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Dialysis

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Progressively Increased QTc Dispersion was associated with sudden cardiac death in Patients with End Stage Renal Disease on Hemodialysis. - Korean Multicenter Study -

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Background: Patients with end stage renal disease (ESRD) on hemodialysis (HD) have a high risk of sudden cardiac death (SCD) due to serious ventricular arrhythmias. We performed an electrocardiogram wave pattern analysis of patients with ESRD on HD to find risk factors for predicting SCD.

Methods: We conducted a retrospective study involving 36 HD patients who died from SCD (SCD-HD) and 314 HD patients well controlled (Non-SCD) from January 2010 to June 2015 in 3 general hospitals (multi-centers). The QT interval, QT dispersion, and QT peak-end interval on all 12 leads, as well as some other 12-lead ECG parameters, were measured. We evaluated the first and last ECGs in 350 patients on HD.

Results: The SCD-HD patients were older (69.0 ± 12.2 vs. 60.8 ± 13.8 years, $p=0.001$) than the Non-SCD patients, while there was no significant difference in the gender, underlying disease, or body surface area between the two groups among the enrolled 350 patients (50.0% male, 61.7 ± 13.9 years) ($p>0.05$). However, a decreased QT peak-end interval (OR 0.961, $p<0.001$) in all pre-cordial leads (V1-V6) and a prolonged QTc dispersion (OR 1.023, $p<0.001$) were associated with an increase in SCD. The QTc dispersion increased progressively compared to those at the time of initial HD during mean follow-up duration of 2.5 years. (from 38.8 ± 15.2 to 49.5 ± 25.0 ms, $p=0.037$). A multivariate analysis also revealed that prolonged QTc dispersion (OR 1.1, $p=0.003$) was an independent predictor of SCD in HD patients, and the area under the curve (AUC) for QTc dispersion was 0.653 in the receiver operator curve (ROC) analysis.

Conclusion: A decreased QT peak-end interval and prolonged QTc dispersion were independent predictors of SCD in patients with ESRD on HD. Therefore, serial ECG monitoring may have important clinical implications in patients with ESRD on HD.

Keywords: end stage renal disease, hemodialysis, QT interval, sudden cardiac death