FELLOWS CORNER

Anterior mitral line pseudo-block: Pitfalls of the atrial differential pacing maneuver

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WHAT WE LEARNED FROM THIS CASE

- Double potential separation along the line and differential pacing at both sides of the line represent the gold standard to prove the achievement of linear conduction block.
- In the context of long lines running through diseased atrial substrate mediating slow conduction, single-site differential pacing may give misleading results (pseudo-block).
- In these cases, differential pacing along the length of the line or an activation map during left atrial appendage pacing may be useful.

A 64-year-old man with history of atrial fibrillation–induced tachycardiomyopathy was referred for a redo procedure after a previous radiofrequency pulmonary vein (PV) isolation procedure in 2015. The high-density substrate voltage map showed areas of bipolar low voltages (<0.5 mV) in the anterior wall and septum, and reconnection of the left PVs through an anterior carina gap (Supplemental Figure 1). After reisolation of the left PVs, posterior box isolation was performed and confirmed with entry mapping and high-output pacing (20 mA). Given the presence of anterior low voltages, an anterior mitral line (from the mitral annulus to the right superior PV) was deployed for substrate modification. Thereafter, while pacing from the left atrial appendage (LAA), widely split (116 ms) double potentials were observed along the mitral end of the line. Atrial activation pattern and differential pacing at both sides of the line in the perimitral location suggested achievement of bidirectional conduction block (Figure 1A and 1B and Supplemental Figure 2). The same pacing maneuver was then performed on the right superior PV end of the line, showing the presence of residual conduction. Activation mapping during LAA pacing (Figure 1C) confirmed the presence of a conduction gap in the right superior PV region. Additional radiofrequency applications at this site achieved complete block, as proven by differential pacing along the posterior end of the line and LAA pacing (Figure 1D).

Although the efficacy of additional linear ablation is still debated, the proarrhythmic effect of incomplete lines has consistently been demonstrated. If linear ablations are performed, it is of paramount importance to achieve and prove bidirectional conduction block. Criteria for conduction block across lines have been well described in the seminal work by Shah and colleagues.[1] Double potential separation along the line and differential pacing at both sides of the lines represent the gold standard to prove the achievement of linear conduction block. However, in exceptional cases, such a maneuver may be misleading. Our case illustrates that in the context of long lines running through diseased atrial substrate mediating slow conduction, differential pacing at multiple sites along the length of the line should be performed. This will avoid misinterpretation and unmask remaining gaps and pseudo-block.

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Appendix

Supplementary data

Supplementary data associated with this article can be found in the online version at 10.1016/j.hroo.2022.08.009

KEYWORDS Atrial fibrillation; Mitral line; Anterior mitral line; Checking the line; Bidirectional block; Differential pacing; Mapping (Heart Rhythm O2 2022;3:713–714)

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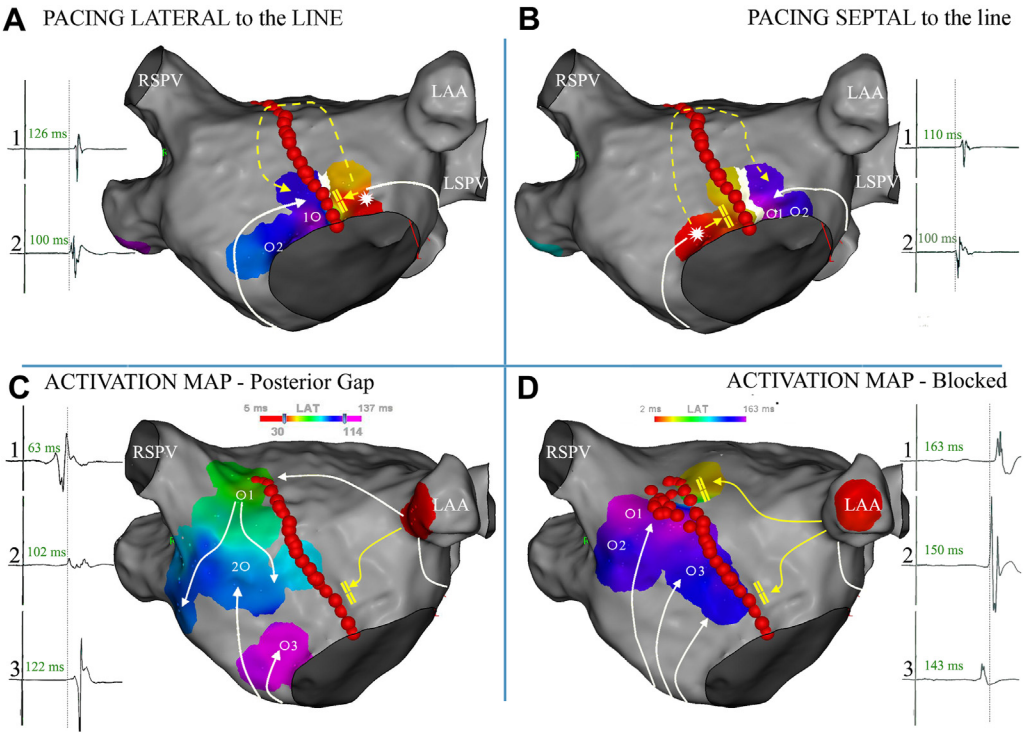

Figure 1 **(A)** Activation map pacing lateral to the line, close to the mitral annulus, and recording at different sites medial to the line (electrograms 1 and 2), showing presumed conduction block. **(B)** Activation map pacing septal to the line and recording at different sites lateral to the line, again suggesting conduction block. **(C, D)** Activation map while pacing from the left atrial appendage (LAA). **(C)** Showing a gap in the posterior end of the mitral line, in the right superior pulmonary vein (RSPV) antral region. **(D)** Remapping after additional radiofrequency applications proves the achievement of true bidirectional conduction block. LSPV = left superior pulmonary vein.

Reference

1. Shah D, Haïssaguerre M, Takahashi A, Jaïs P, Hocini M, Clémenty J. Differential pacing for distinguishing block from persistent conduction through an ablation line. Circulation 2000;102:1517–1522.