


## IMAGES IN EMERGENCY MEDICINE

## Cardiovascular

# A case of pediatric palpitations

Lauren Icken MD<sup>1</sup>  | Alexander Bracey MD<sup>1</sup> | Benjamin Biddix MD<sup>2</sup> |  
H. Pendell Meyers MD<sup>3</sup> | Christopher Malabanan MD<sup>1</sup>

<sup>1</sup>Albany Medical Center, Department of Emergency Medicine, Albany, New York, USA

<sup>2</sup>Albany Medical Center, Department of Pediatric Cardiology, Albany, New York, USA

<sup>3</sup>Carolinas Medical Center, Department of Emergency Medicine, Charlotte, North Carolina, USA

**Correspondence**

Lauren Icken, MD, Albany Medical Center, Department of Emergency Medicine, 43 New Scotland Avenue, Albany, NY 12208, USA.

Email: [ickenlauren@gmail.com](mailto:ickenlauren@gmail.com)

**KEYWORDS**

Belhassen, fascicular ventricular tachycardia, ventricular tachycardia, verapamil

## 1 | CASE PRESENTATION

A 17-year-old male presented as a transfer for palpitations and tachycardia. His electrocardiogram (ECG) on arrival is shown in Figure 1. There was no family or personal history of cardiac conditions. Prior to transfer, the patient underwent two attempted adenosine cardioversions without any change in rhythm, rate, or “unmasking” of underlying rhythm. On arrival, the patient was well-appearing with subjective dyspnea.

## 2 | DIAGNOSIS: FASCICULAR VENTRICULAR TACHYCARDIA

The initial ECG demonstrates a regular monomorphic wide complex tachycardia at 166 bpm with QRS interval duration slightly greater than 120 ms. The morphology of the QRS complex demonstrates left axis deviation with right bundle branch block (RBBB). These findings are consistent with a diagnosis of fascicular (eponymously: Belhassen) ventricular tachycardia (FVT).

FVT is a re-entrant tachyarrhythmia often involving the posterior fascicle. It may involve abnormal Purkinje tissue with slow conduction that is calcium dependent and verapamil sensitive.<sup>1</sup> Patients are typically young and healthy; thus, FVT is generally well tolerated. Common

symptoms are dyspnea or palpitations. FVT is generally not sensitive to adenosine or beta receptor antagonists, while 90% will respond to verapamil.<sup>2</sup>

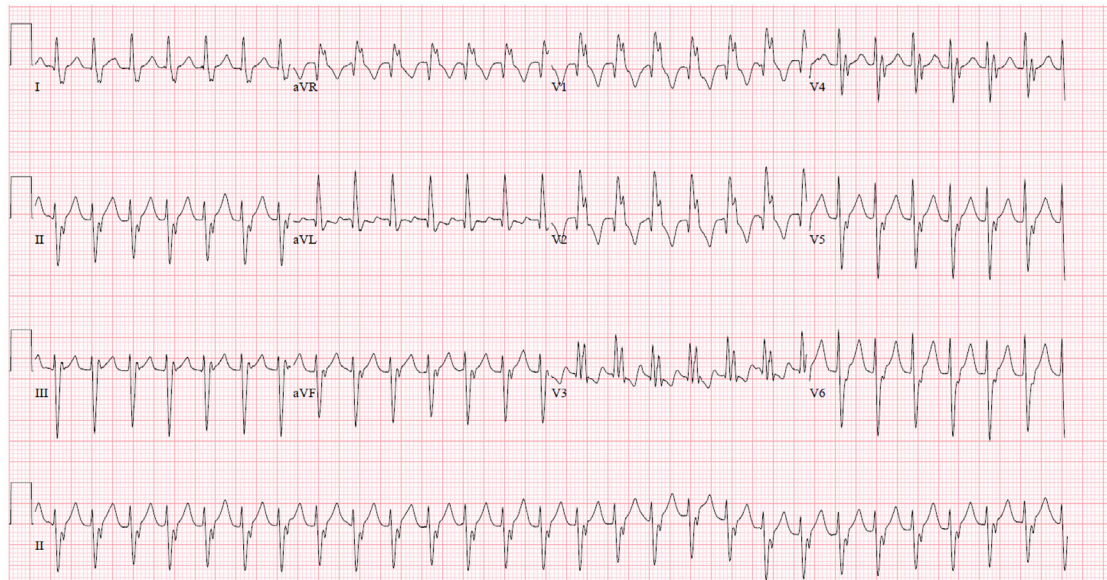
FVT can be difficult to distinguish from classic ventricular tachycardia (VT) or other supraventricular tachycardias (SVT) with aberrancy. While FVTs almost always result in a QRS duration > 120 ms, they are typically narrower than classic VT in a range of 120–140 ms. Classic VT is rarely as narrow as 120 ms, should seldom have such a steep, rapidly conducted QRS upstroke as seen in many of the leads in Figure 1, and generally does not create a bundle branch block pattern. The same characteristics make antidromic atrioventricular reentrant tachycardia improbable.

