EP CASE REPORT

Dormant pulmonary vein conduction before ablation revealed by adenosine: evidence for intermittent venoatrial conduction?

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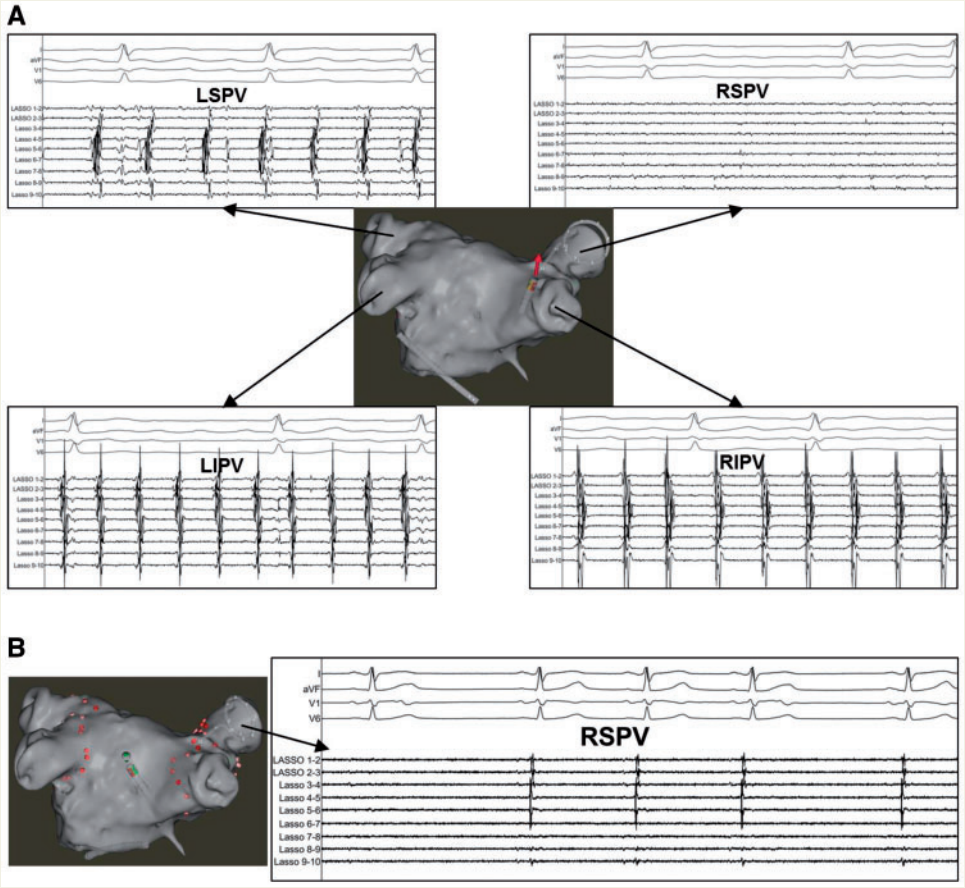
A 46-year-old man with paroxysmal atrial fibrillation and a history of percutaneous occlusion of an ostium primum atrial septal defect underwent pulmonary vein (PV) isolation. Echocardiography displayed a normal left ventricular ejection fraction with mild right ventricular dilatation and normal left atrium. After transseptal access, the geometry of the left atrium was reconstructed with a 10-pole variable LassoNav catheter (Biosense Webster, Diamond Bar, CA, USA) in combination with the CARTO3 system (Biosense Webster). After an initial procedure in sinus rhythm, atrial fibrillation was mechanically induced. Voltage mapping showed no evidence of left atrial scarring. Mapping with the Lasso catheter revealed widely connected left and right inferior PVs. In contrast, no potentials were recorded in the right superior PV despite a fully deployed Lasso catheter manipulated to ascertain the adequate mapping of all segments (*Panel A*). Both left- and right-sided ipsilateral PVs were circumferentially ablated despite the apparent electrical isolation of the right superior PV. Sinus rhythm was restored by direct current cardioversion, and adenosine challenge was undertaken. After ruling out left PV dormant conduction, the Lasso catheter was positioned in the right superior PV. Surprisingly, repeated adenosine injection revealed a transient and reproducible conduction along the postero-superior segment of the PV that had remained electrically quiescent during the whole procedure (*Panel B*). After complementary segmental ablation, adenosine did not reveal any dormant conduction.



Until recently, the use of adenosine was generally limited to the acute post-ablation period with the aim of restoring dormant conduction in acutely non-conducting, but still viable, muscular sleeves of PVs and other thoracic veins.

In the present case, the initial PV interrogation revealed an electrically quiescent PV, while others were diffusely connected without concomitant left atrial scarring. The adenosine challenge after ablation unexpectedly revealed an electrical connection to the PV that had

remained silent throughout the procedure. This case thus demonstrates that some PV muscular sleeves may alternate between electrical quiescence and phases of recovered excitability under certain circumstances such as those provoked by adenosine.

To the best of our knowledge, this is the first report of adenosine challenge inducing conduction in electrically silent PV muscle connections previous to any ablation. Recently, a similar observation has been reported where an un-ablated arrhythmogenic superior vena cava with intermittent conduction to the right atrium was revealed by adenosine.[1] In the chronic post-ablation period, Myiazaki *et al*.[2] have shown that adenosine could reveal dormant conduction of arrhythmogenic thoracic veins, including PVs, despite absence of reconnection at the start of the procedure. Additionally, a previous report by Ouyang *et al*.[3] showed that sites of PV conduction gaps observed during a second redo could differ from those observed during the first redo procedure.

Taken together, these observations provide strong evidence that spontaneous intermittent pulmonary veno-atrial conduction may occur. The clinical relevance of this phenomenon warrants further investigation and may expand the field of clinical application of adenosine challenge.

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References

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