QRS alternans and cycle length oscillation during narrow QRS tachycardia

Laurent Roten and Etienne Delacrétaz*

Swiss Cardiovascular Center Bern, University Hospital, CH-3010 Bern, Switzerland

Online publish-ahead-of-print 30 April 2008

Discussion

Pre-excitation with R waves greater in amplitude than S waves in V1 and a positive delta wave in inferior leads are consistent with antegrade conduction over a left anterolateral accessory pathway. In the presence of an accessory pathway, the most likely mechanism of the narrow QRS tachycardia is an orthodromic atrio-ventricular (AV) re-entrant tachycardia. The timing of the discrete P-wave visible during tachycardia at the beginning of the T-wave, best seen in lead V1 (arrow), is consistent with this mechanism.

Supraventricular tachycardia with alternating cycle lengths is most often due to orthodromic AV re-entry tachycardia, with alternating antegrade conduction over a slow and a fast AV nodal pathway. However, atrial tachycardia with similar alternating conduction is possible, and the AV nodal re-entry tachycardia with conduction alternating over two distinct antegrade slow AV nodal and single fast pathways has been described. Variation in the conduction time within the His-Purkinje system has also been described, but the variation in the tachycardia cycle length is usually minimal. Finally, AV nodal re-entry tachycardia with retrograde conduction alternating over distinct pathways (fast and slow) has been described.

Invasive electrophysiological study

In our case, the RP interval remains constant, whereas the PR interval varies (intervals marked). Thus, the alternating interval is located in the antegrade limb of the re-entry, i.e. in this case, the AV node. In this tracing, atrial tachycardia with alternating antegrade conduction over fast and slow AV nodal pathways cannot be formally ruled out, but at several occasions, the tachycardia terminated with the AV block, suggesting another mechanism.

The electrophysiological study confirmed the orthodromic AV re-entry with retrograde conduction over a left anterolateral accessory pathway, with the earliest retrograde atrial activation seen at the distal coronary sinus, and revealed dual AV nodal physiology. Following catheter ablation of the accessory pathway, dual AV nodal physiology persisted, but there was no tachycardia inducible.

The mechanism of QRS alternans during narrow QRS tachycardia is not known. It has been attributed to non-specific intraventricular conduction abnormalities or rocking heart. QRS alternans has been considered to be strongly suggestive of AV re-entrant tachycardia. However, it may also occur during AV nodal re-entrant tachycardia and can also be induced by abrupt rapid atrial pacing.

Conflict of interest: none declared.

References