Supraventricular tachycardia with cycle length variation and apparent VA dissociation: what is the mechanism?

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A 33-year-old woman was referred for an electrophysiologic study because of a documented supraventricular tachycardia. Stimulation from the RV-apex showed retrograde conduction over the bundle of His without any evidence of an accessory pathway. Programmed atrial stimulation with one extra stimulus revealed a dual atrioventricular (AV) nodal physiology. Under isoprenaline, a supraventricular tachycardia was inducible. On the first glance, this tachycardia presented with ventriculo atrial (VA) dissociation on the surface ECG (Figure). Is that true?

The correct diagnosis is an AV nodal re-entrant tachycardia (AVNRT) which uses two different slow pathways either in an antergrade or a retrograde direction. This results in cycle length variations and an apparent VA dissociation. The white arrows in the figure demonstrate the activation sequence (FP, fast pathway; SP, slow pathway; white, ECG; yellow, His catheter; green, CS catheter; purple, RV catheter). Starting with a retrograde FP conduction, the antegrade conduction passes through a slow pathway (SP 1) as in common AVNRT. The following retrograde conduction uses the second slow pathway (SP 2). This is followed by a dual response in the antergrade direction via the fast pathway and one of the slow pathways. With retrograde conduction through the fast pathway the sequence starts again.

The differential diagnosis of an AVNRT with AV Wenckebach block in an upper common pathway had been ruled out by atrial stimulation at the tachycardia cycle length.

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