

Cardioneuroablation for the effective treatment of recurrent vasovagal syncope to restore driving abilities

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Approximately half of the general population will have one syncopal event during their lifetime, and its most frequent cause is reflex syncope. Recurrent syncope may significantly worsen the quality of life and may have serious consequences for traffic safety. According to the European Society of Cardiology (ESC) guidelines published in 2018, patients with reflex syncope, which is recurrent, severe, or takes place while driving, are advised not to drive until successful treatment is established [1].

Cardioneuroablation (CNA), which decreases vagal tone and modifies circulatory system reflexes, was an effective treatment in our patient in restoring driving abilities [1–4].

Our patient was a 56-year-old man with 8 syncopal episodes in the previous 6 months. His first loss of consciousness occurred while driving a car and ended with a car collision. Other episodes took place at home, mainly in a standing position. He was hospitalized 3 times without detecting any disorders except mild hypertension. After this life-threatening syncope, according to the ESC guidelines and Polish law, the patient was informed about contraindications to driving until proper diagnosis and treatment were established [1]. He accepted the restriction, so there was no need to issue an official statement. Syncope while driving a car and a high frequency of episodes resulted in symptoms of depression requiring pharmacotherapy.

We did a tilt table test for our patient, with syncope in the seventh minute after sublingual nitroglycerin sensitization, which was caused by a sinus pause lasting 19 seconds (Figure 1A). He was diagnosed with cardioinhibitory vasovagal syndrome type II B according to the Vasovagal Syncope International

Study. He also underwent a breathing test, Valsalva maneuver, carotid sinus massage with no abnormalities detected, and an atropine test, which resulted in an increase in heart rate from 71 to 121 bpm and showed him as an appropriate responder to CNA. Before he was referred for CNA, cardiac pacing was considered (class IIb recommendation of the ESC guidelines) [1]. Since there are conflicting results of randomized trials including patients with dual-chamber pacing for the treatment of cardioinhibitory vasovagal syncope and following the patient's preferences, CNA was recommended [5].

Anatomically-guided biatrial and binodal CNA with bilateral extracardiac vagal nerve stimulation (ECANS) was performed under general anesthesia according to Pachon's method [6]. After a basic electrophysiological study with normal parameters and three-dimensional electroanatomical mapping of the atria and pulmonary veins (Figure 1B), ultrasound-guided ECANS was done, which revealed sinus arrest lasting 11.5 seconds. Afterward, radiofrequency applications were performed in the regions of parasympathetic innervation of the heart. Control ECANS did not reveal sinus arrest.

Eight weeks later, we did a control procedure. During right ECANS, a sinus pause lasting 11 seconds occurred, and radiofrequency (RF) applications of the parasympathetic ganglia were repeated. Denervation was confirmed pharmacologically by administration of 2 mg intravenous atropine (sinus rhythm increased from 80 to 85 bpm at 10 minutes — <7%).

Three months later, the patient underwent a tilt table test and control ECANS without any abnormalities.

