Poster presentation

The Gootter registry. Guiding our outcomes to terminal electrical rhythms - A CMR study of ICD events

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Introduction

Sudden cardiac death (SCD) remains a major health problem, accounting for nearly 1000 deaths in the US daily. Clinical trials have proved a survival benefit with ICD implantation in patients with a LVEF <30-35%. However, it has been estimated that of the 2 million ICD's currently implanted, only 5% ever fire to correct a deadly arrhythmia. Also, many patients who would benefit from a prophylactic ICD are not considered candidates for implantation suggesting our criteria are inaccurate. Clearly, an accurate predictor of deadly cardiac arrhythmias has yet to be identified.

Purpose

Cardiac MRI (CMR) is noninvasive, non-irradiating, and can identify even small regions of LV myocardial fibrosis. These investigators believe that this micro-fibrosis is the common underlying substrate for deadly arrhythmias from multiple ischemic and non-ischemic etiologies.

Methods

This study was approved by the IRB. All patients receiving ICD for either primary or secondary prevention were enrolled. Comprehensive CMR examination (1.5 T GE Sigma v14x) including myocardial delayed contrast enhancement (E) was performed in 42 patients over a period of 3 years (185 patients were screened and 143 were excluded for patient refusal, pacer or ICD leads, unable to schedule prior to ICD implantation, and claustrophobia). Patients were followed routinely in the ICD clinic and monitored for appropriate ICD shocks or anti-tachycardia pacing (ATP), ventricular tachycardia () and cardiac death (primary end-points). Secondary end-points included non-sustained (NS), supraventricular tachycardia (S), and non-cardiac death. Continuous variables were expressed as mean + SD. CMR findings in patients without events yet to be analyzed.

Results

Mean age is 59 +/- 12 years. 41/42 patients available for follow-up (480 +/- 300 days). ICD implantation performed within 12 + 18 days after CMR. There were 37 primary and 5 secondary prevention implants. 7(17%) patients experienced primary (N = 3) or secondary (N = 4) end-points. Of these, 3 had >10% and 3 had < 10% ratio of E/LV mass. 1(17%) patient had an endocardial (CAD) E pattern and 5(83%) a non-CAD E pattern. There were 2 deaths, 1 pulmonary embolism and 1 SCD (<24 hours after CMR prior to ICD), Table 1.

Conclusion

This is an early report from the GOOTTER registry on patients with short term events after ICD implantation. 7(17%) endpoints have occurred. 3(7.7%) had a primary event (1 death) >1 year follow up.

LVEF was a poor discriminator for SCD prediction. Fibrosis is a common denominator for a deadly arrhythmia substrate as seen in all the patients with events even those who have a preserved LVEF.

Table 1: Characteristics of 7 patients with episodes

S. NO	Age	Sex	Events	LVEF (%)	E	%E	Location of E	CAD	Prevention
1	64	M	3 episodes of NS No shock	28	N/A GFR <30 ml/min/1.73 m2	N/A	N/A	Yes	Primary
2	66	M	3 episodes of NS No shock	23	Base to distal anterior, septal and lateral wall	14.5	Mid myocardial and subepicardial	Yes	Primary
3	61	M	1 NS 1 S episode No shock Expired from PE	28	Mid and distal inferior wall	2.7	Mid myocardial	Yes	Primary
4	61	M	3 episodes of NS 1 episode of terminated by ATP 1 episode of S	65	Patchy fibrosis mid anterior wall	0.7	Mid myocardial	No	Secondary
5	50	M	expired within 24 hrs of CMR study	21	Basal inferior and antero-septal wall	2.1	Subepicardial	No	Primary
6	67	M	2 episodes of terminated with shocks 7 episodes of S	44	Basal anterior and mid to distal inferior wall	10.8	Mid myocardial	Yes	Secondary
7	82	M	1 episode of S	46	Basal to distal anterior and antero-septal wall	15	Subendocardial and mid myocardial	Yes	Secondary