Abstract: P98

The value of scar mapping by cardiac magnetic resonance imaging pre ablation for ventricular tachycardia: should an implantable cardioverter defibrillator put you off?

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Topic(s):
Late Gadolinium Enhancement and Viability

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We report the case of a 45 year old male patient with dilated cardiomyopathy presumed secondary to prior anthracycline administration for acute lymphoblastic leukaemia (16 years ago). He had severe LV impairment, a dual chamber non-MRI conditional ICD in situ, and presented with multiple ICD shocks.

The patient was treated medically with maximal dose beta blockade, however device interrogation showed multiple episodes of ventricular tachycardia (VT), with the majority of episodes being successfully treated by ATP. Ablation of the ventricular tachycardia was planned, and in our institution all patients undergo pre-procedural CMR with late gadolinium enhancement imaging for scar characterization and localization to plan the ablation strategy.

CMR was performed in accordance with ESC and Heart Rhythm Society Guidelines (1,2) with the patient giving written consent and the device re-programmed to ODO mode with therapies off for the duration of the scan. The patient was monitored throughout the scan, and the device re-interrogated and re-programmed to the initial settings post-scan. There were no acute complications or significant changes to the device or lead parameters. The CMR revealed a three segment transmural infarct, highlighting a previously-unknown potential arrhythmogenic substrate.

The patient proceeded to have a successful ablation of the clinical arrhythmia. He made a good recovery and was discharged from hospital, with no further device therapies.

LGE-CMR demonstrated a dilated and hypertrophied LV cavity with severe LV systolic function (LVEF calculated at 35%) in keeping with a dilated cardiomyopathy. Standard FLASH LGE imaging was non-diagnostic due to artifact from the ICD generator (Figure 1. A). The hyperintensity artifact was removed using a wideband phase sensitive inversion recovery motion corrected sequence, revealing transmural late gadolinium enhancement at basal-mid infero-septal level, with extension into the inferior segment. (Figure 1. B).

This case highlights the diagnostic benefit of LGE CMR in cases of cardiomyopathy, even when the underlying cause is thought to be known. Non-invasive scar localization using LGE CMR is increasingly used for planning ablations for ventricular tachycardia, and has been shown to improve procedural success (3). However, a large proportion of patients in need of these procedures have implantable devices, which often prevents clinicians from performing these scans. Our case is consistent with an increasing body of evidence that LGE imaging with CMR is both safe and can provide high diagnostic value in patients presenting with VT and implantable devices. Moreover, the use of wideband LGE eliminates hypersensitivity artifact allowing for good quality tissue characterization.
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