

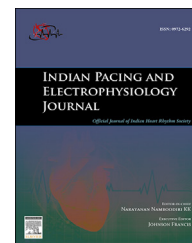
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Double-gap-in-roof reentrant tachycardia following surgical thoracoscopic atrial fibrillation ablation

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ABSTRACT

A case of macro-reentrant tachycardia associated with a box lesion after thoracoscopic left atrial surgical atrial fibrillation (AF) ablation yet to be described. The goal was to clarify the mechanisms and electrophysiological characteristics of this type of tachycardia.

A patient was admitted for an EP study following surgical thoracoscopic AF ablation (box lesion formation by right-sided Cobra thoracoscopic ablation). Thoracoscopic ablation was done as the first step of the hybrid ablation approach to the persistent AF; the second step was the EP study. At the EP study, he presented with incessant regular tachycardia (cycle length of 226 ms). An EP study with conventional, 3D activation and entrainment mapping was done to assess the tachycardia mechanism. Two conduction gaps in the superior line (roofline) between the superior pulmonary veins were discovered. The tachycardia was successfully treated with a radiofrequency application near the gap close to the left superior pulmonary vein; however, following tachycardia termination, pulmonary vein isolation was absent. A second radiofrequency application, close to the roof of the right superior pulmonary vein closed the gap in the box and led to the isolation of all 4 pulmonary veins. No atrial tachycardia recurred during the 6-month follow-up.

Conduction gaps in box lesion created by thoracoscopic ablation can present as a novel type of man-made tachycardia after surgical ablation of atrial fibrillation. Activation and entrainment mapping is necessary for an accurate diagnosis.

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Introduction

Pulmonary vein isolation (PVI) is a well-established treatment option for patients with symptomatic paroxysmal atrial fibrillation. The success rate of PVI in patients with persistent

or even long-lasting persistent atrial fibrillation, however, is less than satisfactory [1,2]. Therefore, alternative techniques, including a combination of surgical thoracoscopic ablation followed by catheter ablation (e.g. hybrid approach), have been developed [3,4]. However, more complex left atrial

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ablations, especially with incomplete lesion formation, can be pro-arrhythmogenic and give rise to certain types of man-made tachycardias. In this case we report on a type of man-made reentrant tachycardia caused by a double gap in the roofline section of a box lesion created during surgical thoracoscopic AF ablation.

Case report

A 59-year old patient with symptomatic long-lasting persistent atrial fibrillation presented to the outpatient department of the Cardiocenter. A hybrid ablation, i.e. a combination of surgical thoracoscopic ablation, followed by catheter ablation, was offered for treatment of the patient's condition; this treatment approach was offered as part of a research project being conducted by the Cardiocenter, University Hospital Kralovske Vinohrady in Prague, Czech Republic. The research project was approved by the local Ethics Committee of the University. The procedure consisted of a surgical thoracoscopic ablation (box lesion) followed by catheter ablation (to insure the completeness of the box lesion, ganglionated plexi ablation and right cavotricuspid isthmus ablation). After a written informed consent was obtained, a surgical

thoracoscopic video-controlled ablation was performed as described previously [5,6].

In brief, after general anesthesia induction, and with selective lung ventilation, the right chest was entered with three thoracoscopic working ports. The pericardium was opened and the transverse and oblique sinuses were dissected. A COBRA Fusion™ 150 (Estech, Atricure, Inc., West Chester, Ohio, USA) catheter was then placed into the transverse sinus, behind the left atrial appendage and into the oblique sinus, encircling the four pulmonary veins (PV). The epicardial fat pad in the atrial septum and in the atrial groove was dissected and a box lesion was created using both a unipolar and bipolar ablation (three cycles of 60 s radiofrequency energy application).

As a second part of the hybrid procedure, an EP study was scheduled until 3 months following surgical ablation. The ECG of the patient before EF study is shown on Fig. 1.

