

EP CASE REPORT

An atypical roof-dependent atrial tachycardia with a long channel of conduction identified with high-density mapping: pitfall of the conventional assessment of the roof line block

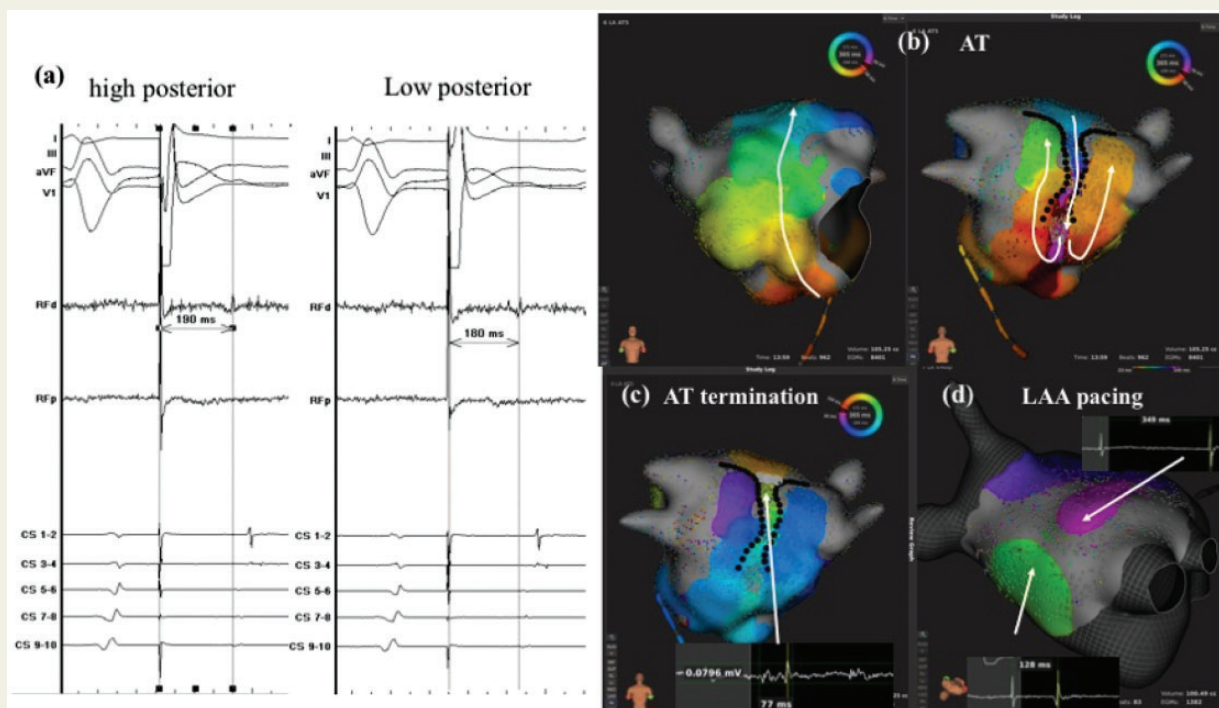
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A 60-year-old woman presented for radiofrequency (RF) ablation of an incessant atrial tachycardia (AT) after initial atrial fibrillation (AF) ablation (previously underwent pulmonary vein isolation, a cavo-tricuspid isthmus line, and left atrial defragmentation). At the time of the electrophysiological study the patient was in AT with a cycle length of 245 ms. We created an activation map of the AT with the Orion™ multipolar basket catheter (64 electrodes, area 0.4 mm²; 2.5 mm spacing) and the Rhythmia™ system (Boston Scientific, USA) with continuous (automated) acquisition and standard beat acceptance criteria: (i) CL variation <10 ms, (ii) <5 ms activation time difference variations between the coronary sinus (CS) electrograms, (iii) catheter motion <1.0 mm per beat, (iv) catheter tracking uncertainty <3 mm, and (v) confidence mask <0.03 mV. With the Rhythmia system, we created an activation map ($n = 12\,846$ points) in 14 min, displaying a typical double loop macro-re-entrant AT with roof-dependent and peri-mitral circuits. RF application to the gap of mitral isthmus terminated the AT in 35 s. We completed the mitral isthmus line with the end point of bidirectional block. Subsequently, we completed the roof line in 6 min and confirmed block while pacing the left atrial appendage (LAA); the duration from the stimulus to the local activation was 180 ms on the low posterior wall and 190 ms on the high posterior wall, which suggested that the posterior wall was activated from the inferior to superior (Figure 1A). We paced from the ablation catheter and similarly confirmed that the roof line was bidirectionally blocked. However, atrial burst pacing induced another AT. An activation remap (8401 points, 14 min) displayed the unique roof-dependent AT (CL = 360 ms), which conducted via a long channel on the posterior wall (superior to inferior in direction) involving the roof. Areas on either side of the channel were activated from inferior to superior in direction (black tags show the line of block in Figure 1B). Additional 10 s RF application

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within channel successfully terminated the AT (grey tags in the *Figure 1C*), and the duration between the stimulus on the LAA and the high posterior wall extended to 240 ms. Furthermore, the new map during the LAA pacing following the ablation confirmed that no potential conduction remained on the roof (*Figure 1D*). Afterwards, no other ATs were inducible. Total procedure and ablation time was 3 h and 9 min, respectively.

Although conventional assessment of linear block is effective,¹ we have demonstrated a case where areas of scar and slow conduction on the posterior wall initially led to a false confirmation of block along the roof line. This pitfall should be taken into account and further high-density mapping with the Rhythmia system may offer further utility for the clinician.

Conflict of interest: none declared.

Reference

1. Hocini M, Jaïs P, Sanders P, Takahashi Y, Rotter M, Rostock T *et al*. Techniques, evaluation, and consequences of linear block at the left atrial roof in paroxysmal atrial fibrillation: a prospective randomized study. *Circulation* 2005;**112**:3688–96.