

Case report

Pre-excited atrial fibrillation in a woman with minimal pre-excitation: A case report

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A 46-year-old Thai woman presented with palpitations. A 12-lead electrocardiogram (ECG) showed rapid pre-excited atrial fibrillation (AF). The ECG following electrical cardioversion demonstrated minimal pre-excitation with a short PR interval and small apparent delta waves only in leads II, III, V₄, and V₅. An electrophysiologic study was performed and revealed sinus rhythm with a short H-V interval compatible with pre-excitation. A programmed electrical stimulation revealed orthodromic atrioventricular re-entrant tachycardia via the left lateral accessory pathway. Catheter ablation was successfully performed using a retrograde aortic approach to the left lateral accessory pathway. There was no recurrence of Wolff–Parkinson–White ECG pattern, supraventricular tachycardia, or AF during the 12-month follow-up visit. This is a rare case of minimal pre-excitation presenting with pre-excited AF as the first presentation. This case report reflects that minimal pre-excitation does not indicate a low risk of ventricular fibrillation and sudden cardiac arrest.

Keywords: Accessory pathway, bypass tract, minimal preexcitation, preexcited atrial fibrillation, Wolff–Parkinson–White.

Patients with Wolff–Parkinson–White (WPW) syndrome have a bridging atrioventricular (AV) pathway in the myocardium, which leads to antegrade conduction from the atrium to the ventricle. A previous study demonstrated that the incidence of atrial fibrillation (AF) was 11.0% in these patients.⁽¹⁾ The faster conduction velocity via the accessory pathway compared with that of AV nodal tissue results in a rapid ventricular rate in patients with pre-excited AF. This may lead to cardiac arrest because of ventricular fibrillation (VF). Pre-excited AF risk depends on the duration of the antegrade refractory period and the number of accessory pathways.⁽²⁾ However, pre-excited AF rarely occurs in patients with minimal pre-excitation. The author reports here a patient with minimal pre-excitation who presented with pre-excited AF as the initial presentation.

Case report

A 46-year-old Thai woman presented with palpitations at the emergency department of a provincial hospital. She had a history of hypertension and dyslipidemia. A 12-lead electrocardiogram (ECG) was performed and revealed an irregular wide QRS complex tachycardia with delta waves most apparent in leads V₄ and V₅ (173 beats/min), compatible with pre-excited AF (**Figure 1**). A 120-joule electrical cardioversion was successfully performed to restore sinus rhythm. The subsequent ECG exhibited minimal pre-excitation with a short PR interval of 108 ms and small apparent delta waves only in leads II, III, V₄, and V₅ (**Figure 2**). The minimal pre-excitation pattern was defined as the maximal delta wave duration, which was measured from the onset of the delta wave to the rapid deflection of the QRS complex in any leads of the 12-lead ECG, with a duration of less than 40 ms.⁽³⁾ The laboratory examination revealed normal electrolytes. An echocardiogram revealed good left ventricular contraction without wall motion abnormalities or significant valvular dysfunction. The sinus rhythm was maintained with flecainide 200 mg/day and bisoprolol 2.5 mg/day. The patient was prescribed warfarin 21 mg/week for stroke prevention because she had a CHA₂DS₂-VA score of 1. She was referred to the author's hospital for catheter ablation.

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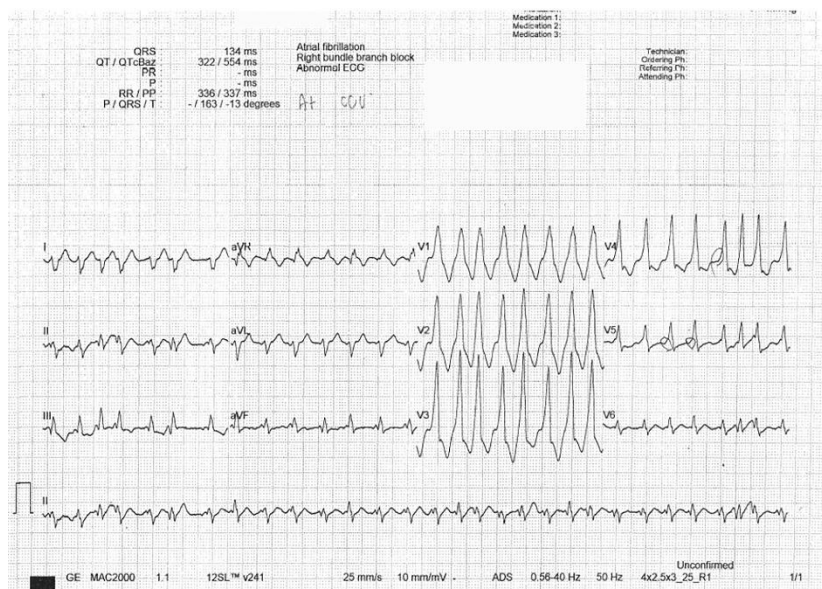


Figure 1. A 12-lead electrocardiogram illustrating an irregular wide QRS complex tachycardia with delta waves most apparent in leads V_4 and V_5 compatible with preexcited atrial fibrillation.

