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CASE REPORT

Simultaneous wide and narrow QRS complex tachycardia: what is the mechanism?

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Atrioventricular nodal reentrant tachycardia;
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Abstract We present the case of a 50-year-old patient with several episodes of syncope and documented simultaneous wide and narrow QRS complex tachycardia. We then review this tacharrhythmia, focusing on electrophysiological findings and pathophysiology, diagnosis and treatment.

PALAVRAS-CHAVE
Taquicardia de reentrada nodal auriculoventricular;
Taquicardia do tracto de saída do ventrículo direito;
Taquicardia dupla;
Arrastamento espontâneo

Taquicardia complexa de QRS simultaneamente largo e estreito: qual o mecanismo?

Resumo Apresentamos um caso de um doente de 50 anos com diversos episódios de síncope e documentação de taquicardia com complexo QRS simultaneamente largo e estreito. Fazemos uma revisão desta taquiarritmia tendo em especial atenção achados electrofisiológicos e fisiopatologia, diagnóstico e tratamento.

We present the case of a 50-year-old patient with several episodes of syncope and documented simultaneous wide and narrow QRS complex tachycardia. We then review this tachyarrhythmia, focusing on electrophysiological findings and pathophysiology, diagnosis and treatment.

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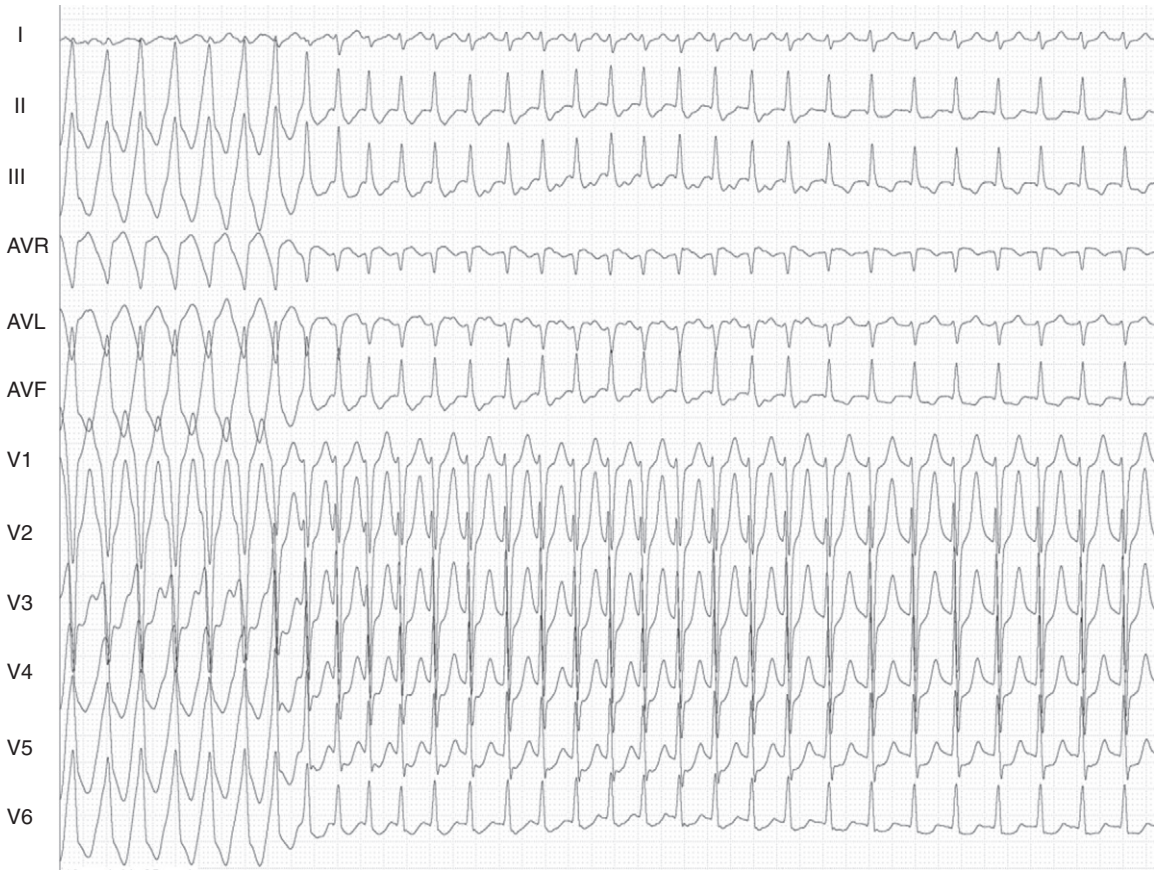

Figure 1 Twelve-lead ECG. In the first part of the tracing a broad QRS tachycardia is shown, with LBBB inferior axis morphology and negative QRS complex in aVL. After this run there is a change to a narrow QRS complex. Surface leads (I, II, III, aVF, V1 and V6), and electrograms recorded from the right ventricular apex and the coronary sinus.

Case report

A 50-year-old man presented to the emergency department due to an episode of palpitations and dizziness. He reported several episodes of sudden syncope. The standard 12-lead electrocardiogram (ECG) performed on admission showed a wide QRS complex tachycardia, which changed spontaneously into a narrow QRS complex tachycardia (Figure 1) and vice versa. Blood pressure during the episode was 90/65mmHg. Due to the fact that the tachycardia was repetitive, bisoprolol was administered intravenously and sinus rhythm was restored. An emergency echocardiogram revealed no evidence of structural heart disease. An electrophysiological study (EPS) was subsequently performed. A bipolar catheter was placed initially in the right ventricular (RV) apex (afterwards withdrawn towards the His position) and a quadripolar catheter in the coronary sinus (CS). Ventricular stimulation performed from the right RV apex showed decremental retrograde conduction with a proximal to distal activation sequence in the CS. Programmed atrial stimulation revealed a dual AV nodal physiology with an AH jump and subsequent induction of atrioventricular nodal reentrant tachycardia (AVNRT). The diagnosis of AVNRT was based on the long postpacing interval (PPI) during entrainment of the tachycardia from the RV apex (PPI-TCL=180ms) (Figure 2A), septal VA interval of -10ms (Figure 2A), a stimulus-atrial (during pacing from the RV apex) minus ventriculo-atrial (during tachycardia) interval greater than 85ms, and absence of fusion during entrainment of the tachycardia. As in the baseline ECG, runs of wide QRS complex tachycardia with left bundle brunch morphology (LBBB) interacting with the narrow QRS tachycardia were also observed. The intracardiac signal during the latter confirmed that it was a ventricular tachycardia (VT) (Figure 2B) (VA dissociation, without anterograde His potential). Another interesting finding was the absence of atrial advancement by spontaneous single ventricular extrastimuli when the His bundle was refractory (Figure 2C). Transient entrainment of the AVNRT by non-sustained VT was also seen. During this phenomenon, the interval from the last beat of the VT to the first beat of the SVT minus the tachycardia cycle length (TCL) [($V_{VT} - V_{SVT}$) − TCL] was longer than 115ms (Figure 2C and D), suggesting AVNRT, and making the diagnosis of an orthodromic septal tachycardia unlikely.

Based on these observations, radiofrequency catheter ablation of the slow pathway region was performed using a 4-mm non-irrigated bidirectional catheter (Biosense Webster, Diamond Bar, CA). Post-ablation programmed atrial and ventricular stimulation failed to induce any supraventricular tachycardia even under isoproterenol infusion. However, premature ventricular complexes (PVC) and a wide QRS complex tachycardia identical to the initial one were