CASE REPORT

Wide QRS Tachycardia: What Is the Rhythm?

Jonathan Rosman, M.D., Joseph Tawil, M.D., Sam Hanon, M.D.,
and Paul Schweitzer, M.D.

From the Beth Israel Medical Center, University Hospital and Manhattan Campus for the Albert Einstein College of Medicine, New York, NY

We report a case of an elderly man who presented to the emergency room complaining of palpitations. Electrocardiogram revealed wide QRS tachycardia with a narrow beat within the tachycardia. Most commonly, a narrow complex beat during a wide complex tachycardia suggests a capture or fusion beat in the setting of ventricular tachycardia. However, there are situations where supraventricular tachycardia can also manifest this way. In our patient a pacemaker interrogation clarified the diagnosis.

A.N.E. 2006;11(4):354–356

wide complex tachycardia; bundle branch block

CASE

An 86-year-old man was admitted to the hospital with a complaint of "palpitations." The patient had a history of congestive heart failure, with a severely reduced left ventricular ejection fraction, and non-sustained ventricular tachycardia. The patient had a permanent pacemaker placed 5 years prior for sick sinus syndrome.

On presentation, the blood pressure was 128/87 and heart rate was 120. An ECG was performed (Fig. 1). The pacemaker was then interrogated (Fig. 2). What is the rhythm?

The patient's ECG revealed a regular, wide complex tachycardia with no clearly identifiable P waves. The fifth beat on the ECG is a narrow QRS complex within this wide complex tachycardia. Intracardiac electrograms via the pacemaker programmer revealed atrial flutter with 2:1 block. Retrieval of the patient's previous records, obtained after pacemaker interrogation, revealed a previously documented left bundle branch block (Fig. 3) which has the same QRS morphology as the tachycardia ECG. While a "double tachycardia," simultaneous VT, and atrial flutter are possible, these

are highly unlikely given that the ventricular rate is half the atrial rate, indicating likely 2:1 conduction, and the QRS morphology is the same as the baseline ECG indicating a supraventricular origin.

DISCUSSION

Most commonly, a narrow complex beat during a wide complex tachycardia suggests a capture or fusion beat in the setting of ventricular tachycardia. However, there are situations where supraventricular tachycardia could also manifest this way. Normalization of QRS duration in patients with a bundle branch block is an uncommon electrocardiographic phenomenon.¹ The most common causes of the QRS normalization during supraventricular tachycardia are ventricular fusion, simultaneous delay in both bundles, and fascicular beats.^{1–4}

Normalization of QRS duration during a tachycardia can be caused by improvement in the conduction of the affected bundle or by additional delay in the contralateral bundle; both leading to uniform conduction in both bundles and thus, a narrow QRS. Ventricular fusion, in the presence of an

Address for reprints: Jonathan Rosman, M.D., Beth Israel Medical Center, University Hospital and Manhattan Campus for the Albert Einstein College of Medicine, 350 East 17th Street, Baird Hall, 20th floor, New York, NY 10003. Fax: (212) 777-3798; E-mail: jrosman@bethisraelny.org

The authors have no conflict of interest and there was no financial support for this case report.

©2006, Copyright the Authors
Journal compilation ©2006, Blackwell Publishing, Inc.

Figure 1. ECG recorded on arrival to the emergency room showing a wide complex tachycardia with one narrow QRS complex.

Figure 2. Pacemaker interrogation revealing atrial flutter with 2:1 AV block.

Figure 3. Baseline ECG showing normal sinus rhythm with a left bundle branch block.

underlying bundle branch block, results in a narrow QRS when the ventricular premature beat originates in the same ventricle that manifests the conduction block. In addition, a narrow QRS complex may be seen if the premature beat originates either in the ventricular septum, in the fascicles of the left bundle, or below the level of the bundle branch block.

The cause of QRS complex normalization in the setting of an underlying bundle branch block is difficult to establish, particularly in the absence of clear P waves. The narrow beat may originate in the atria, junction, or ventricles. The finding of a narrow QRS of different morphology within a wide complex tachycardia may lead to a misdiagnosis of ventricular tachycardia with a capture or

fusion beat. In the current case, the pacemaker and old ECG allowed for accurate diagnosis and correct treatment.

REFERENCES

1. Schweitzer P, Mark H. Normalization of the QRS complex in bundle branch block: Its Mechanisms and Diagnostic Criteria. *Clin Prog* 1985;3:207-219.
2. Kinoshita S. Variations in the critical cycle length inducing rate dependent bundle branch block. *Am Heart J* 1978;96:54-61.
3. Schamroth L, Agathangelou N. QRS normalization by ventricular fusion. A study of intraventricular conduction. *Pacing Clin Electrophysiol* 1981;4:448-451.
4. Wu D, Denes P, Dhingra R, et al Bundle branch block. Demonstration of the incomplete nature of some "complete" bundle branch and fascicular blocks by the extrastimulus technique. *Am J Cardiol* 1974;33:583-589.