IMAGES IN CARDIOLOGY

Usefulness of Ventricular Extrasystole to Infer Unidirectional Cavotricuspid Isthmus Block after Atrial Flutter Ablation

Utilidad de una extrasístole ventricular para inferir bloqueo unidireccional del istmo cavo-tricuspideo en la ablación de aleteo auricular

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Typical atrial flutter includes cavotricuspid isthmus (CTI) as part of its reentrant circuit, and since this is the slow-conducting area, it is usually the target for radiofrequency ablation (RFA). Success rate for typical atrial flutter RFA is 95%, (1) with Class I (Level of Evidence I) when episodes are symptomatic and recurrent. Diagnosis of typical atrial flutter is obtained by recording the right-to-left (proximal to distal) coronary sinus activation and the type of rotation in the right atrium. CTI entrainment from the right atrium is confirmed with its participation in the circuit. The purpose of the RFA is to achieve the bidirectional block of the CTI. The methods to confirm the block include CTI stimulation on both sides (low lateral right atrium and coronary sinus ostium), change of the right atrial activation sequence, and morphology changes in atrial ECG at both sides of the CTI. The images presented here show how a ventricular extrasystole retrogradely leads to the atria before CTI ablation in sinus rhythm is initiated, activating them concentrically from the septal region towards the lateral walls of both atria. This is recorded with a 20-pole catheter that shows the proximal to distal coronary sinus activation (bipoles 9-10 to 1-2) and the activation of the CTI and the lateral right atrial wall (bipoles 11/12 to 17/18) (Figure 1). During the application of radiofrequency, another spontaneous extrasystole (a usual situation of no value during these procedures) allows inferring that conduction through the CTI has been modified; a change in the atrial activation sequence due to the extrasystole is observed. Figure 2 shows that depolarization of the coronary sinus remains unchanged (blue), since the left atrium is not included in the circuit, although an inverse rotation in the right atrium is observed (red), as the CTI block prevents depolarization of its lateral wall in a clockwise direction (bipoles 17-18 to 11-12). It is therefore confirmed that clockwise atrial flutter conduction has been blocked. It is corroborated by atrial stimulation from the coronary sinus ostium. Stimulation from the low lateral right atrium confirmed the bidirectional block of the CTI. It should be pointed out that this phenomenon is observed only when the retrograde conduction through AV node is preserved.

Conflicts of interest

None declared (See authors' conflicts of interest forms on the website/ Supplementary Material).

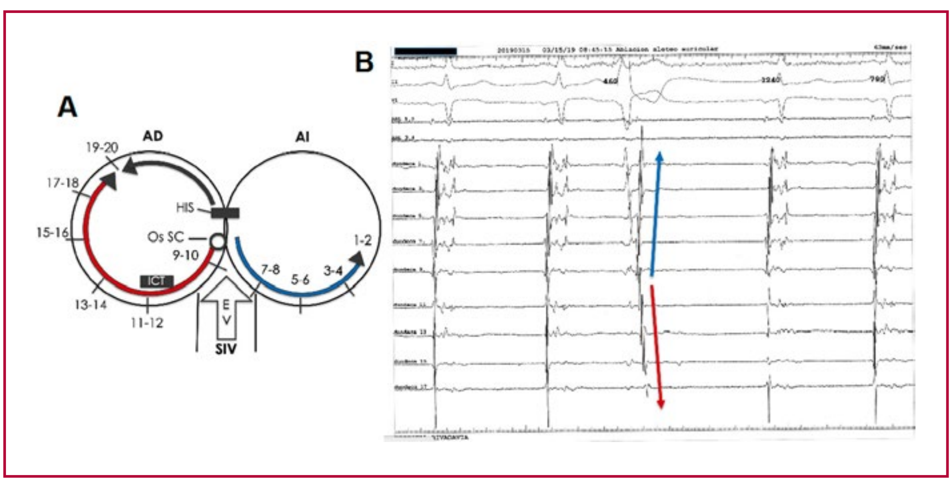

Fig. 1. During the sinus rhythm, a ventricular extrasystole (VE) concentrically activates the left atrium (blue) with clockwise rotation to the right atrium (red). A. Schematic diagram of the VE activating both atria. B. Sequence of depolarization of both atria due to VE. Three surface channels, 2 ablation catheter channels (ABL 1, 2 and 3, 4), and 9-channel duodecapolar catheter; distal to proximal CS (duodeca 1 to duodeca 9) and close to CS ostium to high lateral atrium (duodeca 11 to duodeca 17).

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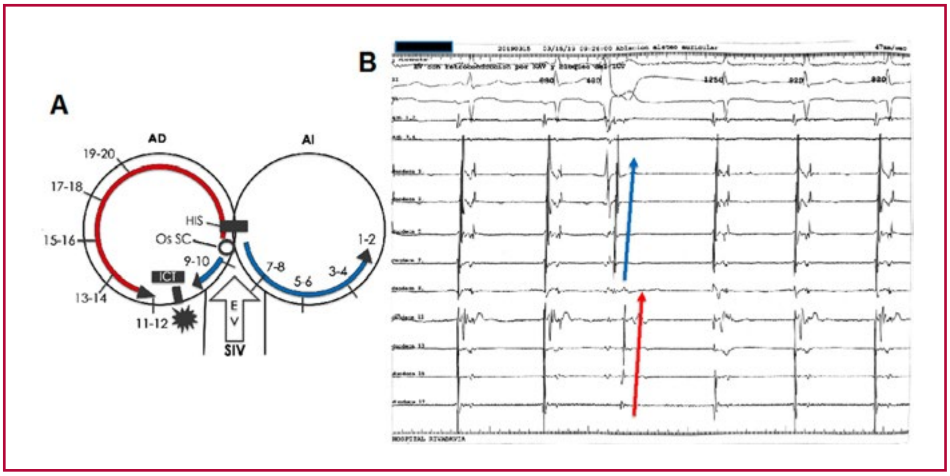

Fig. 1. During ablation, a ventricular extrasystole evidences the change in the right atrial activation. Clockwise rotation is interrupted and depolarized in the opposite direction (red) due to the cavotricuspid isthmus block. Activation of the left atrium remains unchanged (blue). A. Counterclockwise depolarization of the right atrium (RA) (red). B. Change of the RA activation sequence (blue).

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