Catheter ablation of a right lateral accessory pathway using ibutilide: a case report

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SOUHRN

Úvod: Katetrizační ablace akcesorní dráhy může být u pacientů s recidivujícími epizodami fibrilace síní náročná. Použití antiarytmik může významně interferovat s fungováním akcesorní dráhy, což znemožní mapování pomocí katétru.
Metody: V této kazuistice je popsána aplikace ibutilidu v prevenci fibrilace síní během mapování a ablace pravé laterální akcesorní dráhy pomocí endokardiálního katétru u mladého pacienta, aniž by došlo k významné interferenci s fungováním akcesorní dráhy.
Závěr: Úspěšné mapování a ablace pravé laterální akcesorní dráhy pomocí katétru s aplikací ibutilidu u mladého pacienta s epizodami fibrilace síní.

ABSTRACT

Introduction: Catheter ablation of an accessory pathway can be challenging in patients with recurrent episodes of atrial fibrillation. The use of antiarrhythmics can significantly interfere with the accessory pathway, making its catheter mapping impossible.
Methods: This case report describes the use of ibutilide to prevent atrial fibrillation during endocardial catheter mapping and ablation of a right lateral accessory pathway in a young patient without significantly interfering on accessory pathway.
Conclusion: Successful catheter mapping and ablation of a right accessory pathway in a young patient with episodes of atrial fibrillation using ibutilide.

Introduction

Radiofrequency (RF) ablation is a safe and effective therapy for the treatment of recurrent atrio-ventricular tachycardia (AVRT).[1] In these cases, RF is delivered on the annulus of tricuspid and mitral rings aiming to eliminate accessory pathways (AP), which can be in almost any site along the valvular rings. The most common causes of failed AP ablations are inability to access the target site (25%), catheter instability (23%), mapping errors because of oblique AP orientation (11%), epicardial AP (8%) and recurrent atrial fibrillation (AF) (3%).[2] The occurrence of AF and flutter can preclude mapping and require cardioversion. Antiarrhythmic drugs can alter conduction on the accessory pathway and the electrical cardioversion cannot be performed too often. In a young patient with a symptomatic ventricular preexcitation, after an unsuccessful ablation attempt, the RF was performed using small doses of ibutilide (0.1 mg to maximum of 1–2 mg). Indeed, this antiarrhythmic drug may prevent atrial arrythmias without altering significantly AP conduction and refractoriness maintaining ventricular pre-excitation (delta wave).[3,4]

Case report

An 18-year-old male patient of Ivorian origin, without structural heart disease, history of palpitations, was refe-

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rred to our hospital for an electrophysiological (EP) study. His resting surface electrocardiogram (ECG) suggested a right lateral accessory pathway with a PR interval of 87 ms and a QRS duration of 172 ms (**Fig. 1**). In November 2023, the patient signed an informed consent form for an electrophysiological study (EPS) and catheter ablation (CA). Antiarrhythmic medications, including flecainide and beta blockers, were discontinued for three days before the intervention. Electroanatomic mapping (EAM) was adopted to avoid the use of ionizing radiation by preferring the zero-X-ray procedure and to allow a more precise localization of the accessory pathway. The EAM was performed using the EnSite NavX mapping system (Abbott, St. Paul, MN, USA). After establishing femoral vascular access, a steerable decapolar catheter (Inquiry, Abbott) was positioned in the coronary sinus, while a quadripolar non-steerable catheter (Supreme, Abbott) was placed in the right ventricle. An irrigated ablation catheter was then positioned near the tricuspid annulus. During catheter placement, orthodromic atrioventricular reentrant tachycardia was observed, with a tachycardia cycle length of 380 ms (**Fig. 2**). During mapping, the earliest ventricular activity was recorded at the lateral tricuspid annulus. However, several sustained episodes of atrial fibrillation (AF) occurred, necessitating electrical cardioversion (EC). The electroanatomic mapping of the tricuspid annulus was difficult due to the numerous AF episodes which required intravenous flecainide. After resolution of the arrhythmic episodes, the ventricular preexcitation disappeared, making it impossible to continue mapping the accessory pathway, leading to the decision to abort the procedure.

