EP CASE REPORT

His bundle pacing in Ebstein's anomaly

Louise Segan*, Mark Perrin, Jessica Thomas, and Daryl Ridley

Department of Cardiology, Barwon Health, Ryrie Street, Geelong VIC 3220, Australia

* Corresponding author. Tel: +613 4215 0000; fax: +613 4215 1990. *E-mail address:* louise.segan@barwonhealth.org.au

Introduction

Ebstein's anomaly is characterized by inferior displacement of the tricuspid valve, creating a portion of 'atrialized' right ventricle and progressive right heart enlargement. Atrial arrhythmias are common; however, permanent pacing is infrequently required.[1,2] This is the first documented case demonstrating feasibility of His bundle pacing in Ebstein's anomaly.

Clinical case

A 41-year-old male had recurrent, difficult-to-control paroxysmal atrial flutter in the context of Ebstein's anomaly and previous surgical Wolff–Parkinson–White ablation during childhood. Despite two catheter ablation attempts and multiple cardioversions, he had ongoing symptomatic episodes of atrial flutter resulting in frequent hospital presentations.

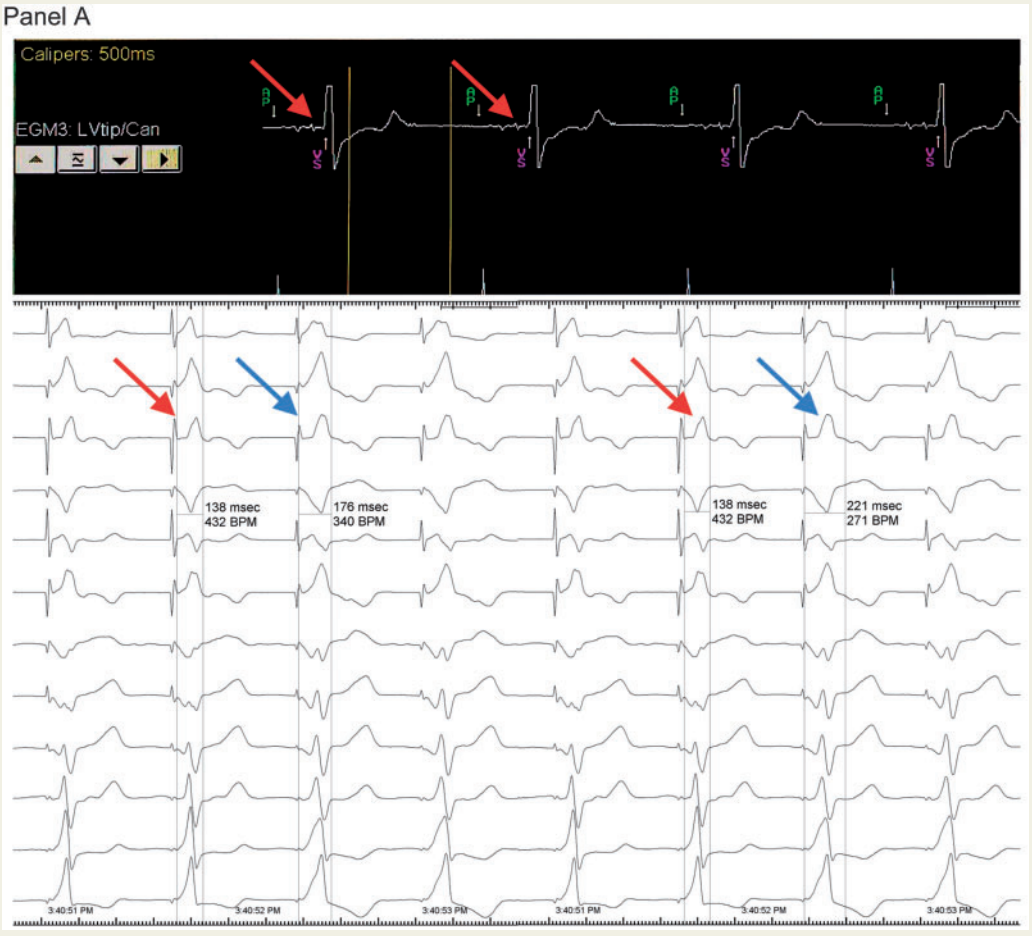

Figure 1 Panel *A*, top image: programmer interrogation demonstrating his spike (red arrow); bottom image: electrogram (EGM) demonstrating non-selective His to RV septal capture (bottom left; His capture-red arrow; RV septal capture-blue arrow) with significant change in ventriculoatrial conduction from His bundle to RV pacing (bottom right arrows, respectively).

Echocardiography demonstrated severe right atrial (RA) enlargement (RA area 38 cm^2), right ventricular (RV) dilatation with associated RV dysfunction and severe tricuspid regurgitation. The left ventricular (LV) function was preserved. A decision was made to offer permanent pacemaker implantation and staged atrioventricular (AV) node ablation as a definitive treatment strategy. Venous access was obtained

via the left subclavian vein (7-Fr sheath). Three leads were inserted via the left subclavian vein: His lead (Medtronic 3830 SelectSecure MRI SureScan 69 cm) implanted into the atrialized His bundle, RA lead (Medtronic 5076 CapSureFix Novus MRI SureScan 52 cm) implanted into the RA appendage, and a backup RV lead (Medtronic 5076 CapSureFix Novus MRI SureScan 58 cm) into the RV outflow tract. Non-selective His capture with presumed recruitment of both left and right bundles, evidenced by significant reduction in QRS duration compared to RV pacing (138 ms vs. 176 ms) was demonstrated with good outputs (threshold 1.0 mV, impedance 361 Ω) with RV pacing below 1.0 mV [*Figure 1*: top: H–V interval 58 ms, His spike (red arrow); bottom left: His (red arrow) to RV septal capture (blue arrow)] and a significant change in ventriculoatrial conduction (*Figure 1*, bottom right; His (red arrow): 138 ms vs. RV septal (blue arrow): 221 ms). A Percepta Cardiac Resynchronisation Therapy Pacemaker transvenous pacing system (Medtronic) was utilized (His lead in LV port, RV lead in RV port, and RA lead in RA port). Atrioventricular node ablation was planned for 8 weeks post-permanent pacemaker implantation. The patient had uninterrupted anticoagulation throughout the peri-procedural period.

Conclusion

His bundle pacing is a feasible pacing strategy in young patients with Ebstein's anomaly and refractory atrial arrhythmias requiring long-term pacing with the potential benefit of maintaining biventricular synchrony and preserving LV function.

Supplementary material is available at *Europace* online.

Conflict of interest: none declared.

References

1. Chapman M, McMinn J, James SA, Turley AJ. Endocardial left ventricular pacing and AV node ablation in a patient with Ebstein's anomaly and mechanical tricuspid valve replacement with an inaccessible coronary sinus. *Europace* 2018;**20**:iv57.
2. Allen MR, Hayes DL, Warnes CA, Danielson GK. Permanent pacing in Ebstein's anomaly. *Pacing Clin Electrophysiol* 1997;**20**:1243–6.