Cryoablation for the Para-Hisian accessory pathway: Early Indian experience

Sir,

Ablating Para-Hisian accessory pathways in an effective way that prevents conduction system damage continues to be a challenge for electrophysiologists.[1] The rates of inadvertent atrioventricular (AV) block with radiofrequency (RF) ablation of antero-and mid-septal pathways may be as high as 10% in pediatric patients.[2] A variety of alternative techniques[3] have thus been suggested, notably an approach at the noncoronary cusp or through the superior vena cava, and the utilization of cryothermal energy.[4] Per the intrinsic properties of cryothermal energy, there is a longer latency to permanent lesion formation compared to RF energy conferring a margin of safety.[4] Furthermore, freeze-mediated tissue adherence helps to maintain good contact at the target site while preventing damage to surrounding structures.

An otherwise healthy 16-year-old girl with a structurally normal heart recently presented to our clinic with complaints of recurrent paroxysmal palpitations for the prior year. Her baseline electrocardiogram [Figure 1a] demonstrated manifest preexcitation with a delta-wave polarity negative in lead V1 and positive in leads I, II, III, and aVF with transition in leads V2–V3 consistent with a right anteroseptal accessory pathway.

On an electrophysiology study, nondecremental AV conduction was noted with an anterograde accessory pathway refractory period of 310 ms. Ventricular pacing demonstrated nondecremental retrograde conduction with the earliest atrial activation noted at the distal His electrodes. Initial mapping was performed with a 4-mm tip nonirrigated RF ablation catheter during atrial pacing. Earliest ventricular activation thus obtained localized to the 2 o'clock position on the tricuspid annulus just below the position of the His catheter [Figure 1b]. At this site, a large-amplitude (0.2 mV) His potential was recorded. An initial unsuccessful attempt at RF ablation was made with energy delivered just below the location of the His catheter, maintaining a safe distance from it.

It was thus decided to proceed with cryoablation using a 6-mm tip *Freezor Xtra* catheter (Medtronic, Inc.). Anterograde preexcitation was bumped during cryoablation catheter manipulation, at the site of earliest ventricular activation [Figure 1c]. The loss of preexcitation induced mechanically by catheter manipulation has been noted in patients with right antero-and mid-septal pathways secondary to their close subendocardial course. It is plausible that the bulkier cryoablation catheter is more prone to cause mechanical trauma.

Cryothermal energy was delivered at the site of bumping. Cryomapping was undertaken at a temperature of –20°C for 20 s while monitoring the PR interval, and the freeze was subsequently completed for a total duration of 240 s attaining a nadir temperature of –80°C. A consolidation freeze was attempted just above this first site, however, cryomapping here led to a 2:1 supra-Hisian AV block, and the freeze was stopped with the immediate recovery of AV conduction. The patient remains well on the 3-month follow-up, with no recurrence of preexcitation or tachycardia.

To the best of our knowledge, this is the first report of cryoablation of an accessory pathway from the Indian subcontinent. This case reiterates the feasibility and safety of cryoablation when tackling arrhythmia mechanisms close to the cardiac conduction system.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the legal guardian has given his consent for images and other clinical information to be reported in the journal. The guardian understands that names and initials will not be published and due efforts will be made to conceal patient identity, but anonymity cannot be guaranteed.

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Nil.

