Risk Stratification for Ventricular Tachyarrhythmia in Patients with Nonischemic Cardiomyopathy

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Background: The implantable cardioverter defibrillator is effective in reducing mortality among patients with heart failure (HF) due to ischemic heart disease. Recent clinical trial data have called into question the benefit of an ICD in patients with HF due to non-ischemic cardiomyopathy (NICM).

Objective: The purpose of this study was to identify a risk stratification score for ventricular tachyarrhythmia (VTA) among patients with NICM receiving a primary prevention ICD.

Methods: The study population comprised of 1842 patients with NICM who were enrolled in the landmark MADIT and RAID trials. Fine and Gray analysis was used to develop a model to predict the occurrence of Ventricular Tachycardia/Ventricular Fibrillation (VT/VF)$\geq$170 b.p.m., while accounting for the competing risk of non-arrhythmic mortality defined as dying prior to experiencing VTA. Secondary endpoints included Fast VT/VF, defined as VT/VF $\geq$200 b.p.m and Appropriate Shocks for VT/VF. .Patients were grouped into 3 strata based on their risk score. Anderson-Gill regression models were used to generate mean intensity ratios (MIR) to evaluate the burden of the VTAs during follow up. We used Ghosh-Lin curves to describe the mean cumulative function (MCF) of recurrent VTA events.

Results: Five factors associated with increased risk for VTA were identified: ICD vs cardiac resynchronization therapy with a defibrillator (CRT-D), prior history of non-sustained VT, male gender, left ventricular ejection fraction$\leq$25%, and Black race. A score was generated based on this model and the patients were stratified into three risk groups. There were 1258, 294, and 252 patients in the low, intermediate, and high-risk groups, respectively. The four-year cumulative incidences of VTA in the low-, intermediate-, and high-risk groups were 21%, 38%, 50% respectively. The endpoints of Fast VT/VF and Appropriate Shocks also revealed a similar trend. The high-risk group was found to have nearly a 2-fold increased risk of VTA as the intermediate-risk group (HR=2.05 95% CI [1.6-2.7], p<0.001) and approximately 3 times the risk as that of the low-risk group (HR=3.34 95% CI [2.6-4.43], p<0.001). Consistently, the burden of recurrent VTA events was 3.6 times higher in the high-risk group compared to the low-risk group (MIR=3.564 95% CI [2.602-4.882] P<0.001) and 1.9 times higher compared to the intermediate risk group (MIR=1.884 95% CI [2.602-4.882] p<0.001).

Conclusions: In conclusion, our findings suggest that patients with NICM who are ICD candidates experience a significant risk for VT/VF and a high burden of VT/VF during follow-up. Clinical and echocardiographic variables can be used to risk stratify patients with for the occurrence of VT/VF. Future studies validating our risk score in predicting arrhythmic events in patients with non-ischemic cardiomyopathy are required.