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Mild Renal Impairment Adds Prognostic Value to MTWA and EPS in Predicting Ventricular Tachyarrhythmias

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Patients with severe renal dysfunction have increased total mortality and might not benefit from ICD implantation. The aim of this study was to determine whether mild renal dysfunction adds to microvolt T-wave alternans (MTWA) and to an electrophysiological study (EPS) in predicting ventriculart tachyarrhythmic events (VTEs).
Methods:The ABCD trial enrolled patients with ischemic cardiomyopathy, LVEF 0.40 ף, and non-sustained ventricular tachycardia. Patients underwent both a MTWA test and an EPS at baseline. Of those, 529 patients had a baseline creatinine level available. Creatinine level in the third tertile (>1.2 mg%) was considered abnormal. The primary end-point of the study was first VTE (ICD therapy or SCD). Using Cox regression and the log-rank test we analyzed the effect of renal dysfunction on VTEs, alone and in combination with MTWA and EPS.
Results: Median creatinine level was 1.1 mg% for the whole cohort. The hazard ratio for all cause mortality, cardiac mortality, and VTEs in patients with abnormal creatinine vs. the rest was 4.4 ($p<0.01$), 4.2 ($p<0.01$), and 1.8 ($p=0.02$), respectively. One-year VTE rate in patients with both normal creatinine and MTWA tests was 4.2% vs. 13.1% in patients who had both tests abnormal ($p=0.01$). One-year VTE rate in patients with both normal creatinine and EPS was 4.1% vs. 17.6% in patients who had both tests abnormal ($p<0.01$). Using creatinine level, MTWA, and EPS, the VTE rate at the end of follow up (median=1.8 years) was 10.9%, 10.0%, 16.6%, and 26.5% with none, one, two, or three abnormal tests, respectively ($p=0.01$).
Conclusions
Mild renal dysfunction increases cardiac mortality, but it also predicts the likelihood of VTEs. Withholding ICD therapy in patients with mild renal dysfunction may not be appropriate given the high likelihood of appropriate ICD therapy in our population. The combination of an abnormal creatinine, with either a MTWA test or EPS or both improves the risk stratification value of each alone.