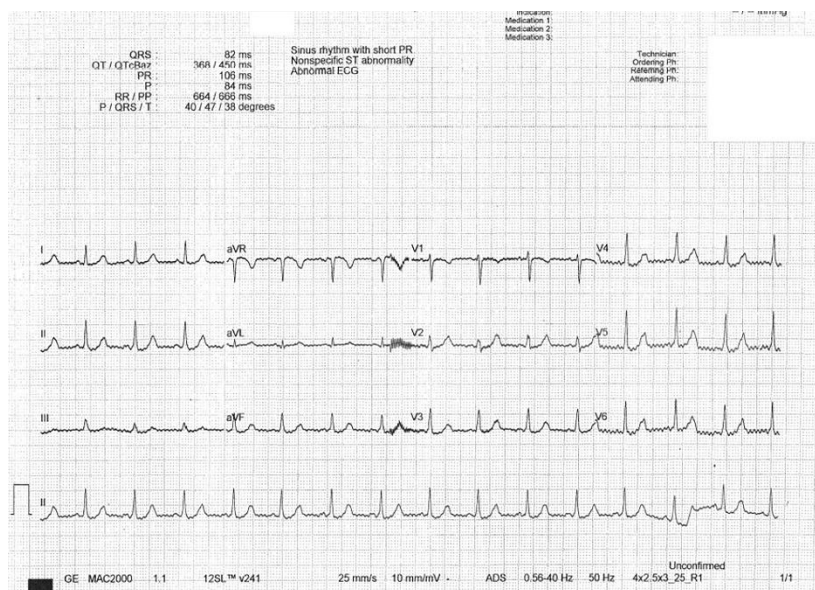


Figure 2. A 12-lead electrocardiogram after electrical cardioversion showing minimal preexcitation with small delta waves in leads II, III, V_4 , and V_5 .

An electrophysiologic study (EPS) was performed and showed sinus rhythm with a short H-V interval of 31 ms, compatible with pre-excitation (**Figure 3**). The shortest pre-excited RR interval during atrial pacing was 360 ms, and the accessory pathway antegrade effective refractory period (ERP) was 240 ms. Programmed electrical stimulation revealed a regular narrow QRS complex tachycardia with eccentric atrial activation (the earliest atrial activation was at CS1,2), compatible with orthodromic

AV re-entrant tachycardia via the left lateral accessory pathway (**Figure 4**). Catheter ablation was successfully performed via a retrograde aortic approach to the left lateral accessory pathway, resulting in the loss of delta waves. After catheter ablation, no supraventricular tachycardia (SVT) or AF was inducible during isoproterenol infusion, and no delta waves reappeared after adenosine administration. The subsequent ECG revealed sinus rhythm without delta waves (**Figure 5**). Flecainide, bisoprolol, and warfarin were discontinued after catheter ablation. There was no recurrence of the WPW ECG pattern, SVT, or AF at the 12-month follow-up visit.



Figure 3. An electrophysiologic study revealing sinus rhythm with a short H-V interval of 31 ms compatible with preexcitation.

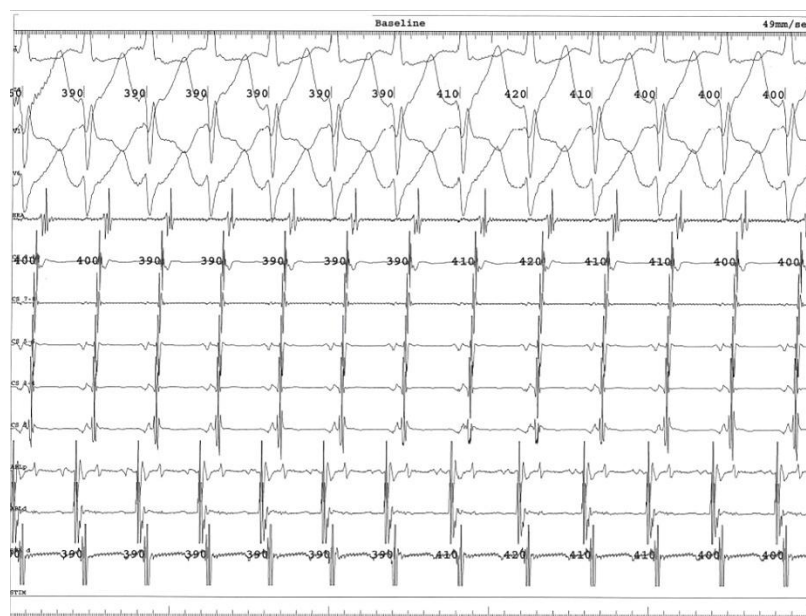


Figure 4. A programmed electrical stimulation showing the regular narrow QRS complex tachycardia with eccentric atrial activation (the earliest atrial activation was at CS1,2) compatible with orthodromic atrioventricular reentrant tachycardia utilizing left lateral accessory pathway. CS, coronary sinus.

