patients recruited for the study. Electrolytes before and after HD were analyzed. Single lead ECG signal was recorded for five minutes and the HRV time domain parameters used were standard deviation of all normal RR intervals(SDNN), root mean square successive difference(RMSSD), number of pairs of adjacent NN intervals differing by more than 50ms(NN50). Frequency domain parameters analysis was quantified spectral power by fast Fourier transformation (FFT) and autoregressive (AR) method for the following frequency bands: 0.15- 0.4 Hz (high frequency, HF), 0.04- 0.15 Hz (low frequency, LF).
Result: All electrolytes except chloride changes before and after HD were shown to be statistically significant. Time and frequency domain HRV parameters were shown to increase significantly after HD. There was no correlation between electrolytes changes and time or frequency domain HRV parameters before and after HD.
Conclusion: 1. time and frequency domain HRV parameters significantly increased after HD. 2. Pearson's partial correlation analysis revealed there was no statistically significant correlation between electrolytes changes and the HRV parameters before and after HD.

Table Heart Rate Variability among 52 samples before and after hemodialysis

	Before hemodialysis	After hemodialysis	P	Before hemodialysis	After hemodialysis	P
	FFT	FFT		AR	AR	
LF norm	38.5±0.6	41.2±1.8	0.041	35.1±4.7	42.5±1.2	0.025
HF norm	55.1±11.2	60.1±9.2	0.032	54.2±1.3	61.1±4.2	0.013
LF/HF	0.53±0.11	0.71±0.52	0.031	0.48±0.22	0.74±0.11	0.032