

# ECG ROUNDS

## A Lady With Palpitation

### Clinical History:

This 19-year-old female patient presented with recurrent palpitations for 3 years. The palpitations were of sudden onset, lasting for hours and stopped abruptly, and were associated with dizziness and chest discomfort. **Figures 1 and 2** show the ECG during an episode of palpitation and immediately after the attack respectively.

Figure 1

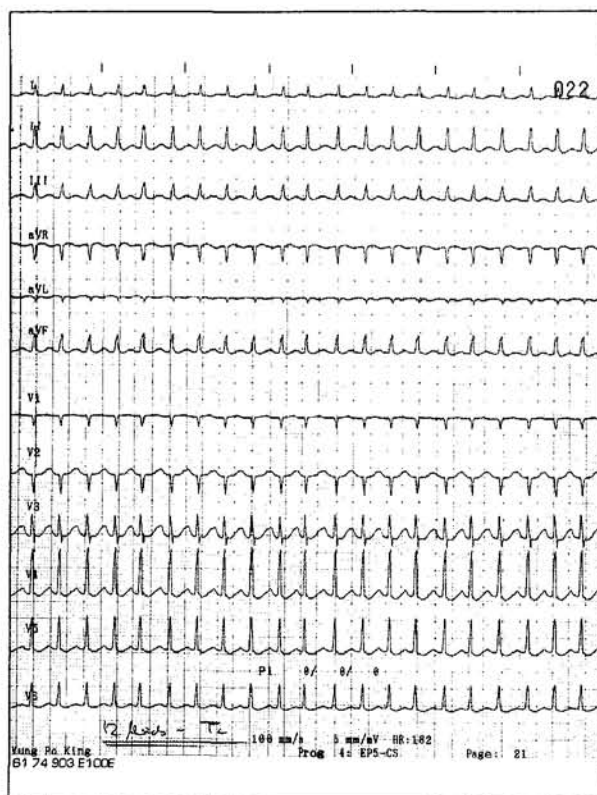
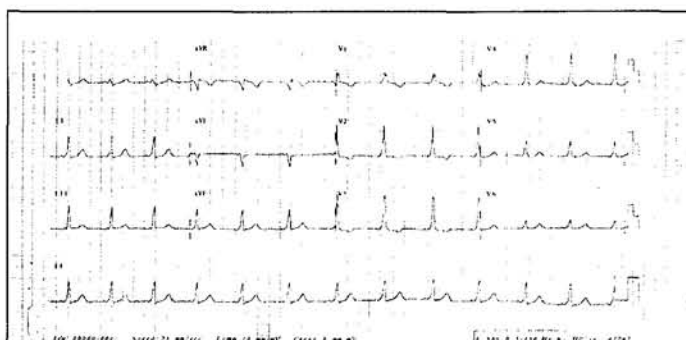


Figure 2



### Question 1: What was the diagnosis?

- A. Left ventricular hypertrophy with atrial fibrillation
- B. Acute myocardial infarction with ventricular tachycardia
- C. Wolff-Parkinson-White Syndrome with supraventricular tachycardia
- D. Acute pericarditis with sinus tachycardia

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**Answer : C. Wolff-Parkinson-White Syndrome with supraventricular tachycardia**

This ECG during palpitation (**Figure 1**) shows regular narrow complex tachycardia, with a heart rate of 182 per minute. The diagnosis is most likely paroxysmal supraventricular tachycardia (accessory pathway mediated atrioventricular reciprocating tachycardia or atrioventricular nodal reentrant tachycardia). The other differential diagnosis is atrial flutter with regular atrioventricular block. This is less likely because the ventricular rate is usually 150/min or 100/min in atrial flutter with either 2 : 1 or 3 : 1 block. Moreover, there is no definite evidence of sawtooth flutter wave in **Figure 1**.

