Reminder of important clinical lesson

Asymptomatic Wolff–Parkinson–White syndrome: incidental ECG diagnosis and a review of literature regarding current treatment

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Summary

A 19-year-old male presented with periorbital cellulitis responsive to intravenous antibiotics. A routine ECG on admission showed slurred upstroke of the QRS complexes consistent with Wolff–Parkinson–White syndrome (WPW). He has never experienced any cardiac-related symptoms. Once the periorbital cellulitis resolved, he was referred to the specialist cardiology ablation clinic. He was counselled on the arrhythmogenic risks of untreated WPW and the potential complications of radiofrequency catheter ablation (RFCA). He decided to go ahead with electrophysiological studies and RFCA, which took place successfully. This case highlights the importance of routine ECG in the diagnosis of asymptomatic WPW. The use of prophylactic ablation of asymptomatic WPW is controversial and should be considered on a case-specific basis.

BACKGROUND

Wolff–Parkinson–White syndrome (WPW) is a macro-reentrant arrhythmia first described over 80 years ago in healthy young people with shortened PR intervals and bundle branch block on ECG.¹ These patients were prone to tachycardia episodes.¹ It is now known that conduction through an accessory pathway (AP), also known as Bundle of Kent, causes pre-excitation of the ventricles.² This predisposes patients to supraventricular tachycardia, atrial fibrillation and, in worst cases, ventricular fibrillation (VF) leading to cardiac arrest.³ Characteristic ECG appearance includes shortened PR intervals and slurred upstrokes of the QRS complexes.⁴

WPW has an estimated prevalence of 2–4 per 1000⁵ and a significant proportion is found incidentally in asymptomatic patients when presenting for routine checkups.⁶ Although both symptomatic and asymptomatic WPW patients are prone to developing life-threatening arrhythmias such as VF, asymptomatic patients can remain undetected and therefore may miss the chance for intervention. Alarming, up to 50% of WPW patients presenting with cardiac arrest had previously been asymptomatic.²

Electrophysiological studies (EPS) are a useful tool in risk stratification of WPW and the definitive management of WPW is radiofrequency catheter ablation (RFCA), which is recommended for the treatment of symptomatic WPW according to American College of Cardiology, American Heart Association and European Society of Cardiology (ACC/AHA/ESC) guidelines.⁸ However, these guidelines are unclear over the management of asymptomatic WPW; an area of continuing controversy.⁹ Alternatively, drug therapy can be used for the management of symptomatic WPW but evidence is lacking for treatment of asymptomatic WPW.²

CASE PRESENTATION

A 19-year-old male university student presented to the emergency department with a gradual-onset pain and swelling of his left periorbital region over 4–5 h after being stung by a wasp while sunbathing. He was otherwise fit and well with no significant medical history or family history. On examination, he could only partially open his left eye and there was gross periorbital erythematous swelling encroaching on the eyeball. There were no ophthalmoplaegia or visual disturbances. Visual acuity was normal. Cardiovascular, respiratory and abdominal examinations were unremarkable. Observations were as follows: auricular temperature 37.1°C, pulse 70 per minute and regular, blood pressure 115/77 mm Hg, oxygen saturation 100% on room air.

INVESTIGATIONS

Blood tests were consistent with infection: haemoglobin 14.5 g/dl, white cell count $12.1 \times 10^9/l$, platelets $380 \times 10^9/l$, neutrophils $10.3 \times 10^9/l$, sodium 139 mmol/l, potassium 3.9 mmol/l, urea 4.5 mmol/l, creatinine 62 $\mu\text{mol/l}$, glucose 5.3 mmol/l and C reactive protein was 16 mg/l (figure 1). Urine dipstick was clear. A resting ECG showed slurred upstrokes of the QRS complexes (figure 2).

DIFFERENTIAL DIAGNOSIS

Asymptomatic WPW.

TREATMENT

Our patient's periorbital cellulitis showed good response to intravenous benzylpenicillin and flucloxacillin. He was referred to an electrophysiology ablation clinic where he was counselled on the risks of life-threatening arrhythmias

if WPW was left untreated. He was offered RFCA and counselled on the potential risks of procedural complications. Our patient decided to proceed with treatment and underwent electrophysiology studies with subsequent RFCA of WPW.

OUTCOME AND FOLLOW-UP

The patient underwent successful catheter ablation of WPW with follow-up in our cardiology outpatient department and continues to be well.

