CASE REPORT

Partial participation of the coronary sinus owing to longitudinal dissociation during peri-mitral atrial flutter

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Longitudinal dissociation of the coronary sinus (CS) and the partial involvement of the CS owing to the longitudinal dissociation of the CS during tachycardia have rarely been reported.

A 69-year-old man was referred to our hospital for radiofrequency catheter ablation for atrial tachycardia (AT). He had previously undergone pulmonary vein isolation, defragmentation in the left atrium (LA) and the CS, ethanol infusion into the vein of Marshall (VOM), and posterior mitral isthmus (MI) ablation.

A baseline electrocardiogram revealed AT with 2:1 atrioventricular conduction at a cycle length of 260 ms. Electrograms (EGMs) recorded in the CS consisted of double components. The first one demonstrated a distal to proximal activation sequence. The second one demonstrated a proximal to distal activation sequence. Orion multielectrode catheter (Boston Scientific, Cambridge, MA, USA) recorded the two sharp and high-frequency signals corresponding to these two EGMs recorded on the CS indicating the near-field signals. Activation mapping of the LA and the CS with High-density Rhythmia mapping system (Boston Scientific, Cambridge, MA, USA) revealed the following features (*Figure 1* and Supplementary material online, *Video*): (i) clockwise propagation around the endocardial mitral annulus (MA) was blocked at the posterior MI lesion (solid arrow); (ii) activation continued from the distal to the proximal CS epicardially (dotted arrow); and (iii) activation broke out from the proximal/mid-CS to the LA, spreading with both counterclockwise and clockwise propagation around the endocardial MA (solid arrows). Overdrive pacing from the distal CS successfully captured the first component of the electrograms, and the post-pacing interval (PPI) was identical to the tachycardia cycle length (T-CL). Moreover, downstream overdrive pacing from the proximal CS during tachycardia entrained the first components of EGMs recorded in the CS orthodromically with an identical PPI to the T-CL, whereas the secondary components of EGMs recorded in the CS were captured antidromically. Therefore, the secondary components of EGMs recorded in the CS were believed to be a bystander. The possibility that the secondary components of EGMs that were recorded in the CS represented the EGMs of the LA was unlikely. Because the timing

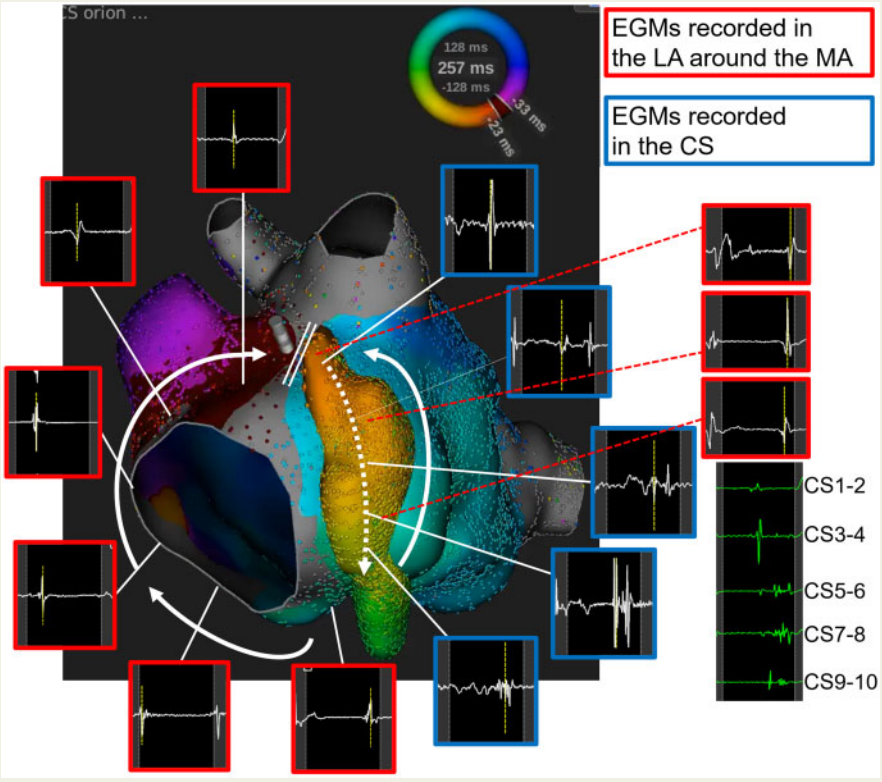

Figure 1 Activation mapping of the left atrium and the coronary sinus with High-density Rhythmia mapping system.

of EGMs recorded in the endocardial LA by Orion multielectrode catheter during tachycardia varied from that of the secondary components of EGMs recorded in the CS. The possibility of a double-barrel CS was ruled out by CS venography.

These findings established the diagnosis of peri-mitral atrial flutter (PM-AFL) involving the CS as an epicardial part of the circuit. Moreover, one part of the CS was involved as an epicardial circuit, whereas the other part of the CS was activated as a bystander because of the longitudinal dissociation of the CS. The previous defragmentation in the CS and ethanol infusion into the VOM likely contributed to this longitudinal dissociation. Radiofrequency catheter ablation in the distal CS was performed and lead to termination of the PM-AFL.

Supplementary material

Supplementary material is available at *Europace* online.

Conflict of interest: none declared.