

Not Your Usual Pre-Excitation

ECG CHALLENGE

A 67-year-old man with a medical history of moderate to severe mitral regurgitation secondary to flail posterior mitral valve leaflet, hypertension, type II non-insulin-dependent diabetes mellitus, and paroxysmal atrial fibrillation was found to have the following ECG (Figure 1) after elective mitral valve repair. What abnormalities are present? Do you recommend further testing or treatment?

Please turn the page to read the diagnosis.

Rajat Goyal, MD
 Abhijeet Singh, MD
 Roger Fan, MD

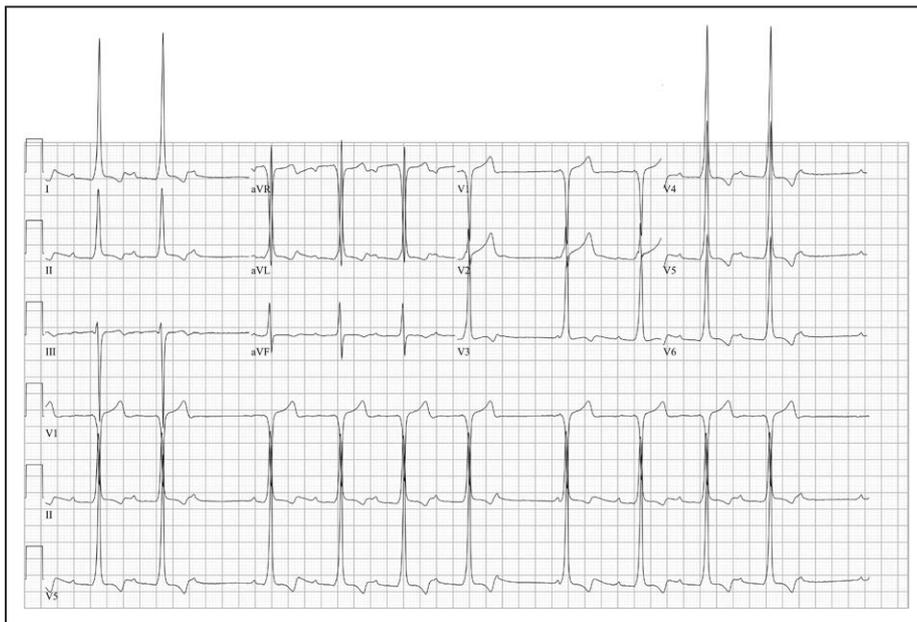


Figure 1. ECG obtained after elective mitral valve repair.

Correspondence to: Roger Fan, MD, Stony Brook University Hospital, Heart Rhythm Center, HSC T16-080, Stony Brook, NY 11794. E-mail roger.fan@stonybrookmedicine.edu

© 2017 American Heart Association, Inc.

RESPONSE TO ECG CHALLENGE

The ECG (Figure 2) demonstrates normal sinus rhythm with pre-excitation but unexpectedly with progressively lengthening PR interval consistent with Mobitz I (Wenckebach) block. The seventh QRS complex (arrow) is a junctional escape beat that occurs simultaneously with a nonconducted P wave. Prominent delta waves are seen with all QRS complexes without a change in the degree of pre-excitation despite progressive atrioventricular block or with junctional escapes. In addition, there are nonconducted P waves. These findings demonstrate that the level of pre-excitation is below the level of the atrioventricular node. This ECG is therefore consistent with the diagnosis of a fasciculoventricular accessory pathway (FVAP).

FVAPs are a rare occurrence, with an incidence of 1.2% to 5.1% of all pre-excitation syndromes.¹ They take off below the atrioventricular node (from the His bundle or bundle branches) and insert directly into the ventricular septum, resulting in pre-excitation that is often subtle.²

A surface ECG on its own is rarely able to differentiate between pre-excitation due to a typical atrioventricular accessory pathway and that from an FVAP, especially in

patients with anteroseptal or midseptal bypass tracts.² In a typical accessory pathway, atrioventricular nodal Wenckebach is usually not seen because it is masked by brisk antegrade conduction over the accessory pathway, resulting in a fixed P wave-to-delta wave time. No blocked P waves are seen either because there is always an alternative route to the ventricle. In patients with an FVAP, however, 3 specific ECG findings are seen. First, there is a fixed amount of pre-excitation despite progressive atrioventricular delay. Second, atrioventricular nodal block leads to an absence of atrioventricular conduction (ie, a dropped P wave). Last, when present, premature junctional beats (or junctional escape complexes) will exhibit the same degree of pre-excitation as sinus beats. The 3 findings taken together confirm that pre-excitation occurs below the level of the atrioventricular node and therefore the presence of an FVAP.

