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STUDIUM PRZYPADKU / *CLINICAL VIGNETTE*

Hybrid ablation of haemodynamically unstable ventricular tachycardia using a transabdominal minimally-invasive approach and percutaneous left ventricular assist device

Ablacja hybrydowa z małoinwazyjnego dostępu przezbrzusznego ze wsparciem lewokomorowym u chorego z niestabilnym hemodynamicznie częstoskurczem komorowym

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A 67-year-old man with severe heart failure and left ventricular (LV) ejection fraction of 25%, was admitted due to 48 implantable cardioverter-defibrillator shocks within the preceding 24 h. He had undergone a previous endocardial ablation of haemodynamically unstable ventricular tachycardia (VT) originating from the basal inferior wall of the LV, as confirmed by pacing manoeuvres and attempted limited activation mapping. However, no endocardial scar was identified in voltage mapping. Due to VT recurrence despite antiarrhythmic treatment, the patient was referred for hybrid ablation. The procedure was performed under general anaesthesia with haemodynamic support by catheter-based assist device, Impella CP (Abiomed, MA, USA), introduced into LV retrograde via aorta. Surgical access was obtained via minimally invasive, transabdominal endoscopic approach through central tendon of diaphragm incision. In voltage mapping performed using a three-dimensional CARTO3 UniVu system (Biosense Webster, Diamond Bar, California, USA), once again no endocardial scar tissue (< 0.5 mV as scar and 0.5–1.5 mV as a border zone) was detected (Fig. 1C). Subsequently, with Impella support, it was possible to map the clinical VT (Fig. 1A) originating within the last ablation area. Contradictory to this point, in endoscopic view, only a small area of epicardially created scar could be identified. Finally, the creation of a non-excitable, transmural lesion with combined endo- (Navistar Thermocool Smarttouch catheter [Biosense Webster, Diamond Bar, California, USA]) and surgical epicardial (EpiSense catheter [nContact, Morrisville, NC, USA]) ablation was possible (Fig. 1B) under CARTO3 and fluoroscopic guidance, targeting the earliest activation area homogenisation. In the following electrophysiological study, arrhythmia was non-inducible. In the three-month follow-up period there was no VT recurrence. Ablation in haemodynamically unstable VT in a patient without evidence of endocardial substrate is a challenging procedure with limited efficacy due to lack of identifiably ablation targets. A favourable approach is activation and entrainment mapping with support of an LV assist device systems (LVAD), which could maintain end-organ perfusion and facilitate mapping and ablation of ongoing VT. Given the data obtained from the previous ablation procedure, we suspected that the intramural or epicardial origin of VT was the main reason for the failure of previous endocardial ablation and considered a hybrid approach with combined endo- end epicardial ablation, expecting better lesion transmurality with shorter procedure time. Despite the fact that data of VT ablation using surgical access are limited to subxiphoid window or limited thoracotomy, we decided on an endoscopic transabdominal approach considering it to be less invasive, allowing faster recovery after intervention. In the presented case, the used hybrid strategy with pLVAD support was feasible and safe with non-inducibility of any arrhythmia at the end of the procedure. In short-term follow-up there was no complication or recurrence of VT. To the best of our knowledge, this is the first case of hybrid ablation of VT using a minimally invasive transabdominal approach and an Impella device. In selected patients, hybrid ablation with LVAD assist could be considered as an alternative, effective approach in the treatment of electrical storm.

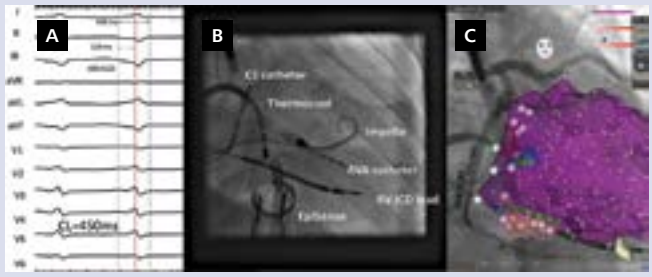

Figure 1. **A.** 12-lead electrocardiogram of clinical ventricular tachycardia; CL — cycle length; **B.** Catheter positions during application; RAO view; CS — coronary sinus; RVA — right ventricular apex; RV ICD — right ventricular implantable cardioverter defibrillator lead; **C.** Voltage map using CARTO3 UniVu

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Conflict of interest: *Michał Zembala — consultant for AtriCure, Synetis*

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