In June 2024, a second attempt was made. As before, during mapping of the tricuspid annulus, several AF episodes recurred. Intravenous ibutilide was administered (up to 1 mg), which converted AF to atrial flutter, and eventually sinus rhythm. This status allowed us to induce and maintain the atrioventricular reentrant tachycardia (AVRT), allowing us to map the tricuspid annulus and identification of the area of greatest V-A fusion near the lateral wall. Due to poor contact and stability of the ablation catheter, we utilized a deflectable introducer (Agilis, Abbott). In this region, radiofrequency (RF) energy was applied (35 W, 43 °C) using a 3.5-mm irrigated tip ablation catheter (Tacticath Contact Force, Abbott), resulting in permanent loss of preexcitation without any complications (**Fig. 3**). The procedure was terminated after 30 minutes, with no recovery of accessory pathway (AP) conduction observed during testing with atrial and ventricular pacing, as well as adenosine infusion.

Discussion

During electrophysiological studies to locate the accessory pathway, episodes of AF or AFL may occur, potentially prolonging the procedure or hindering accurate mapping if these arrhythmias are frequent or prolonged. These arrhythmias can be managed with electrical or pharmacological cardioversion. Electrical cardioversi-

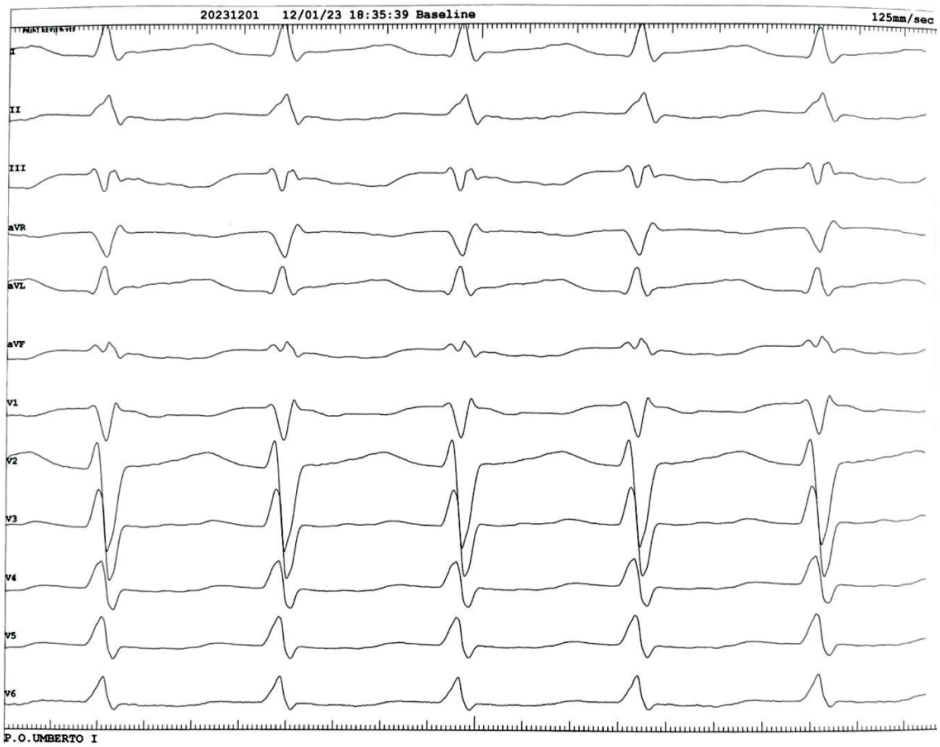

Fig. 1 – Surface EKG showed a sinus rhythm with a short PR interval, evidence of full ventricular preexcitation with left bundle branch block (LBBB) morphology suggestive of a right lateral accessory pathway.

