

Epicardial ablation of hemodynamically unstable ventricular tachycardia supported by a percutaneous assist device, limited by a left ventricular aneurysm and adhesions after cardiac surgery

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DOI: 10.33963/v.phj.99499

Received:

December 21, 2023

Accepted:

February 21, 2024

Early publication date:

March 22, 2024

We present the case of a 67-year-old male with ischemic heart failure admitted to our department after many adequate discharges of an implanted implantable cardioverter-defibrillator. The patient had undergone coronary artery bypass grafting in 2017 and endocardial ablation twice before the current hospitalization for hemodynamically unstable ventricular tachycardia (VT). Echocardiography confirmed severe left ventricular systolic dysfunction with left ventricular ejection fraction of 30% and a large akinetic aneurysm in the apical region. On current coronary angiography, further revascularization was not required. During the hospital stay, sustained VT occurred in two morphologies (VT-1 — **Figure 1A**, VT-2 — **Figure 1B**), which required external cardioversion, each time due to hemodynamic instability. The computed tomography scan confirmed a true aneurysm (**Figure 1C**). The therapy escalation for electrical storms based on the current recommendations did not result in the patient's electrical stability [1]. During the Heart Team consultation, the patient was disqualified from aneurysmectomy but was eligible for a repeat ablation with epicardial access and a percutaneous left ventricular assist device.

Initially, subxiphoid and transeptal approaches were prepared, and a percutaneous left ventricular assist device (Impella CP Abiomed, MA, US) was inserted into the

left ventricle (**Figure 1D**). With pacing maneuvers, VT-1 was induced very easily. Using the electroanatomical system (Carto 3, Biosense Webster, Diamond Bar, CA, US), high-density mapping was performed. Voltage mapping showed an extensive scar area in the apical region (<0.5 mV as a scar and 0.5–1.5 mV as the border zone). In contrast, activation mapping showed the critical isthmus of the arrhythmia at the base of the aneurysm. Using radiofrequency energy applications from the endocardial side, VT-1 was terminated (**Figure 1E**). Subsequent pacing induced VT-2, which was mapped as endocardial and in a limited portion of the epicardium due to adhesions (**Figure 1D**). With endocardial and epicardial radiofrequency energy applications at the infero-septal portion of the aneurysm border zone, VT-2 was terminated (**Figure 1F**). No recurrence of VT was detected during the hospital stay or 3 months after discharge.

Recurrent VTs represent a significant burden for patient prognosis. Successful VT ablation can reduce the risk of rehospitalization and improve survival [2]. The difficulty of the procedure may be related to its hemodynamic instability, which necessitates the use of alternative ablation techniques, and various anatomical aspects. Currently, in Poland, circulatory support is mainly used during high-risk hemodynamic procedures [3]. Meanwhile, the use of temporary mechani-

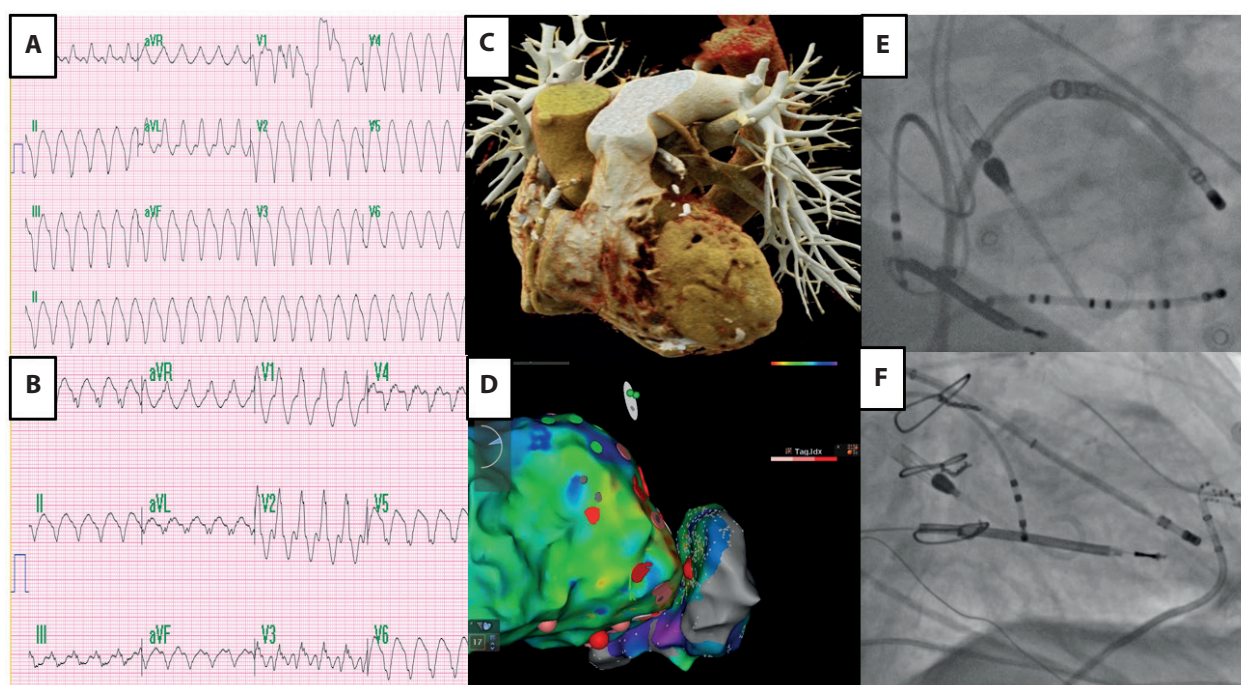


Figure 1. A–B. Twelve-lead electrocardiogram presenting the morphology of clinical ventricular tachycardias (VT). C. Computed tomography reconstruction showing a large akinetic aneurysm in the apical region of the left ventricle. D. Endocardial and epicardial activation map of VT-2. E–F. Fluoroscopic view presenting the position of the ablation catheter on the critical isthmus of clinical VT

cal hemodynamic support may be helpful during complex VT ablations [4]. In particular, it allows activation mapping, which more selectively identifies the critical isthmus. Both the mapping of epicardial layers and applications in this area should be the target when endocardial ablation fails [5]. A limitation of such a therapeutic strategy may be also the post-infarction aneurysms that modify anatomical relationships and adhesions formed either after pericarditis or cardiac surgery, which reduce the areas to be mapped. In the case of large left ventricular aneurysms, it may be useful to assess pre-procedural anatomy with computed tomography. In our patient, applications to the small area on the epicardial side at the base of the aneurysm restricted by adhesions finally resulted in the termination of VT-2.

Article information

Conflict of interest: None declared.

Funding: None.

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