DISCUSSION

We presented a patient incidentally diagnosed with WPW who later underwent successful RFCA. This was

an interesting case for two reasons. First, the diagnosis of asymptomatic WPW represents a 'tip of the iceberg' scenario where the numbers of patients picked up from routine ECGs represent only a small proportion of the disease burden. This calls for clinicians to possess an open mind when dealing with patients with unrelated problems in acute medicine. Second, the management of asymptomatic WPW is controversial and has been the subject of much debate in the literature. We aim to explain the rationale behind the management of our patient and put it into perspective with current opinions.

Complications of WPW

Untreated asymptomatic WPW leads to life-threatening arrhythmias. In 1986, Milstein *et al* followed-up 42 patients with asymptomatic WPW and found that the risk of unprovoked serious arrhythmia was low.¹⁰ Later in 1990, a similar study by Leitch *et al* demonstrated that supraventricular tachycardia developed in 6 out of 75 patients during a 4-year follow-up. More recently, Pappone *et al* demonstrated in a 5-year prospective cohort study of 212 patients with asymptomatic WPW that EPS are useful tools in risk stratification.¹² In this study, the authors found that patients who were younger, with shorter AP anterograde refractory periods and multiple APs were more likely to develop symptoms. Three patients developed VF cardiac arrest, highlighting the potential dangers of untreated asymptomatic WPW.¹³ A similar study carried out later by the same group on 184 asymptomatic children with WPW demonstrated similar results.¹¹ Nineteen children experienced potentially life-threatening arrhythmic event within 20 months of follow-up, of whom three had arrhythmia-related cardiac arrests.¹¹ These studies demonstrate the risks of life-threatening arrhythmia development in untreated asymptomatic WPW and have earmarked EPS as a reliable risk stratification tool.

WPW and Ablation

WPW can be managed with drugs or ablation. RFCA has been shown in numerous studies to be effective in

Full blood count and differentials

Haemoglobin	14.5 g/dl
White cell count	12.1 × 10 ⁹ /L
Platelets	380 × 10 ⁹ /L
Neutrophils	10.3 × 10 ⁹ /L

Urea and Electrolytes

Sodium	139 mmol/L
Potassium	3.9 mmol/L
Urea	4.5 mmol/L
Creatinine	62 µmol/L

Other tests

Glucose	5.3 mmol/L
C-reactive protein	16 mg/L.

Figure 1 Blood results on admission.

Figure 2 ECG on admission. There are QRS complexes with slurred upstrokes, that is, 'delta waves' throughout the ECG. This ECG demonstrates Wolff-Parkinson-White syndrome.

terminating the AP in WPW, with success rate around 95%.¹⁴ However, the procedure itself is not without risks. Two large scale landmark studies Multicentre European Radiofrequency Survey (MERFS, n=2222) and North American Society of Pacing and Electrophysiology (NASPE, n=5427) demonstrated serious complication rates of 4.4% and 1.8% respectively.^{15 16} In another study by Kugler *et al* on 5383 ablations, cumulative complication rate was 3%, including perforation and thromboembolic events.¹⁷ These studies along with many others indicate that although RFCA is a highly effective treatment for WPW, it carries a small but possible risk of serious complications.

Asymptomatic WPW and the treatment dilemma

The decision to perform RFCA depends on balancing the risk of procedure complications against the likelihood of developing life-threatening arrhythmias if the WPW syndrome is left untreated. ACC/AHA/ESC SVT guidelines considers that the latter risks are greater than the former and therefore state that 'RFCA has sufficient efficacy and low risk' to be used first line for symptomatic WPW. However, the guidelines are unclear regarding the use of prophylactic RFCA for the treatment of asymptomatic WPW. Indeed, previous studies showed that up to 15% of asymptomatic WPW patients develop arrhythmias later in life, but only a small minority develop VF causing cardiac arrest. The majority of asymptomatic patients never develop any symptoms. EPS is therefore used to risk stratify asymptomatic WPW patients and RFCA is offered to patients with high risk of life-threatening arrhythmogenesis. Furthermore, the guidelines state that patient preference is an important consideration and this need to be taken into account.

In this case report, our patient presented with asymptomatic WPW which, at the age of 19, could lead to serious arrhythmias in later life. He was referred to the appropriate specialist for consideration of ablation. He was told that there was a small chance of life-threatening arrhythmias developing later in his life and this needed to be balanced with the potential risk of complications with the RFCA procedure. We empowered him to make a decision and he decided to proceed with RFCA which was successful.

Learning points

- ▶ Asymptomatic WPW is usually diagnosed incidentally and predisposes to life-threatening arrhythmias
- ▶ Optimal management of asymptomatic WPW is controversial
- ▶ Definitive management is referral to specialists for RFCA
- ▶ Decision to treat asymptomatic WPW with ablation should involve the patient consideration.

Competing interests None.

Patient consent Obtained.

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