Using the left femoral vein, a 10-polar catheter was inserted into the coronary sinus (CS) and intracardiac echocardiography (ICE) probe was inserted into the right atrium (RA). In the RA, a tachycardia of cycle length of 226 ms, and the activation sequence on the CS catheter was proximal-distal. Therefore, from the right femoral vein, two SL1 sheaths (8 and 8.5 F) were inserted into the RA, and activation mapping of the RA was carried out using a 3.5 mm mapping catheter

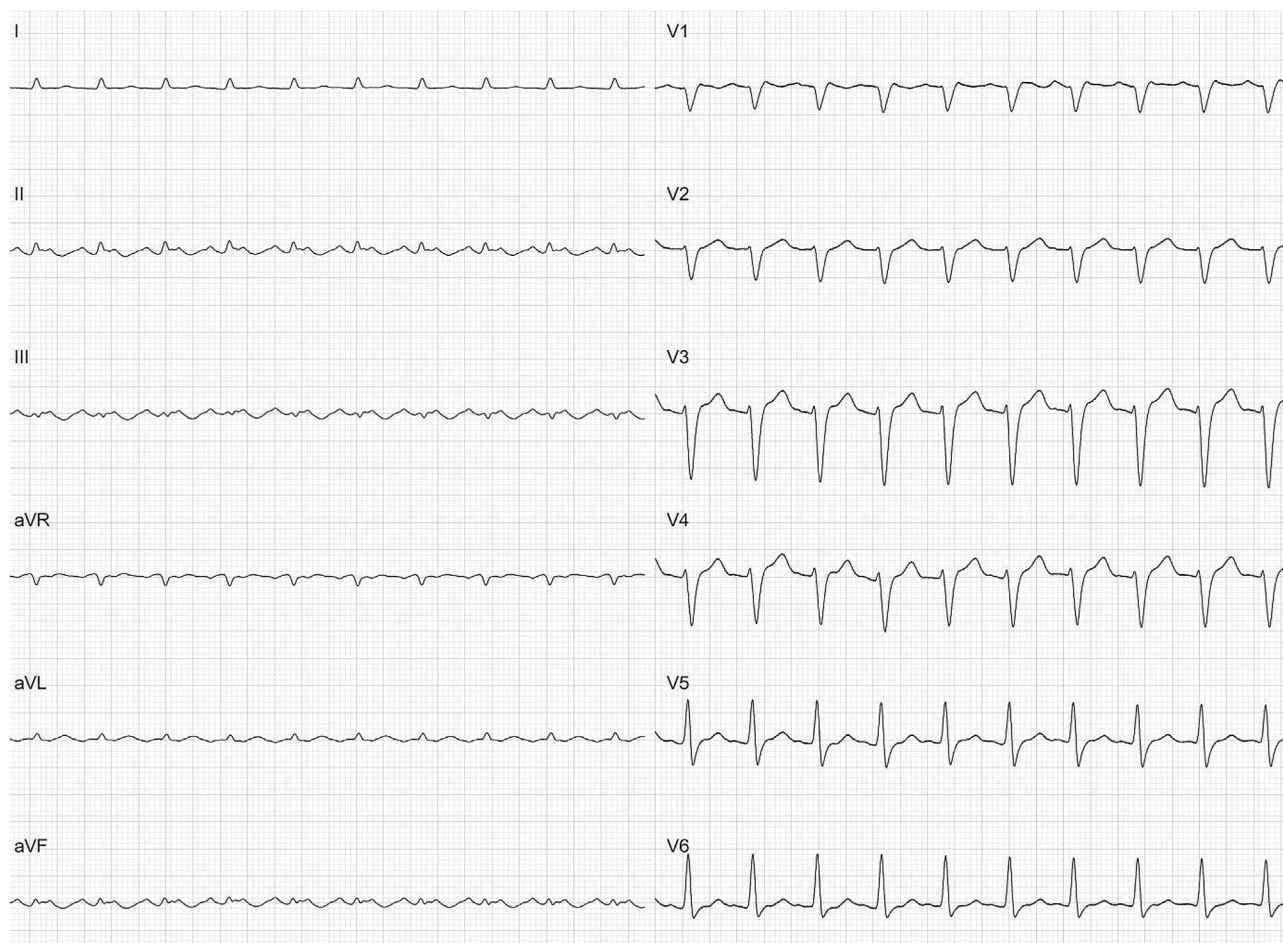


Fig. 1 – Twelve leads ECG of the patients before the EP study.

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