EMERGENCY CASEBOOK

Beware of prosthetic valve thrombosis despite therapeutic anticoagulation

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Patients with mechanical heart valves require anticoagulation within carefully controlled ranges to prevent valve thrombosis, a life-threatening condition. The majority of doctors will be required to manage anticoagulation, often on a temporary basis such as during elective procedures. As long-term anticoagulation management moves away from specialised hospital clinics, there needs to be widespread awareness of the complications of sub-therapeutic international normalised ratios (INRs).

CASE HISTORY

A woman, aged 56 years, with severe aortic regurgitation required aortic valve replacement with a 23 mm Carbomedics prosthetic valve. Coronary angiography at this time had demonstrated unobstructed coronary arteries. Following surgery, management of anticoagulation had been difficult, possibly related to poor adherence with warfarin treatment.

She presented 10 years later with rapid onset of shortness of breath, and was found to be in severe pulmonary oedema (fig 1, published with the patient's written consent). She had sinus tachycardia (heart rate 120 beats/min), hypotension (blood pressure 85/40 mm Hg) and at auscultation an ejection click and prosthetic second closure sound could not be heard. A harsh ejection systolic murmur was heard over the whole precordium. The previous week, her INR had been 1.1. The warfarin dose had been increased, and at presentation was 5.3. She required non-invasive ventilation and intravenous furosemide. Despite a good diuresis, there was no clinical improvement. Emergency trans-thoracic echocardiography demonstrated dynamic left ventricular systolic function. The aortic valve prosthesis was not well visualised but colour flow mapping demonstrated marked turbulence to aortic valve inflow and moderate aortic regurgitation. Continuous wave Doppler demonstrated a severe gradient across the aortic valve prosthesis (peak gradient 133 mm Hg, mean gradient 84 mm Hg, normal mean gradient 8–10 mm Hg).

A diagnosis of prosthetic valve thrombosis (PVT) was made and she was transferred for immediate cardiac surgery. At operation, an organised thrombus was found, fixing the two tilting discs. The valve was excised and replaced with a tissue valve. She made a good recovery postoperatively.

DISCUSSION

This case illustrates the importance of a high clinical suspicion for PVT despite a high INR at presentation. Patients with PVT present with acute dyspnoea, and auscultation will reveal an absence of mechanical heart sounds and the presence of new murmurs; Doppler echocardiography will show a high gradient across the valve. Traditionally, fluoroscopic screening was used to make the diagnosis, with a reduction in valve movement clinching the diagnosis. Transoesophageal echocardiography has largely superseded fluoroscopy, allowing visualisation of

thrombus and abnormal leaflet movement. This patient was too ill to undergo transoesophageal echocardiography until intubated immediately before cardiac surgery.

Valve replacement surgery started with the advent of cardiopulmonary bypass in the 1950s, and the dangers of PVT were rapidly recognised. Risk factors include inadequate anticoagulation, including the use of low molecular-weight heparin in place of intravenous unfractionated heparin, poor drug compliance, low cardiac output and hypercoagulable states such as pregnancy. PVT is higher in the mitral than in the aortic position. Patients with a prosthetic valve and sub-therapeutic INR must be admitted urgently and treated with intravenous heparin.

PVT is life threatening and may be treated surgically or by thrombolytic treatment. Patients presenting in cardiogenic shock are at the highest risk of death and therefore some authorities recommend thrombolysis for these patients in view of the high mortality from surgery.¹ However, thrombolysis for PVT is unsuccessful in 16% of cases, and there is a 9% chance of stroke. Mortality from surgery is likely to be related to end-organ failure, so early diagnosis is essential. In a series of patients undergoing valve replacement surgery for PVT, the inhospital mortality was 41%, and the 10-year actuarial survival was 46%.²

PVT should be suspected in any patient with a prosthetic valve who presents with pulmonary oedema. The clinical history and disappearance of prosthetic heart sound on auscultation should especially alert the doctor to the diagnosis.

Figure 1 Chest radiograph showing pulmonary oedema. Informed patient consent was received for publication of this figure.

Abbreviations: INR, international normalised ratio; PVT, prosthetic valve thrombosis

Maintenance of a therapeutic INR is essential in patients with prosthetic heart valves.

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