



Rapid communication

Atriofascicular pathway detection with novel ablation catheter

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ABSTRACT

Atriofascicular pathways are a rare cause of antidromic atrioventricular reciprocating tachycardia. The IntellaTip MiFi ablation catheter (Boston Scientific, MA, USA) is a novel ablation catheter that allows enhanced signal clarity with highly localized electrograms. This is the first report of this catheter being successfully used to map and ablate the atriofascicular pathway potentials.

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1. Case report

A fit and healthy 25-year-old male presented with palpitations from a regular broad complex tachycardia (BCT) of left bundle branch block (LBBB)-like morphology, 330-ms cycle length, and no discernible 'p' waves. Intravenous adenosine terminated the BCT, resting electrocardiogram (ECG) was not pre-excited, and echocardiogram was normal.

During the electrophysiologic study, retrograde conduction was central and decremental. Atrial pacing at 400 ms:280 ms reproducibly induced the clinical BCT. Fig. 1A shows that conduction switched from nodal (narrow QRS complexes with distinct His potential—solid blue arrow) to the atriofascicular pathway (LBBB-like complexes and interpolation of the His potential—dotted blue arrow) during Wenckebach-pacing maneuver.

Fig. 1B shows that the IntellaTip MiFi ablation catheter was used to map the atriofascicular pathway potential in sinus rhythm. The 8-mm tip ablation catheter has three radially positioned, equally spaced mini-electrodes, 2 mm from the tip. Bipolar recordings were made between these mini-electrodes: m1–2, m2–3, and m3–1. This enabled precise signal localization and clearer identification of the pathway potential than the conventional ablation distal bipolar recording (blue dotted box, Fig. 1B). The gains on the catheter mini-electrodes were 5000-fold greater, and those in the conventional distal pole of the ablation catheter

were 10,000-fold greater. The pathway potential was located at the 7-o'clock position on the tricuspid annulus. Radiofrequency ablation (RFA) at this site (60 °C, 70 W, and 120 s) resulted in no pathway conduction and non-inducible BCT.

2. Discussion

Atriofascicular pathways consist of fibers arising from the right atrial free wall and insert at or adjacent to the distal right bundle. They usually only conduct in an anterograde manner, participating in the anterograde limb of an antidromic atrioventricular reciprocating tachycardia (AVRT) with LBBB-like morphology and decremental properties [1]. Standard therapy involves targeted RFA around the tricuspid annulus as guided by pathway potentials also known as Mahaim (M) potentials [2,3]. These M potentials can be as large as the His deflection or can be small and narrow with a low amplitude [4]. Furthermore, unintentional mechanical trauma by catheter manipulation can result in transient abolition of these potentials from a few minutes to a few hours [1,5]. These M potentials are also recorded only in close proximity to the atrial insertion site, and thus, accurate localization and ablation at this site result in successful abolition of this pathway [5–7]. Hence, ablation of these atriofascicular pathways can be challenging.

The IntellaTip Mifi catheter has been shown to delineate local electrograms better in the isthmus than the conventional bipolar electrode during atrial flutter ablation. The signal amplitude in the mini-electrodes has been noted to be higher than that of the

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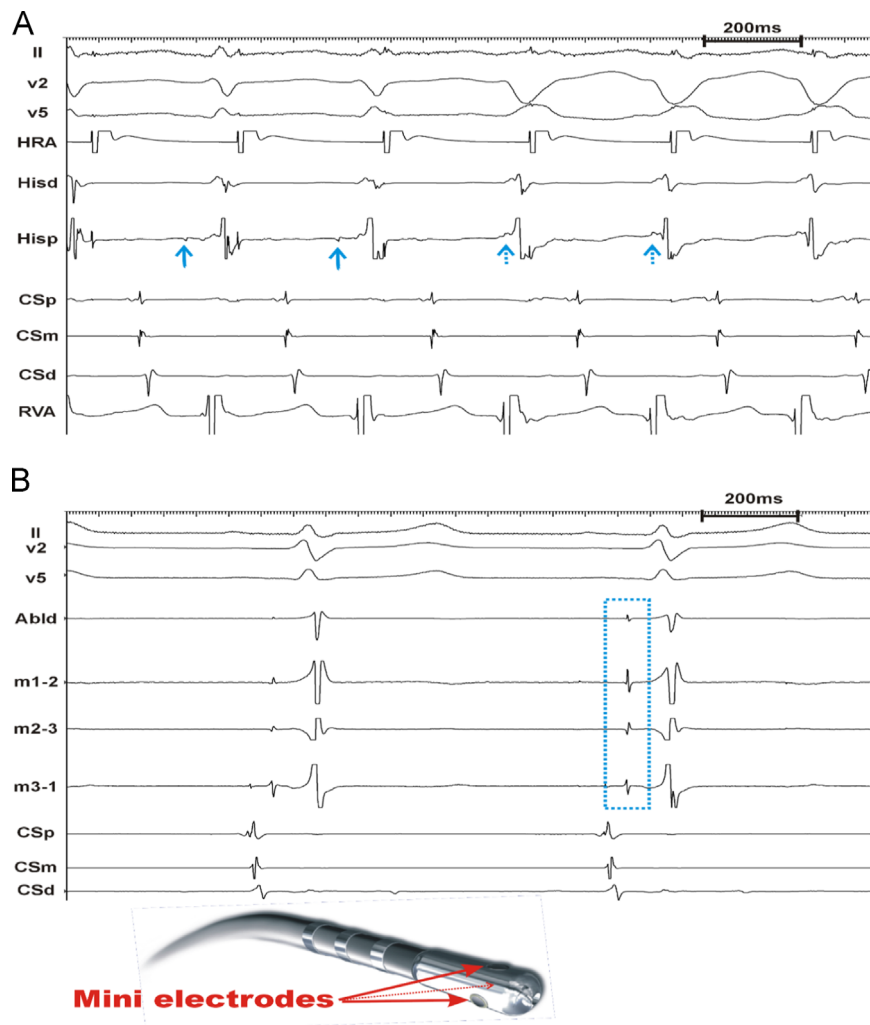


Fig. 1. Panel A demonstrates Wenckebach pacing when antegrade conduction switches from AV node to the atriofascicular pathway. Panel B compares the pathway potentials between conventional distal pole of the ablation catheter and the microelectrodes of the IntellaTip Mifi catheter along with an illustration of the mini-electrodes on the tip of the IntellaTip Mifi catheter. HRA- High Right Atrium, Hisd- His distal, Hisp- His proximal, CSp- Coronary Sinus proximal, Csm- Coronary Sinus middle, CSd- Coronary Sinus distal, RVA- Right Ventricular Apex, AblD- ablation distal, m1-2(m2-3,m3-1)- mini electrodes1-2.

conventional bipolar catheter. This has enabled better mapping and assessment of RFA efficacy [8–10].

We used the same principle in this case to make use of the special characteristics of the novel ablation catheter to localize the atrial insertion point accurately. Furthermore, the M potentials, as recorded from the distal mini-electrodes, were clearer and of higher amplitude compared with those recorded using the conventional distal pole of the ablation catheter. We did not compare this with a standard ablation catheter in the same patient to keep the costs of the procedure within reasonable limits and to avoid causing unintentional mechanical trauma to the atrial insertion site.

Conflict of interest

All authors declare no conflict of interest related to this study.

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