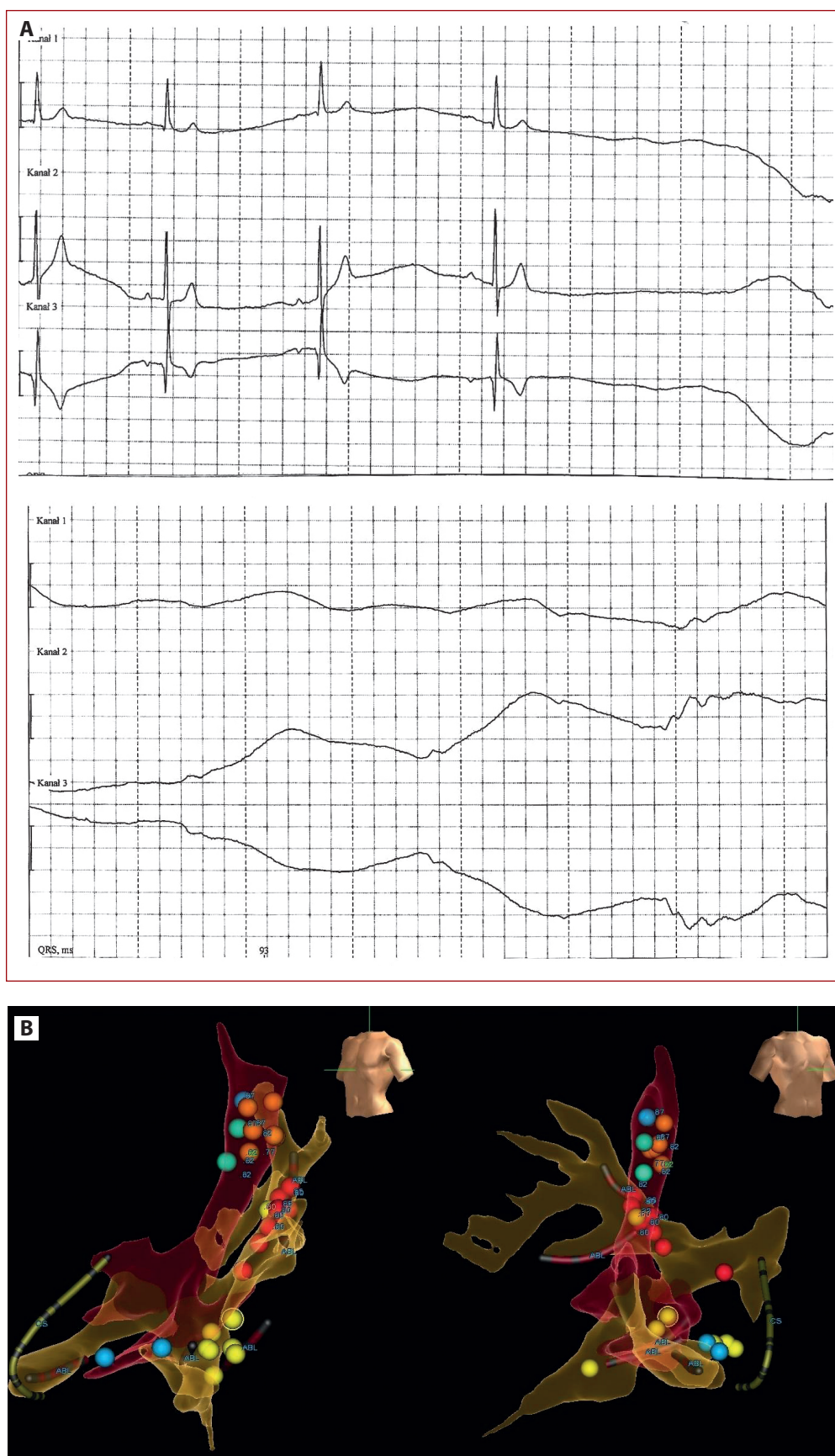


Figure 1. A. Electrocardiogram monitoring during head-up tilt test after sublingual nitroglycerin sensitization — the pause causing syncope. **B.** Electroanatomical map depicting ablation sites. CS — shadow of decapolar catheter on the tricuspid annulus. Blue dots indicate points with His EGM registration or phrenic nerve stimulation. Red, yellow, and orange dots indicate ablation points in the right superior pulmonary vein, ostium of the coronary sinus, and superior vena cava, respectively. Numbers indicate the highest registered sinus rate during applications

Abbreviations: EGM, electrogram

According to the ESC guidelines, the patient was allowed to drive a car again after receiving effective treatment [1]. At 30-month follow-up, the patient remains asymptomatic also while driving, his mental health improved so he no longer requires antidepressants, and he supports other patients after the CNA procedure.

Our case shows the usefulness of CNA as an effective treatment, improving the quality of life by restoring driving ability. Nevertheless, further research on this method is required.

Article information

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