Clinically, FVAPs are benign and have not been implicated in any arrhythmias.³ There is also no concern for 1-to-1 conduction of atrial fibrillation because the atrioventricular node is present to protect against this. Hence, no further clinical testing is required.³ This patient actually first presented with pre-excited atrial fibrillation with rapid ventricular response at the time of his

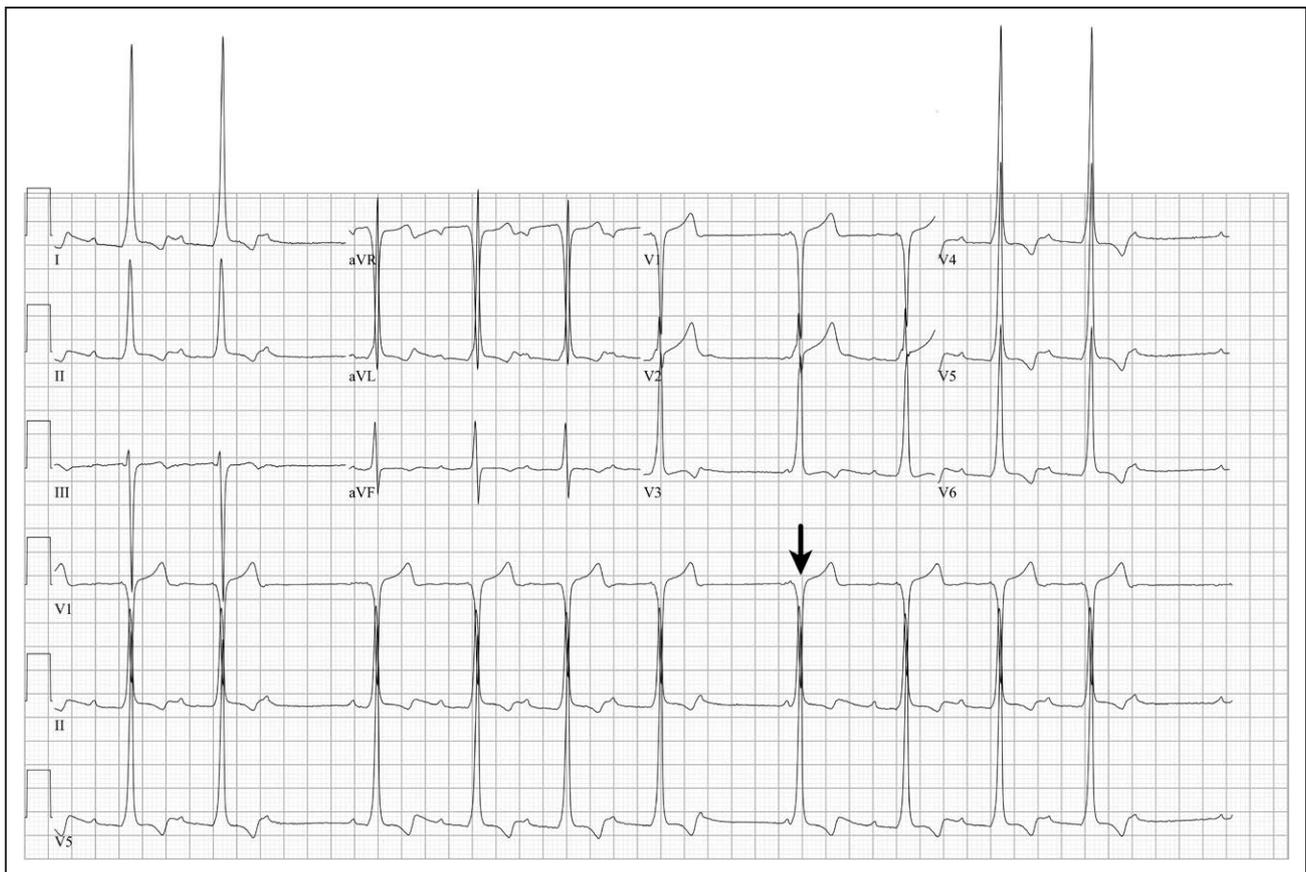


Figure 2. ECG findings.

Sinus rhythm with fixed preexcitation and Mobitz I block. **Arrow** indicates a junctional escape beat with the same degree of pre-excitation. These findings confirm the presence of a fasciculoventricular accessory pathway.

diagnosis of flail mitral leaflet. Before surgery, he underwent electrophysiological study in which FVAP was diagnosed. No ablation was performed given the favorable prognosis associated with this diagnosis.

DISCLOSURES

None.

FOOTNOTES

Circulation is available at <http://circ.ahajournals.org>.

REFERENCES

1. Suzuki T, Nakamura Y, Yoshida S, Yoshida Y, Shintaku H. Differentiating fasciculoventricular pathway from Wolff-Parkinson-White syndrome by electrocardiography. *Heart Rhythm*. 2014;11:686–690. doi: 10.1016/j.hrthm.2013.11.018.
2. Sternick EB, Rodriguez LM, Gerken LM, Wellens HJ. Electrocardiogram in patients with fasciculoventricular pathways: a comparative study with anteroseptal and midseptal accessory pathways. *Heart Rhythm*. 2005;2:1–6. doi: 10.1016/j.hrthm.2004.10.009.
3. Josephson ME. Preexcitation syndromes. In: *Josephson's Clinical Cardiac Electrophysiology: Techniques and Interpretations*. 5th ed. Philadelphia, PA: Wolters Kluwer Health; 2016: 434–436.

Not Your Usual Pre-Excitation
Rajat Goyal, Abhijeet Singh and Roger Fan

Circulation. 2017;135:1759-1761

doi: 10.1161/CIRCULATIONAHA.117.028386

Circulation is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231

Copyright © 2017 American Heart Association, Inc. All rights reserved.

Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the
World Wide Web at:

<http://circ.ahajournals.org/content/135/18/1759>

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in *Circulation* can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the [Permissions and Rights Question and Answer](#) document.

Reprints: Information about reprints can be found online at:
<http://www.lww.com/reprints>

Subscriptions: Information about subscribing to *Circulation* is online at:
<http://circ.ahajournals.org/subscriptions/>