Apparent Fusion Beat During Broad-QRS Complex Tachycardia – What is the Mechanism?

Emily C Hodgkinson, MBChB¹, Peter Kabunga, MBChB¹, George J. Klein, MD³, Raymond W. Sy, MBBS, PhD^{1,2*}

¹ Department of Cardiology, Royal Prince Alfred Hospital, Sydney, New South Wales, Australia

² Sydney Medical School, University of Sydney, Sydney, New South Wales, Australia

³ University of Western Ontario, London, Ontario, Canada

Abstract

The observation of a fusion beat during the broad complex tachycardia can be very pivotal to identifying both the mechanism and the location of the tachycardia.

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Key Words

Broad • QRS complex tachycardia • Aberrancy • Fusion beats

A 77-year-old man presented to the emergency department with palpitations and shortness of breath.

The following 12-lead ECG was recorded (Figure 1).

On the basis of the apparent fusion beat, the broad-QRS complex tachycardia (BCT) was diagnosed as “ventricular tachycardia.” The patient received amiodarone and then he spontaneously reverted to sinus rhythm.

His post-reversion ECG (Figure 2) showed sinus rhythm with a non-specific interventricular conduction delay (QRS = 130 ms).

Premature beats with a monomorphic broad-QRS morphology were also observed. There were of similar morphology to the apparent fusion beat observed on the first ECG. The absence of a preceding P wave suggested that these beats were premature ventricular complexes (PVC).

Figure 1. Twelve-lead ECG showing broad-QRS complex tachycardia with apparent fusion beat (arrows).

Figure 2. Post-reversion 12-lead ECG. Monomorphic premature ventricular complexes noted (arrows).

Figure 3. Spontaneous broad-QRS complex tachycardia recorded on ward telemetry. Initiation is with a PAC (arrow).

During ward telemetric monitoring, the onset of a spontaneous BCT was recorded (Figure 3). The tachycardia initiated with a premature atrial complex. The morphology and axis of the BCT was the same as the presenting tachycardia. Initiation from the atrium argues against ventricular tachycardia. The PVC also did not reset the tachycardia in Figure 1, favoring atrioventricular nodal reentrant tachycardia (AVNRT) or atrial tachycardia although not ruling out AV reentrant tachycardia. Subsequent testing confirmed a diagnosis of AVNRT.

Review of the presenting ECG in the light of the telemetry strip suggests that the original BCT was in fact SVT with aberrancy and that the apparent 'fusion beat' represented 'reverse fusion' due to a PVC during SVT. This is in contrast to the conventional fusion

beat, which is used to differentiate VT and SVT in BCT. Such beats represent fusion between the "normal" conducted QRS morphology and the QRS morphology in VT. In order to make a diagnosis of fusion, one requires a QRS template of a "normal" sinus beat, a VT beat, and one that is a plausible algebraic summation of the two. In this case, such was not seen. A "different" QRS morphology during any BCT may be a fusion in the usual sense but may well be a PVC during VT or indeed SVT, as was likely the case here. In the simplest sense, it is important to remember that fusion simply implies two wavefronts observed on the ECG at the same time, but it does not necessarily specify their origin.

Conflict of Interest

The authors have no conflict of interest relevant to this publication.

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