Analysis of myocardial scar characteristics by cardiac MRI and its correlation with arrhythmic events on follow-up in ischemic cardiomyopathy (ICMP) patients implanted with Automatic implantable cardioverter defibrillator (AICD)

Hiren Kevadiya
Narayanan Namboodiri K.K.
Krishna Kumar M.
Ajitkumar V.K.

Introduction: Ischemic cardiomyopathy (ICMP) patients remain at increased risk of SCD. Characterization of sudden cardiac death risk remains a challenge in the application of ICD therapy. As the majority of patients remains free from ICD therapy, a further refinement of criteria is needed. Evaluation of pathophysiological substrates related to electrical instability like scar burden and scar characteristics by MGE-CMR might yield complementary prognostic information.

Methods: We performed retrospective, single centre Observational study to identify arrhythmic risk predictors and to evaluate the association between the extent and distribution of myocardial scar, quantified using LGE-CMR, and the burden of ventricular arrhythmias in ICMP patients having AICD. All consecutive ICMP patients implanted with AICD who had undergone CMR for myocardial scar assessment between 2013 & 2018 were included. Non ICMP patients were excluded. Scar was characterized in terms of No. of segments with any scar, transmural scar, Subendocardial scar, dense/non heterogeneous scar, heterogenous scar. The end points were Appropriate ICD therapy.

Result: 39 patients (mean age, 58.2 years; male sex 38) were included. Mean Ejection fraction by 2D ECHO was 35.4% (SD=10.7). Mean amiodarone dose was 115 mg (0-400 mg). Mean LVEF by ECHO was 35.4% in comparison to mean LVEF by MRI was 28.9%. Mean follow-up duration was 28.8 months (3 to 66 months). 17 (43.6%) out of 39 patients were noted to have VT/VF episodes, Twelve (30.8%) out of 39 patients were noted to have appropriate AICD shocks and fifteen (38.5%) were noted to have appropriate AICD therapy in form of shocks/ATP on follow-up. Baseline characteristics, scar characteristic assessed by CMR were compared between two groups of patients having AICD events and not having events on follow-up. There was no statistically significant difference in baseline characteristics between both the groups. There was no statistically significant difference in volumetric parameters and scar characteristics assess by cardiac MRI like number of segments with any scar or transmural scar or subendocardial scar or dense-non heterogeneous scar or heterogenous scar between both the groups. 7.6 segments (mean) (45.2% of total) were noted to have any scar on 17 segments analysis in group of patient having AICD events on follow-up compared to 8.4 segments (mean) (49.9%) in patients without any AICD events.

Conclusion: In our study myocardial scar characteristics assessed by LGE cardiac MRI was not associated with AICD events/arrhythmic events on short term follow-up in ischemic CMP who had AICD/CRT-D implantation. LVEF by 2D ECHO or cardiac MRI has correlated with scar burden but not with arrhythmic event on follow-up.