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Cite this article: Kurath-Koller S, Sallmon H, and Scherr D (2024) Ventricular insertion site ablation of a Mahaim atriofascicular fibre in Ebstein anomaly. *Cardiology in the Young* **34**: 1350–1351. doi: 10.1017/S1047951124025083

Received: 30 August 2023
Revised: 27 November 2023
Accepted: 9 April 2024
First published online: 7 May 2024

Keywords:
ablation; Wolff-Parkinson-White syndrome; Ebstein anomaly

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Ventricular insertion site ablation of a Mahaim atriofascicular fibre in Ebstein anomaly

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Abstract

Ebstein anomaly is frequently associated with accessory pathways, including Mahaim atriofascicular fibres. We herein illustrate successful Mahaim fibre ablation in Ebstein anomaly by targeting the ventricular insertion site below the tricuspid ridge.

Case report

Ebstein anomaly is frequently associated with the presence of accessory pathways.[1] A 22-year-old male with Ebstein anomaly presented due to palpitations. Electrocardiographic examination revealed manifest pre-excitation with clearly visible delta waves, consistent with a right antero-lateral accessory pathway.

Electrophysiology study confirmed the presence of a Mahaim-type accessory pathway with decremental antegrade conduction properties without inducible tachycardia. Prolonged spontaneous atrioventricular conduction led to this uncommonly manifest pre-excitation pattern in a Mahaim pathway. Three-dimensional electroanatomical mapping (CARTO, Biosense Webster) of the accessory pathway was performed along the right (antero-)lateral atrium/tricuspid annulus in pre-excited sinus rhythm only. Optimal potentials were observed at the lateral atrioventricular groove (Fig. 1a,b).

Despite excellent atrioventricular fusion and a sharp "His-like" Mahaim-fiber potential, multiple ablation attempts with good contact force along the lateral tricuspid annulus failed to completely block the accessory pathway. Due to insufficient catheter-tip stability during ablation, we changed our approach. By deflecting the ablation catheter and the steerable sheath, we targeted the ventricular insertion site underneath the tricuspid ring (Fig. 1b,c). Successful radiofrequency ablation was achieved underneath this spot by targeting the Mahaim-fiber potential, resulting in restoration of normal atrioventricular nodal conduction (Fig. 1d).

For successful Mahaim-type fibre ablation in Ebstein anomaly, targeting the ventricular insertion site by hooking the catheter tip underneath the tricuspid ring may be crucial and requires the use of a steerable sheath.[2] This report emphasises the importance of recognising atypical accessory pathways in patients with congenital cardiac anomalies and the significance of tailored ablation strategies for optimal outcomes.

References

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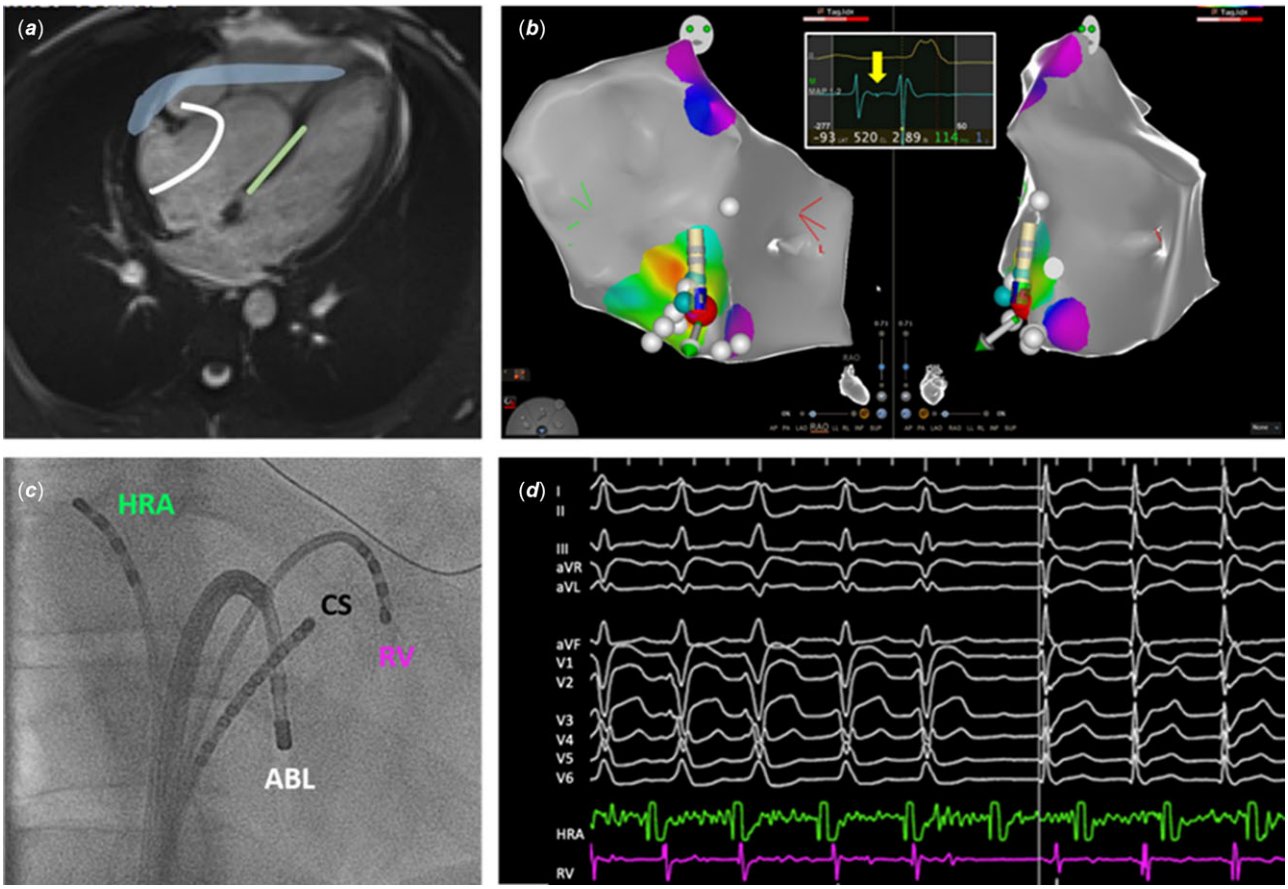

Figure 1. Ventricular insertion site ablation of a Mahaim atriofascicular fibre in Ebstein anomaly. ***a***. MRI depicting Ebstein morphology with displacement of the tricuspid valve and atrialized ventricular area. White line – ablation catheter position; white shadowed area – suspected accessory pathway; green line – septal tricuspid valve annular displacement distance. ***b***. Three-dimensional electroanatomical map. Yellow arrow – Mahaim potential on electrogram. White dots – Mahaim potential locations; cyan dots – Mahaim potential locations; pink dot – best Mahaim potential locations; and red dot – final ablation point resulting in persistent block within 8 s (35W, 47°C). ***c***. Fluoroscopic right anterior oblique view depicting catheter positions with ablation catheter at final ablation spot. ABL = ablation catheter (Thermocool Smarttouch, J&J Med Tech, 8.5F); CS = coronary sinus catheter (deflectable decapolar, 6F); HRA = high right atrial catheter (fixed-shape quadripolar, 6F); RV = right ventricular apical catheter (fixed-shape quadripolar, 6F). ***d***. 12-lead electrocardiogram strip during ablation showing block of accessory pathway conduction (vertical line) resulting in atrioventricular nodal conduction only. HRA = high right atrial catheter; RV = right ventricular apical catheter.

https://doi.org/10.1017/S1047951124025083 Published online by Cambridge University Press