ANALYSIS OF T-WAVE MORPHOLOGY FOR PREDICTION OF LONG-TERM PROGNOSIS FROM THE 12-LEAD ELECTROCARDIOGRAM IN PATIENTS INITIATING HEMODIALYSIS

Chien-Yu Lin, MD, Lian-Yu Lin, MD, PhD, Lu-Chia Sheng, MD, and Pau-Chung Chen, MD, PhD

This project was carried out at En Chu Kong Hospital and Institure of Occupational Medicine and Industrial Hygiene, National Taiwan University College of Public Health

Department of Internal Medicine, En Chu Kong Hospital, Taipei, Taiwan; Departments of Internal Medicine, National Taiwan University Hospital, Taipei, Taiwan; Institure of Occupational Medicine and Industrial Hygiene, National Taiwan University College of Public HEALTH, TAIPEI, TAIWAN

__BACKGROUND__：Cardiovascular disease remains the most common cause of death in end-stage renal disease (ESRD). Different attempts have been made to use the 12-lead surface electrocardiogram (ECG) for risk stratification of patients prone to cardiac mortality, in particular sudden cardiac death. Recently, novel descriptors of T-wave morphology have been

suggested as measures of repolarization heterogeneity and adverse prognosis in nonuremic populations. However, whether these T-wave descriptors provide prognostic information in uremic populations has not been examined. The present study aimed to determine the prognostic value of novel T-wave morphology variables in predicting total, cardiovascular, and arrhythmia-related mortality in ESRD patients initiating hemodialysis.

__METHODS AND RESULTS:__The study was a retrospective cohort of adult ESRD patients starting hemodialysis between 1998 and 2005; follow-up was until 2006. A total of 336 patients were studied. Novel ECG variables characterizing repolarization and the T-wave loop were analyzed. Of 336 patients with technically analyzable data, 155 patients (46.1%) died after a mean follow-up of 24.17 ± 21 months. Direct comparison between cardiovascular death and non-cardiovascular death patients showed that the so-called relative T-wave residium (the relative amount of nondipolar contents within the T wave) predicted cardiovascular mortality ($0.20 \pm 0.20\%$ versus $0.25 \pm 0.21\%$, p=0.003). In Cox modeling, relative T-wave residium was an independent predictor of cardiovascular (relative risk [RR]=1.96; P =0.005) and arrhythmia-related mortality (RR=2.4; p =0.004).

__CONCLUSIONS__：The heterogeneity of myocardial repolarization, measured by the so-called relative T-wave residuum in the ECG, was found to be an independent predictor of cardiovascular and arrhythmia-related mortality in patients before initiating hemodialysis.

Keywords: T-wave morphology, end stage renal disease, ventricular repolarization