Incessant septal ventricular tachycardia in a patient with hypertrophic cardiomyopathy after failed unipolar and bipolar ablation. Is ethanol septal ablation a solution?

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The treatment of ventricular tachycardia (VT) in patients with hypertrophic cardiomyopathy (HCM) is challenging due to the complex substrate and thickness of the muscle [1, 2]. The majority of patients have a scar at the basal or middle interventricular septum on enhanced gadolinium magnetic resonance imaging (MRI) [3]. Spatial fibrosis distribution in the grossly hypertrophied septum can promote deep re-entrant circuits, which can be challenging during ablation [4].

We present a 56-year-old male patient with a long history of HCM and VT with implanted implantable cardioverter defibrillator (ICD), who was successfully treated with amiodarone for 15 years. In 2011, he developed hyperthyreosis, and amiodarone was stopped. Several months later, he experienced numerous ICD interventions for VT. From 2012 to 2015, he underwent five ablations, during which he presented several forms of VT originating from the interventricular septum and left ventricular summit. Ablation of septal VT was successful for several months but resulted in an atrioventricular block which required an upgrade to cardiac resynchronization therapy with defibrillator (CRT-D). In 2016, the patient underwent unipolar radiofrequency re-ablation for LV summit VT and bipolar ablation of mid-septal VT guided by the CARTO 3 system. Right and left ventricular endocardial mapping revealed low-voltage substrates (bipolar <0.5 mV) representing the scar and fractionated potentials on both sides of the thick septum (27 mm). As pace-mapping in the high septum replicated clinical VT, bipolar ablation was performed accordingly to the previously described technique [5]. After the procedure, aortic regurgitation developed presumably as a consequence of LV summit ablation, and the patient underwent aortic valve replacement (ablation was performed from both sides of the left aortic cusp). After that, the patient was free from VT for 2 years when he presented the incessant form of slow VT and progressive heart failure (Figure 1A).

The standard approach with the CARTO 3 system was unsuccessful due to fibrosis and the lack of septal excitability (Figure 1B). As the earliest potentials were recorded under the aortic valve (–30 ms), we decided to perform transcoronary mapping. Coronary angiography showed a small septal branch supplying the upper part of the intraventricular septum under the aortic valve annulus (Figure 1C). An angioplasty pilot (BMW) with an over-the-wire (OTW) balloon (1.25 × 12 mm) was inserted into the several branches of the septal artery finally finding the earliest fractionated potentials, preceding QRS by –64 ms with 12/12 matching between paced rhythm and VT morphology (Figure 1D, E). After the balloon was inflated for contrast injection, VT slowed down and stopped. At this stage, two injections of 2 ml 96% ethanol were performed with 120 seconds of artery occlusion. After 15 minutes, VT could not be induced with pacing with up to 4 extra stimuli. The next day, the patient reported chest pain, and laboratory tests showed high-sensitivity cardiac troponin T (hs-TnT) 3561 pg/ml, which normalized after 2 days. The patient was followed up with home monitoring (Biotronik) for the next 36 months and presented no VT recurrence.

Transcoronary ethanol ablation can be an effective alternative for ventricular tachycardia

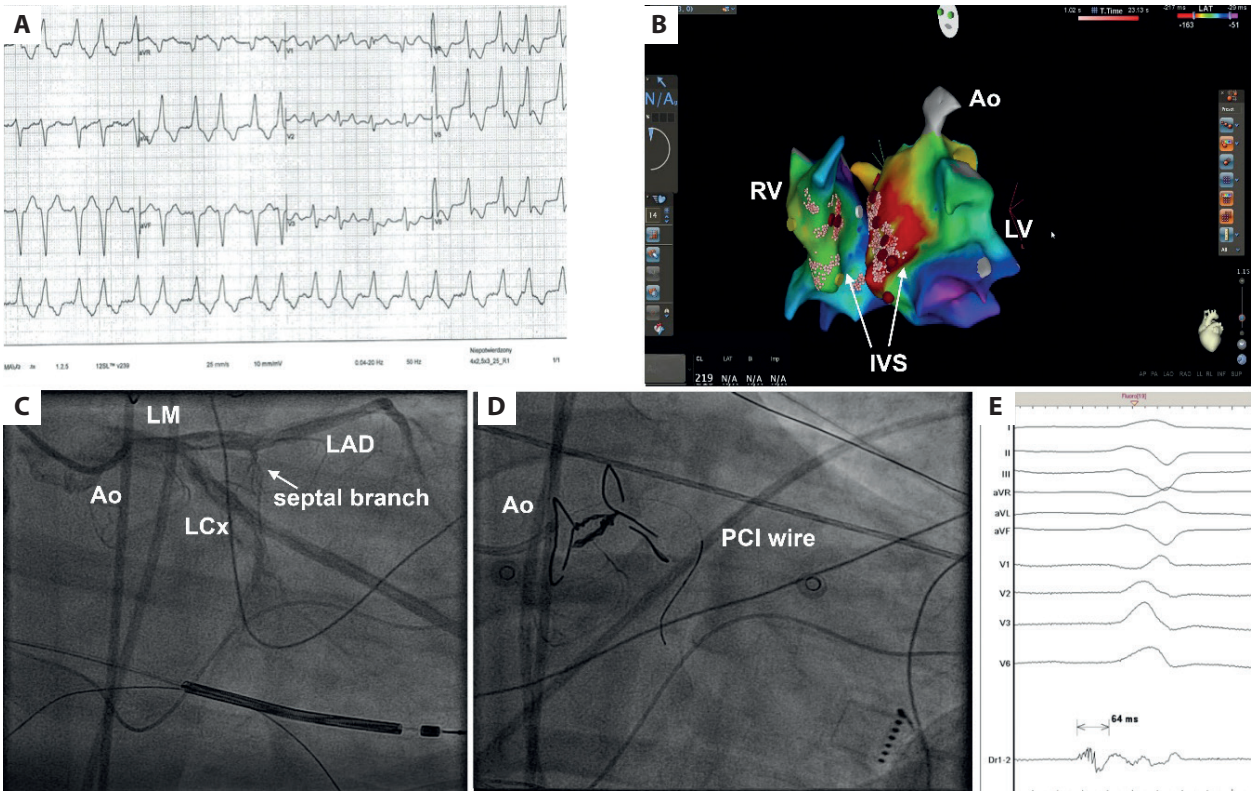

Figure 1. A. Twelve-lead ECG of clinical VT treated with ethanol ablation. **B.** CARTO bipolar map of RV and LV. Extensive scarring present at the left-sided septum where previous ablations were performed. **C.** Coronary angiography (RAO 30). **D.** PCI wire mapping in the septal branch at the site of best potentials. **E** Local potential recorded by the PCI wire at the site of ethanol ablation

Abbreviations: Ao, aortic valve; ECG, electrocardiography; IVS, interventricular septum; LAD, left anterior descending artery; LCx, left circumflex artery; LM, left main artery; LV, left ventricle; PCI, percutaneous coronary intervention; RV, right ventricle; VT, ventricular tachycardia

after failed RF catheter ablation. As the procedure is technically challenging, it is unlikely to be used as the first choice of treatment, but it should be considered as an alternative method after RF ablation failes.

Supplementary material

Supplementary material is available at https://journals.viamedica.pl/kardiologia_polska.

Article information

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