Fig. 2 – Atrioventricular reentrant tachycardia (AVRT) and then the continuation of the mapping of the tricuspid annulus, identifying the area of the greatest V-A fusion near the lateral wall.

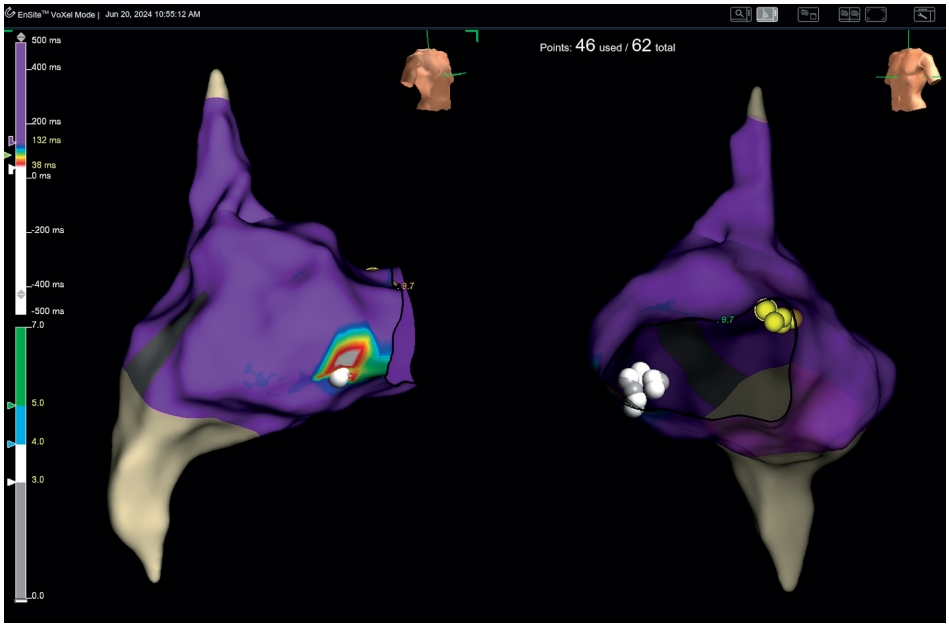

Fig. 3 – In lateral tricuspid annulus RF energy was applied (35 W, 43 °C) with a 3.5-mm irrigated tip ablation catheter (Tacticath Contact Force, Abbott) led to permanent loss of pre-excitation.

on is preferred for hemodynamically unstable patients, while pharmacological cardioversion can be considered for stable patients, though it is generally less effective. In patients with AF and an accessory pathway, drugs like procainamide, propafenone, or flecainide may be used, but they can interfere with accessory pathway conduction, causing loss of the pre-excitation (delta wave). Ibutilide, however, is recommended by the 2019 ESC Guidelines for supraventricular tachycardia, as it resolves arrhythmias without affecting accessory pathway conduction, preventing hypotension and allowing the procedure to proceed.[6] In our case, flecainide in the first attempt led to loss of conduction along the accessory pathway, halting the procedure. In the second attempt, considering the results of Glatter et al.,[3] ibutilide successfully resolved AF/AFL episodes, preserved conduc-

tion along the accessory pathway, and allowed accurate mapping and ablation of the pathway.

Conclusion

We presented the case of a young patient with a right-sided accessory pathway that was nearly impossible to map due to frequent episodes of atrial fibrillation. After the infusion of ibutilide, which helped maintain sinus rhythm without significantly affecting the conduction and refractoriness of the accessory pathway, the procedure became more manageable. This allowed for successful mapping and effective ablation of the pathway. One month later, the patient has not experienced any arrhythmic recurrences.

Conflict of interest
None.

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Informed consent
Written informed consent was obtained from the patient for the anonymous publication of the case details.

Credit authorship contribution statement
MD: Data curation, conceptualization, writing – original draft.
MLP: Data curation, methodology, conceptualization.
RB: Data curation, methodology, conceptualization.
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MB: Writing – review & editing.
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