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Ventricular fibrillation and CRT-D dysfunction during dual-energy catheter ablation for ventricular tachycardia storm: a case report

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KEYWORDS: electrical storm, ventricular tachycardia, pulsed field ablation, cardiac implantable electronic device.

CITATION: Cardiol Croat. 2026;21(11-12):407. | https://doi.org/10.15836/ccar2026.407

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Introduction: Urgent catheter ablation is recommended for scar-related ventricular tachycardia (VT) presenting as an electrical storm. In patients with a cardiac implantable electronic device (CIED), device interrogation should identify failure of antitachycardia pacing (ATP) and resetting of the detection counter, and the device must be thoroughly evaluated and appropriately reprogrammed both before and after the procedure.[1] Interaction between ablation energy and the device system is uncommon but may occur even when the generator itself is intact.

Case report: 68-year-old man with ischemic cardiomyopathy and chronic heart failure with reduced ejection fraction was admitted in April 2026 with palpitations and dizziness, without syncope. On the current admission, device interrogation confirmed a scar-related VT storm recurring after the previous ablation and refractory to ATP: more than 150 ATP sequences and six 40-J shocks were recorded, with ATP failure and repeated resetting of the detection counter. In accordance with the ESC and EHRA guidelines, urgent repeat ablation was performed. Before the procedure, tachyarrhythmia detection and therapies were deactivated and the device was programmed to backup VVI pacing at 40 bpm. Voltage mapping was performed with a dual-energy catheter capable of both radiofrequency (RF) and pulsed field ablation (PFA). RF lesions were delivered along the scar border zone from the mitral annulus to the apex, laterally and inferoseptally, and stacked PFA applications were delivered in the inferoapical segment. As VT remained inducible, RF ablation was attempted from the right ventricle but was abandoned after it induced ventricular fibrillation (VF), which was terminated by defibrillation. Post-procedural interrogation revealed device dysfunction with simultaneously high impedances on all leads, necessitating replacement of the CRT-D generator. The manufacturer's analysis of the explanted generator found no device malfunction.

Conclusion: This case highlights potential interactions between dual-energy RF/PF ablation catheters and implanted CIEDs, which may be serious enough to require generator replacement even in the absence of a confirmed device malfunction. Catheter ablation in patients with CIEDs can generally be performed safely, but data on the effects of specific catheters and energy modalities on device function remain limited. Careful procedural planning, including avoiding energy delivery in the immediate vicinity of defibrillation leads, together with thorough device interrogation and reprogramming before and after ablation, is essential to prevent adverse events.

RECEIVED:
October 25, 2026
UPDATED:
November 4, 2026

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