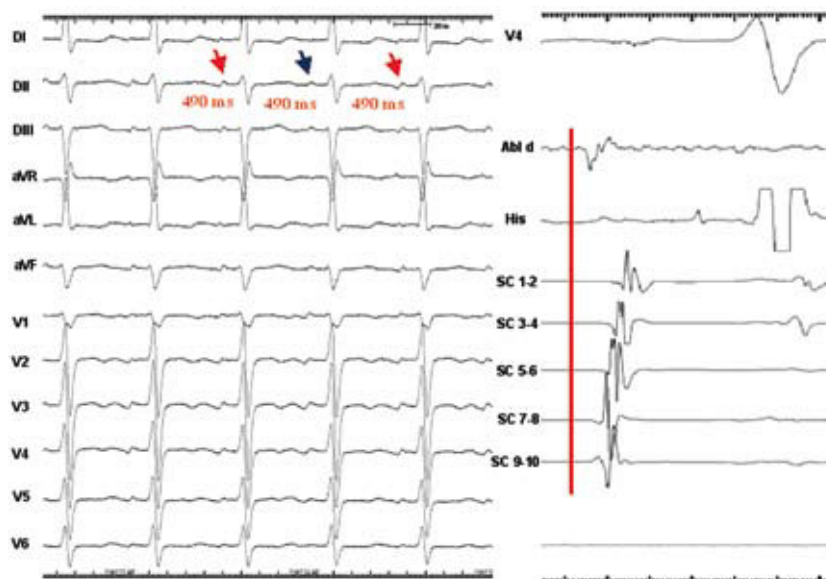


Catheter Ablation of Focal Atrial Tachycardia From the Non-Coronary Aortic Sinus

To the Editor:

We present the case of a 78-year-old woman with a history of allergy to acetylsalicylic acid, type-2 diabetes mellitus, and dyslipidaemia. In January 2008, she experienced dyspnoea and palpitations with no chest pain; she was seen to have incessant atrial tachycardia (AT) and severe left ventricular dysfunction (LVEF, 25%), which was presumed to be secondary. An electrophysiological study was carried out in February 2008 in which an AT with 2 different P-wave morphologies and a cycle length of 460 ms (Figure 1) was induced in a spontaneous, repeatable way using steady atrial stimulation. An activation map was made of the left atrium using the CARTO[®] navigation system and a 4 mm Navistar[®] F-Type catheter, which showed a focal

Figure 1. Left: record of the atrial tachycardia in a 12-lead ECG, where we can see the P-wave morphology. The first and third arrows show a different morphology from that shown by the central arrow, with no change in the length of the tachycardia cycle (490 ms). Right: intracavity record of electrograms at the level of the coronary sinus, the bundle of His and the distal ablation catheter (Abl d). Observe how the local activation registered in the ablation catheter, located in the non-coronary aortic sinus, occurs before the one registered in the bundle of His; this finding is characteristic of this type of tachycardia.



AT with an earlier response in the anteroseptal region. Several applications were made in the zone with the earliest response compared with the surface ECG (0 ms), but they were not effective. A left atrial activation map was made via the transeptal approach; earliest endocardial activation corresponded to the interatrial septum area, with later electrograms than in the right atrium. By the retrograde aortic approach, we registered atrial activation electrograms from the non-coronary sinus of Valsalva, which registered early activation of -12 ms. We performed an aortography to verify the catheter's position in the non-coronary sinus of Valsalva and a single radiofrequency application (90 s; 20-30 W/55°) which was effective and ended the tachycardia when the application began, without it being induced again. In a revision in June 2008, the LVEF was 65% and the 24 h Holter monitor did not register tachyarrhythmia; the patient noted a subjective improvement.

AT originate principally in certain anatomic regions of the atria,^{1,2} and ablation procedures have a high rate of success and minimal risks.^{1,3} However, ablation of ATs located in the anteroseptal region of the atrium has a higher risk level due to their proximity to the conduction system. The interatrial septum anatomy is complex, which makes it difficult to identify the origin of the tachycardia. In a normal heart, the aortic root is located close to the atrial epicardium, between the mitral valves and the tricuspid (Figure 2). The non-coronary sinus of Valsalva makes up the upper edge of the interatrial septum and is bound to the central fibrous body where the bundle of His penetrates. Few studies, containing low patient numbers, describe AT located in the non-coronary sinus of Valsalva. The condition

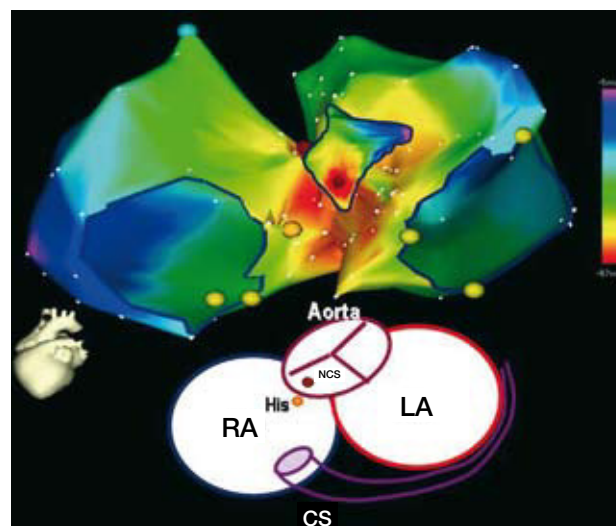


Figure 2. In the upper part of the image, activation map of the 2 atria and the non-coronary sinus during tachycardia, taken with the CARTO® navigation system in a left anterior oblique projection. The earliest zones (in red) correspond with the parts of the left and right atria proximal to the septum and the non-coronary aortic sinus. In the lower part of the image, the schema shows the anatomical relationship of both atria with the aortic root. CS indicates coronary sinus; LA, left atrium; NCS, non-coronary sinus; RA, right atrium.

makes up about 4% of focal ATs at specialised centres. Clinically, its behaviour is no different from that of other supraventricular tachycardias, and in the electrocardiograph, the P-wave morphology, which shares common characteristics with focal tachycardias originating in the para-Hisian area and the interatrial septum, seems to vary from study to study, which reflects the high level of anatomical and conduction heterogeneity in that zone. As in our case, the presence of different P-wave morphologies

in the surface ECG without major changes to the tachycardia cycle length has been described, which indicates different preferential conduction channels for the transmission of impulses from the ectopic focus (Figure 2).⁴ The activation map during tachycardia reflects an early atrial electrogram in the non-coronary sinus of Valsalva, which precedes the activation of the right atrium in the bundle of His. The earliest activation in the right atrium is several milliseconds earlier than the earliest activity in the left atrium, due to the fact that the non-coronary sinus of Valsalva is closer to the bundle of His than to the left atrial anterosseptal region. As a result, before performing ablation from the aortic root, it is necessary to demonstrate that the local activation in the non-coronary sinus of Valsalva precedes that registered in the Hisian region^{3,4} (Figure 1). This case makes it clear that for some ATs that appear to originate in the para-Hisian zone and which would be impossible to ablate from the atrial endocardium, mapping the non-coronary sinus of Valsalva and applying radiofrequency to it can effectively eliminate the tachycardia.

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