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Combination of Hansen Robotic system with cryocatheter in a challenging parahisian accessory pathway ablation

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ABSTRACT

A perceived distinctive feature of cryoablation is the stability (cryoadherence) of the catheter tip during cold temperatures at the desired location, even during tachycardia. We report the case report of a young patient with a parahisian accessory pathway where stability of the ablation catheter was not achieved despite using the cryocatheter with a steerable sheath. Ultimately, stability at the desired location was achieved robotically by means of Hansen system (Hansen Medical, Mountain View, CA, USA).

Case report

A 34-year old male with a lifelong history of palpitations was referred for ablation of supraventricular tachycardia. He had already undergone three prior ablation attempts of a parahisian concealed accessory pathway (AP).

A diagnostic electrophysiological study was then performed using standard catheters. Orthodromic atrioventricular reentry tachycardia was easily initiated during the study with simple catheter-induced beats. Para-Hisian pacing showed fixed VA intervals with and without His-bundle capture, confirming the presence of a septal pathway. A 4 mm deflectable radiofrequency ablation catheter was used initially to map the earliest atrial activation during tachycardia (anteroseptally in the right atrium, slightly lateral to the His bundle at about 1 o'clock in the tricuspid annulus in left anterior oblique view) (Fig. 1A–B). Arterial access was obtained for retrograde mapping of the non-coronary cusp, which demonstrated activations without remarkable precocity. Due to the proximity of the AP insertion site to the His bundle, as well as the catheter instability during the incessant tachycardia, a cryoablation catheter was positioned and stabilized along the tricuspid annulus with an 8 Fr guide sheath (SRO™, St. Jude Medical, St. Paul, Minnesota). Nonetheless, evident catheter motion was still present with the consequent atrial signal variability in the ablation catheter (Fig. 1C). Subsequently, we opted for Sensei robotic system guidance (Hansen Medical, Mountain View, CA, USA). The guide sheath was replaced by the Artisan sheath. Next, after confirming a satisfactory precocity (24 ms before the proximal coronary sinus bipole as a timing reference) and sheltered stability

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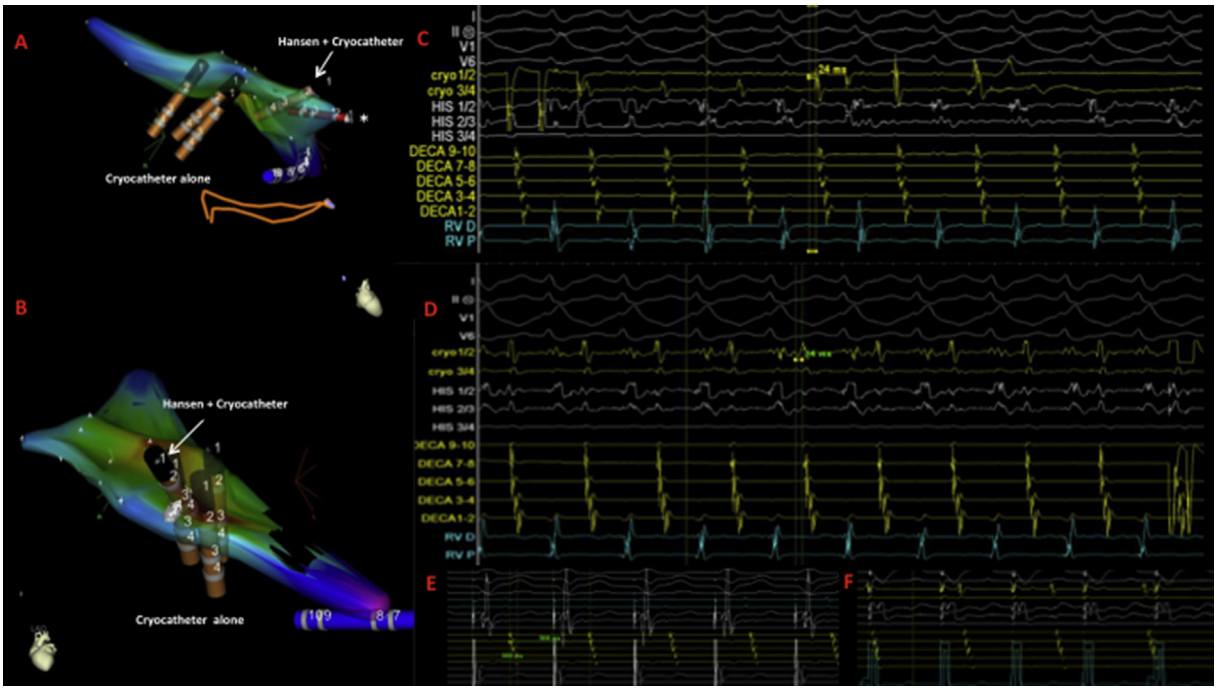

Fig. 1 – A–B. Respectively, right and left anterior oblique views of the activation map of the parahisian region (His catheter is labelled with an asterisk). Ablation catheter (labelled as cryocatheter alone) instability is apparent as compared to the use of the cryocatheter plus robotic assistance (labelled as Hansen + Cryocatheter). C. Surface ECGs and intracardiac signals (cryocatheter, His, decapolar in the coronary sinus and right ventricular catheter respectively). High variability in the cryocatheter amplitude is seen during incessant tachycardia. D. Cryocatheter signal stability is enhanced with the introduction of robotic assistance. E. Ventriculoatrial conduction pre ablation. F. Ventriculoatrial dissociation post-ablation.

(Fig. 1D), cryo-application was initiated with the Freezor® Xtra. Abolition of AP conduction was achieved rapidly (within the first 10 s). Despite close proximity to the His bundle, anterograde conduction was observed to be stable along the His catheter throughout a single 4-min consolidation freeze. Following delivery of the lesion and subsequent thawing, ventricular pacing was performed, documenting VA dissociation, absence of PR prolongation and arrhythmia non-inducibility (Fig. 1E pre, F post ablation). The patient has been symptom-free for 6 month since the ablation.

The Hansen Robotic system is a flexible, purely robotic platform, combining 3D catheter control and with catheter stability. One of the advantages of this technology is that once the catheter reaches the intended site, the robotic system holds the catheter extremely stable [1]. In the present case, it was of help for the cryocatheter to achieve stability before the cryo-thermal application. Furthermore, even in cryoablation, dislocation of the catheter is possible during the beginning of the freezing cycle [2], which could be potentially avoided by the robotic system. Moreover, the close proximity of the accessory pathway to the His bundle would have rendered RF ablation during tachycardia unacceptably risky.

This is the first case reporting the combination of the Hansen Robotic system in addition to the cryocatheter for parahisian AP ablation. Despite the inter-center variability in catheterization techniques and ablation strategies, the utilized combination could yield a high overall success rate and decrease the incidence of procedural complications. Hence, it is our conviction that this possibility could be taken into account in situations where stability cannot be achieved with the utilization of a cryocatheter and long sheaths.

Conflict of interest

None to declare.

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