Adenosine reveals dormant conduction of an arrhythmogenic thoracic vein despite the absence of previous ablation

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A 60-year-old man with paroxysmal atrial fibrillation (AF) underwent pulmonary vein (PV) isolation. Repeat procedure was performed due to immediate clinical recurrence. None of the previously isolated PVS were found to have reconnected. Adenosine challenge induced a burst of atrial tachycardia (AT) initiating a self-terminating episode of AF (Panel A). Based on the 12-lead electrocardiogram (ECG) morphology and after ruling out a left atrial origin, a focus arising from either the superior vena cava (SVC) or the high crista terminalis was suspected. At baseline, no potentials were recorded from the Lasso catheter positioned in the SVC. However, a repeated adenosine injection exposed a dormant conduction from the right atrium to the vein despite the absence of any previous ablation in that area (Panel B, black arrows). It triggered repetitive SVC ectopies (Panel C left, black stars), at times concealed, that reproduced the 12-lead ECG morphology of the AT initiating AF (Panel C right).

The present case thus further expands the field of application of adenosine challenge in patients with recurrent paroxysmal AF despite PV isolation. Until now, adenosine has been shown to restore dormant conduction of arrhythmogenic thoracic veins in the acute and, more recently, chronic post-ablation period. The present case demonstrates that adenosine can also provoke conduction in electrically silent connections between atrium and veins despite the absence of previous ablation.

This finding suggests that some venous muscular sleeves may spontaneously alternate between electrical quiescence and phases of recovered excitability leading to intermittent venoatrial conduction. This hypothesis is further substantiated by reports showing that the sites of PV conduction gaps observed during a third ablation procedure can differ from those observed during the second procedure.


Figure 1 Figure 1. (A) 12-lead ECG of the adenosine-induced burst of atrial tachycardia initiating AF. (B, C) Intracardiac recordings after repeat adenosine injection (sweep speed 50 mm/sec). The Lasso catheter is positioned in the superior vena cava (SVC) and the ablation catheter (RF) on the upper part of the crista terminalis. A bolus injection of adenosine exposes a dormant conduction from the right atrium to the SVC (B, black arrows). It also results in the appearance of repetitive SVC ectopies, at times concealed, (C, left panel, black stars) reproducing the 12-lead ECG morphology of the atrial tachycardia initiating AF (C, right panel).