Although sinus tachycardia and atrial flutter with aberrancy are not ruled out, there are no visible P or flutter waves. The differential is narrowed significantly to FVT originating in the left posterior fascicle or an SVT with RBBB and left anterior fascicular block. It is unlikely that a healthy adolescent would be unable to conduct at 160 bpm, making FVT likelier.

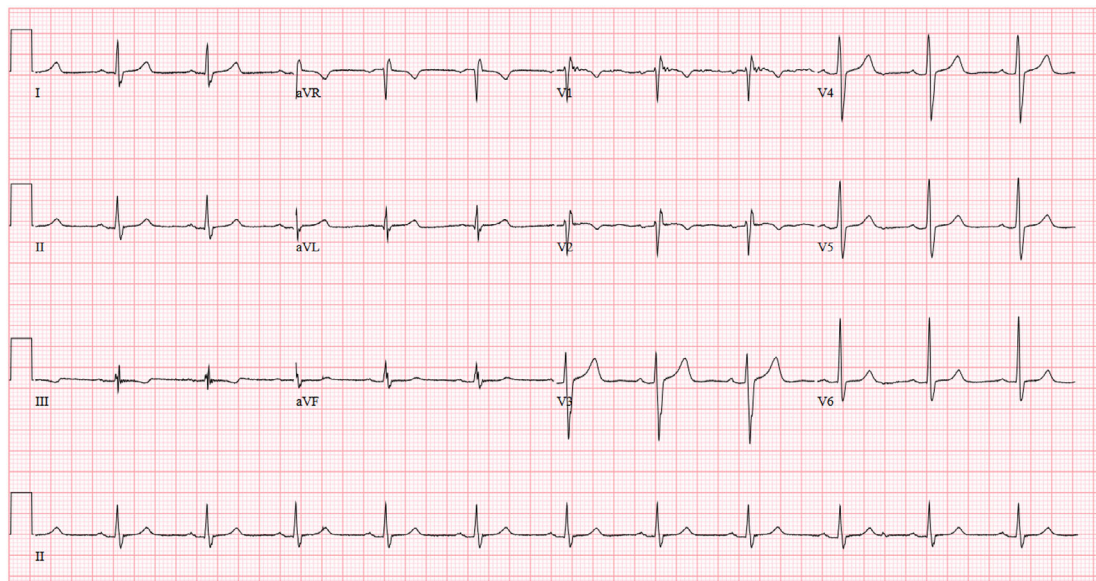
Management includes verapamil and ablation, with the latter successful in 70%–90% of cases.<sup>3</sup> If diagnostic uncertainty exists, cardioversion is safest. In this case, the patient was treated with intravenous verapamil with return of normal sinus rhythm (Figure 2). Outpatient electrophysiology study confirmed the diagnosis and ablation was performed.

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**FIGURE 1** Initial 12-lead electrocardiogram performed on arrival to the emergency department.



**FIGURE 2** Post-cardioversion 12-lead electrocardiogram after administration of verapamil.

#### CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

#### ORCID

Lauren Icken MD  <https://orcid.org/0000-0002-8949-905X>

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