Case Report

Ablation of an atriofascicular accessory pathway with a zero-fluoroscopy procedure

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A 16-year-old patient with recurrent palpitations and documented left bundle branch block superior axis wide complex tachycardia underwent an electrophysiological study and ablation with a zero-fluoroscopy procedure. The electrophysiological study showed a decremental antegrade conducting atriofascicular pathway. Three-dimensional CARTO-guided mapping of the tricuspid annulus in sinus rhythm was performed, and a distinct signal corresponding to the accessory pathway potential of the atriofascicular pathway was found in the posterolateral region. By using an SR0 sheath and a 4-mm-tip catheter, radiofrequency application was delivered at this point on the annulus and successfully eliminated conduction through the accessory pathway.

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1. Case report

A 16-year-old girl with palpitations was admitted to the emergency department. Electrocardiography (ECG) revealed a wide complex tachycardia at a heart rate of 210 bpm and a left bundle branch block (LBBB) morphology with a superior axis. Adenosine was administered intravenously, interrupting the arrhythmia. Her prior medical history was silent negative, except for recurring palpitations. Baseline ECG revealed sinus rhythm with normal PR interval and no evidence of preexcitation. Cardiac ultrasonography revealed normal cardiac anatomy and function. The patient was admitted for an electrophysiological (EP) study and ablation. Considering her young age, a CARTO-guided procedure without fluoroscopy was planned. Nevertheless, a fluoroscopy was available in case required. The baseline measurements were normal, notably with an atrial His conduction time of 82 msec and a His-ventricular conduction time (HV) of 52 msec. Retrograde conduction was concentric and decremental. With incremental atrial pacing, progressive HV interval shortening and QRS widening with a LBBB and superior axis were observed. Notably, once the QRS was fully preexcited, increasing the atrial pacing rate resulted in further AV interval prolongation while the VH (retrograde activation of His) was unchanged (Fig. 1). Preexcitation when pacing was greater from the right atrium than from the coronary sinus (at the same cycle duration), suggesting a right-sided accessory pathway. Atrial extrastimuli easily induced a LBBB morphology in wide complex tachycardia with a 360-msec cycle duration (Fig. 2). The tachycardia was reset by pacing from the right atrium. These findings were suggestive of a decremental atriofascicular pathway. CARTO-guided mapping of the right atrioventricular groove in sinus rhythm was performed, and a distinct signal corresponding to an accessory pathway potential of the atriofascicular pathway was found in the posterolateral region (Fig. 3). By using an SR0 sheath and a 4-mm-tip ablation catheter, radiofrequency energy was delivered, with successful elimination of conduction through the accessory pathway. Radiofrequency application was performed for 60 s at 30 W and a target temperature of 55 °C. After ablation, the EP study was repeated, which showed no evidence of atriofascicular accessory pathway conduction. The AV and VA conduction was concentric and decremental. An AV block was demonstrated with adenosine administration during atrial pacing.

2. Discussion

Wellens [1] reported an association between accessory pathways characterized by anterograde decremental conduction and the description of nodoventricular connections by Mahaim [2].
Consequently, these accessory pathways were erroneously referred to as “Mahaim pathways.” McClelland et al. [3] clarified that decremental conducting pathways responsible for antidromic tachycardia with LBBB and superior axis are atriofascicular accessory pathways that connect the right atrium with the right fascicle. McClelland et al. [3] reported that a high-frequency accessory potential can be detected at the tricuspid ring and can be mapped along the accessory pathway to the connection with the right fascicle. Currently, this potential still provides the best ablation target to eliminate these pathways.

The present case integrates a traditional electrophysiological approach to the treatment of this unique accessory pathway with three-dimensional (3-D) mapping to perform a zero-fluoroscopy procedure. The anatomical location of the accessory pathway potential was clearly located through CARTO mapping. Several reports have shown the feasibility and safety of 3-D-system-guided procedures for reducing radiation exposure from electrophysiological procedure in young patients [4,5]. Radiation exposure bears particular importance in younger individuals because of their greater vulnerability to radiation effects and longer life.

Fig. 1. Decremental pacing from the atrium showing prolongation of AV interval and fixed VH interval while pacing at 550 (A) and 400 msec (B).

Fig. 2. Initiation of reentrant antidromic tachycardia with programmed stimulation from the proximal coronary sinus.
expectancy [5]. In our opinion, a zero-fluoroscopy 3-D guided approach should be considered in electrophysiological procedures in children and younger adults. To maintain safety and efficacy, intracavitary electrograms should be carefully interpreted and monitored during a non-fluoroscopic procedure than during a conventional fluoroscopic approach. This case represents a good integration of traditional electrophysiological study methods and a 3-D guided technique for catheter ablation of an accessory pathway.

**Conflict of interest**

None.

**References**