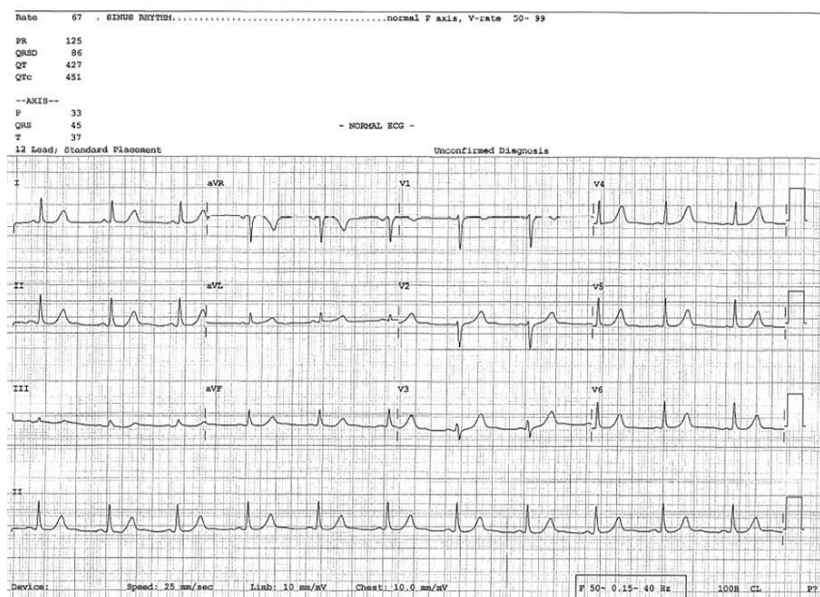


Figure 5. The subsequent ECG after catheter ablation showing sinus rhythm without delta waves. ECG, electrocardiogram.

Discussion

This patient was a rare case of minimal pre-excitation presenting with pre-excited AF as the first presentation. Pre-excited AF is a life-threatening cardiac arrhythmia leading to VF and cardiac arrest. In general, the degree of pre-excitation in patients with WPW syndrome depends on the degree of conduction velocity through the accessory and AV nodal pathways, which determine ventricular activation. Minimal pre-excitation is related to slower conduction velocity over the accessory pathway, faster conduction velocity through the normal AV nodal pathway, and a delayed intra-atrial conduction time to the atrial insertion of the accessory pathway.⁽³⁾

A previous study showed that the left lateral accessory pathway is more common in patients with minimal pre-excitation.⁽³⁾ Moreover, there was a study demonstrating that approximately one-third of patients with left-sided accessory pathways had decremental antegrade conduction.⁽⁴⁾ This patient had a left lateral accessory pathway, which was far from the AV nodal pathway, which resulted in a delayed intra-atrial conduction time to the atrial insertion of the accessory pathway and might subsequently have decremental antegrade conduction. Although this patient had minimal pre-excitation, AF could conduct through the accessory pathway, leading to pre-excited AF, because

the accessory pathway ERP in this patient was less than 250 ms, reflecting a high-risk accessory pathway. This supports the European Society of Cardiology guidelines recommending EPS to risk-stratify patients with asymptomatic pre-excitation, as more than one-fifth of patients with intermittent pre-excitation have accessory pathway ERPs of less than 250 ms.⁽⁵⁾ Hence, patients with minimal pre-excitation, as well as those with intermittent pre-excitation, which have slower conduction velocity via the accessory pathway compared to the AV nodal pathway, do not indicate a low risk of VF and sudden cardiac arrest.

Conclusion

This is a rare case of minimal pre-excitation presenting with pre-excited AF as the first presentation. This case reflects that minimal pre-excitation does not indicate a low risk of VF and sudden cardiac arrest.

Author contributions

KM contributed substantially to the study concept and design, data acquisition, literature review, data analysis and interpretation, manuscript drafting, and critical editing of the manuscript for important intellectual content. The author approved the final version submitted for publication and takes responsibility for statements made in the published article.

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Conflicts of interest statement

The author has completed the International Committee of Medical Journal Editors Form for Disclosure of Conflicts of Interest. The author has no potential or actual conflict of interest to disclose related to the present article.

Data sharing statement

Data generated or analyzed for the present report are included in this published article. Further details are available from the corresponding author on reasonable request after deidentification of the patient whose data are included in the report.

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