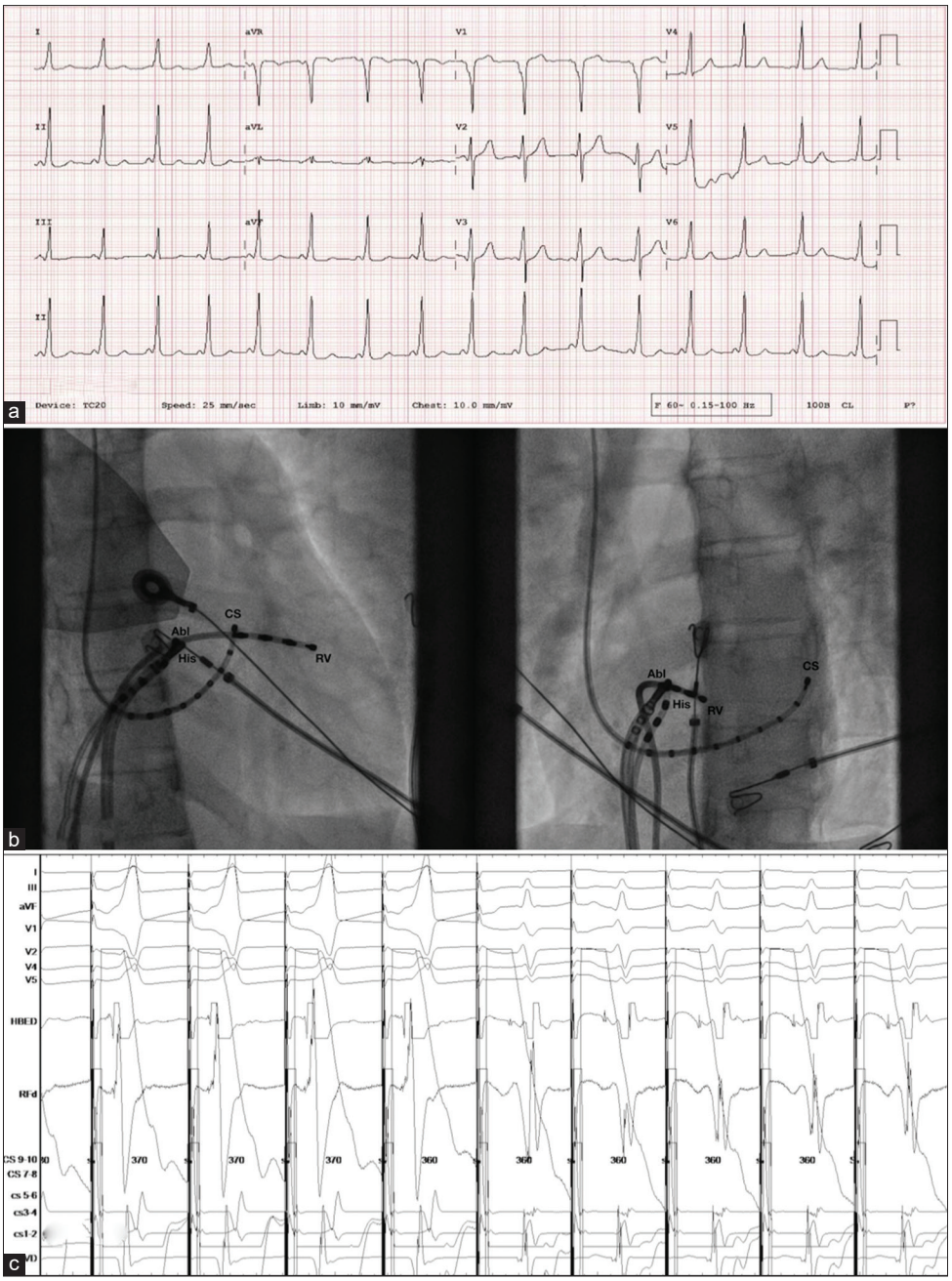

Figure 1: (a) Twelve-lead electrocardiogram in normal sinus rhythm with manifest preexcitation demonstrating negative delta waves in leads V1, positive delta waves in leads I, II, III, and augmented vector foot, and QRS transition in leads V3. (b) Fluoroscopy in 30° right anterior oblique and 40° left anterior oblique projections demonstrating the relative positions of the coronary sinus (CS) decapolar, right ventricular (RV) mid-septal quadripolar (RV), quadripolar His bundle (His) and the 4-mm tip nonirrigated ablation (Abl) catheter at the site of earliest ventricular signal. (c) Bumping of antegrade accessory pathway conduction during cryoablation catheter manipulation. Note is made of the presence of near field, comparable amplitude atrial and ventricular electrograms, early local ventricular activation (local ventricular signal simultaneously occurring with ventricular activation on the distal His catheter), and a sharp signal preceding ventricular activation on the distal Abl electrode likely a pathway potential (this potential is no longer observed once pathway conduction ceases in the fifth beat) (The tracings from top to bottom are surface electrocardiogram leads I, III, aVF, V1-V5, intra-cardiac electrograms from the His-bundle electrodes, the 6-mm tip *Freezor Xtra* catheter [RFd], CS electrodes from proximal to distal and the RV apex). CS: Coronary sinus, Abl: Ablation, RV: Right ventricular

Conflicts of interest

There are no conflicts of interest.

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