Ultra-high density electroanatomic mapping of left atrial local macro-reentry occurring twenty-three years after orthotopic heart transplantation

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Figure 1 (A) Activation map of both atria in left anterior oblique view, confirming cavotricuspid isthmus block; (B) activation map of left atrial lateral wall in lateral view (C) activation map of left atrial lateral wall in superior (left panel) and lateral (right panel) views.
A 48-year-old man with orthotopic cardiac transplantation (at age 25) and cavotricuspid isthmus ablation (at age 46), was referred for catheter ablation of a persistent and symptomatic atrial tachycardia. Preprocedural computed tomography was performed to appreciate atrial anatomy, and rule-out intra-atrial thrombus. Catheter ablation was performed under general anaesthesia with endotracheal intubation and Rhythmia HDX™ system (Boston Scientific, USA) for mapping. Firstly, we realized activation map of the right atrium using Intellamap Orion™ basket catheter (Boston Scientific, USA). This map was completed within 27 min with 35 000 electrograms, confirming cavotricuspid isthmus block with a 210 ms cycle length tachycardia. Right atrium was bystander with an incomplete cycle mapping and an emerging point located to the ostium of coronary sinus (Supplementary material online, Video S1). Activation map of the left atrium (LA) was achieved through a trans-septal approach, lasting 35 min and collected 50 000 electrograms for a total volume of 450 mL (Figure 1A, Supplementary material online, Video S2). Voltage map showed an electrically silent remnant atrium, including pulmonary veins, and highly fractioned electrograms along the LA ridge (Figure 1B). Activation analysis revealed LA local macro-reentry from the donor heart with a figure-of-8 pattern: downward activation through LA ridge (critical isthmus), and upward activation through both LA lateral wall anteriorly and along the atrio-atrial anastomosis posteriorly (Figure 1C, Supplementary material online, Video S3). Ablation was performed at the exit site of the critical isthmus, at the inferior part of LA ridge, with a 4 mm irrigated-tip catheter to deliver 30 W and rapidly terminated tachycardia. Intra-atrial re-entrant tachycardia was no longer inducible at baseline and after isoproterenol infusion. Procedure lasted 150 min with 13 min of fluoroscopy. The patient had no recurrence after 6 months.

Supraventricular arrhythmias occur in 2–7% of patients late after orthotopic heart transplantation, and catheter ablation is the cornerstone for restoration of sinus rhythm. Cavotricuspid isthmus-dependent atrial flutter and right focal atrial tachycardia (mostly emerging from atrio-atrial anastomosis) represent the most frequent types. Left atrial local macro-reentry is an exceptional finding and has not been reported in the literature to our knowledge. In this context of severe atrial remodelling, dilated atria and surgical scars, ultra-high density mapping is a useful tool to determine activation pattern and critical isthmus. In this case, we highlighted the high diagnostic accuracy of using Intellamap Orion™ basket catheter and Rhythmia HDX™ platform, leading to the targeted catheter ablation of a complex atrial arrhythmia.

Supplementary material is available at Europace online.

Conflict of interest: P.B. is an employee of Boston Scientific.

References