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

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

Short title: Septal ethanol ablation as an alternative treatment of incessant VT in HCM

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

We present a 56-year-old male patient with a long history of HCM and VT with DDD-ICD implantation, who was successfully treated with amiodarone for 15 years. In 2011 he developed hyperthyrosis, and amiodarone was stopped. Several months later, he experienced numerous ICD interventions for VT. From 2012 till 2015, he underwent five ablations, during which he presented several forms of VT originating from the interventricular septum and LV summit. Ablation of the septal VT were successful for several months but resulted in atrioventricular block which required upgrade to CRT-D. In 2016 patient underwent unipolar RF re-ablation for LV summit VT and bipolar ablation of mid-septal VT guided by CARTO 3 system. Right and left ventricular endocardial mapping revealed low-voltage substrates (bipolar <0.5 mV) representing scar and fractionated potentials on both sides of the thick septum (27 mm). As pace-mapping in the high septum replicated the clinical VT, the bipolar ablation was performed.
accordingly to previously described technique [5]. After the procedure, the aortic regurgitation
developed presumably as the consequence of LV summit ablation and patient underwent aortic
valve replacement (ablation was performed from both sides of left aortic cusp). After that,
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 CARTO 3 system was unsuccessful due to fibrosis and
inexcitability of the septum (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 OTW balloon (1.25 ×
12 mm) were inserted into the several branches of septal artery finally finding the earliest
fractionated potentials, preceeding 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 complained of chest pain, and laboratory
tests showed elevated troponin T-HS 3561 pg/ml, which normalized after 2 days. The patient
was followed up with home-monitoring (Biotronik) for the next 36 months presenting no VT
recurrence.
Transcoronary ethanol ablation can be an effective alternative for ventricular tachycardia after
failed RF catheter ablation. As the procedure technically is challenging, it is unlikely to be used
as the first choice of treatment, but it should be considered as an alternative method after failed
RF ablation.

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

**Article information**

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Figure 1. A. 12 lead ECG of clinical VT treated with ethanol ablation. B. CARTO bipolar map of RV and LV. Extensive scarring present at 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; 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