to determine whether presence of MF on visual assessment (MFVA) and gray zone fibrosis (GZF) mass predicts SCD and ventricular fibrillation/sustained ventricular tachycardia after cardiac implantable electronic device (CIED) implantation.

Materials and Methods

In this prospective study, total fibrosis and GZF mass, quantified using cardiovascular magnetic resonance, was assessed in relation to the primary endpoint of sudden cardiac death (SCD) and the secondary, arrhythmic endpoint of SCD or ventricular arrhythmias after CIED implantation.

Results

Among 700 patients (age 68.0 ± 12.0yrs [mean ± SD]), 27 (3.85%) experienced a SCD and 121 (17.3%) met the arrhythmic endpoint over 6.93 yrs (median; interquartile range 5.82–9.32). MFVA predicted SCD (hazard ratio [HR]: HR: 26.3 [95% confidence interval [CI] 3.70–3337]; negative predictive value: 100%). In competing risks analyses, MFVA also predicted the arrhythmic endpoint (subdistribution [sHR]: 19.9 [95% CI 6.40–61.9]; negative predictive value: 98.6%). Compared with no MFVA, a GZF mass measured with the SSD method (GZFSSD) > 17 g was associated with highest risk of SCD (HR: 44.6; 95% CI 6.12–5685) and the arrhythmic endpoint (sHR: 30.3 [95% CI 9.60–95.8]). Adding GZFSSD mass to MFVA led to reclassification of 39% for SCD and 50.2% for the arrhythmic endpoint. In contrast, LVEF did not predict either endpoint.

Discussion

This is the largest CMR study of MF in relation to long-term clinical outcomes in patients undergoing CIED implantation. Several findings have emerged. First, all patients experiencing SCD had MFVA on preimplantation CMR. Second, absence of MFVA virtually excluded the composite, arrhythmic endpoint. Third, both TFFWHM mass and GZFSSD mass had an additional predictive value over and above MFVA, with respect to both SCD and the arrhythmic endpoint. Last, LVEF did not predict either endpoint.

Conclusion

In CIED recipients, MFVA excluded patients at risk of SCD and virtually excluded ventricular arrhythmias. Quantified GZFSSD mass added predictive value in relation to SCD and the arrhythmic endpoint.

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