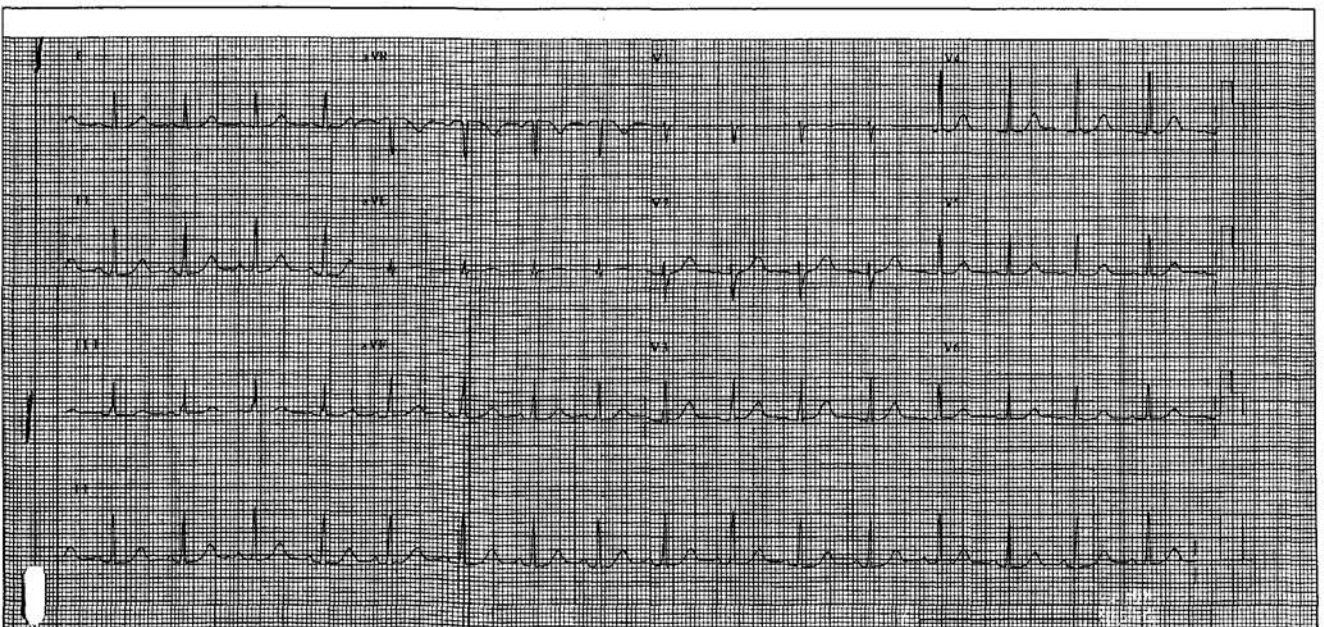
The ECG in **Figure 2** shows a short PR interval of 80 milliseconds (ms) (normal range is 120 ms to 200 ms), and a widened QRS duration of 160 ms (normally up to 120 ms). On close examination, there is slurring of the initial upstroke of the QRS complex (e.g. in lead II), which is a delta wave. The presence of palpitations and these ECG features constitute the Wolff-Parkinson-White

Syndrome. The delta wave implies an accessory pathway connecting the atrium and ventricle, which conducts without delay – hence the short PR interval. The delta wave and QRS complex are positive in chest lead VI, and this is classified as type A Wolff-Parkinson-White syndrome. A left-sided accessory pathway is likely, and because of the negative polarity of delta wave in limb lead aVL, the accessory pathway is situated in the left lateral free wall position.

**Question 2:** In view of her frequent symptomatic arrhythmic attacks, she underwent an interventional cardiological procedure under local anaesthesia. **Figure 3** shows the ECG after that procedure. What was the procedure?

- A. Coronary artery bypass grafting
- B. Radiofrequency ablation of the accessory pathway
- C. Direct current ablation of the atrioventricular node
- D. Surgical division of the accessory pathway

**Figure 3**



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### Answer : B. Radiofrequency ablation of the accessory pathway

The ECG after the procedure (Figure 3) shows normal sinus rhythm, a normal PR interval (150 ms), and QRS duration (80 ms), and absence of the delta wave. The patient had a diagnostic electrophysiological study which confirmed the proposed mechanism of the narrow complex tachycardia and localized the accessory pathway at the left free wall position. This test was performed under local anaesthesia and the catheters were inserted into the heart under x-ray guidance. At the same setting, radiofrequency energy was applied through a mapping catheter to eliminate the accessory pathway. The patient was cured of her tachycardia.

Radiofrequency ablation is a well established treatment option for symptomatic Wolff-Parkinson-White Syndrome.<sup>1-3</sup> The success rate is high (> 90%) and the incidence of complications is low (1-4%).<sup>1,2</sup> The procedure was first performed in Hong Kong in 1990.<sup>4</sup> It offers arrhythmia cure and relieves patients from the need of life-long anti-arrhythmic drugs, which are both costly and sometimes potentially harmful. The quality of life and exercise capacity are significantly better after successful radiofrequency ablation than medical treatment.<sup>5</sup> Radiofrequency ablation can be applied to

patients with multiple accessory pathways, and patients with structural heart disease such as Ebstein's Anomaly can also be managed by radiofrequency ablation.<sup>6</sup> Radiofrequency ablation should be considered as the preferred treatment option for patients with symptomatic accessory pathway mediated tachycardia. ■

### References

1. Jackman WM, Wang X, Friday KJ *et al.* Catheter ablation of accessory atrioventricular pathways (Wolff-Parkinson-White Syndrome) by radiofrequency current. *N Engl J Med.* 1991; 324: 1605-1611.
2. Calkins H, Langberg J, Sousa J *et al.* Radiofrequency catheter ablation of accessory atrioventricular connections in 250 patients: abbreviated therapeutic approach to Wolff-Parkinson-White Syndrome. *Circulation* 1991; 85: 1337-1346.
3. Kuck KH, Schluter M, Geiger M *et al.* Radiofrequency current catheter ablation of accessory atrioventricular pathways. *Lancet* 1991; 337: 1557-1561.
4. Tai YT, Lau CP. Percutaneous catheter ablation with radiofrequency energy: non-surgical cure for patients with supraventricular tachyarrhythmias. *J Hong Kong Med Asso* 1991; 43(2): 113-123.
5. Lau CP, Tai YT, Lee P. The effects of radiofrequency ablation versus medical therapy on the quality of life and exercise capacity in patients with accessory pathway mediated tachycardia. *PACE* 1995; 18: 424-432.
6. Chan RHW, Chan WK, Chow TH *et al.* Radiofrequency catheter ablation of multiple accessory pathways in patients with Ebstein's Anomaly: a diagnostic and therapeutic challenge. (abstract) *J HK Coll Cardiol* 1995; 3(1): 71.