Reminder of important clinical lesson

Prosthetic valve thrombosis: keeping the valve ticking!

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Summary

Prosthetic valve thrombosis is a serious acute complication of mechanical valvular replacement, with significant mortality and morbidity. This case highlights the key diagnostic features and the role of thrombolysis in treatment.

BACKGROUND

Prosthetic valve thrombosis can present acutely, with significant mortality and morbidity. It requires rapid diagnostic assessment to ensure optimal treatment.

CASE PRESENTATION

A 32-year-old female chef, with a metallic bileaflet tilting disc mitral valve replacement following infective endocarditis 7 years previously, presented to casualty with increasing dyspnoea on minimal exertion. Records indicated suboptimal anticoagulation over the past year due to poor adherence and the international normalised ratio on admission was subtherapeutic at 1.3. Examination revealed a pansystolic murmur but no stigmata of endocarditis.

INVESTIGATIONS

Transthoracic echocardiography demonstrated a dilated right ventricle with an elevated estimated pulmonary

artery systolic pressure at 80 mm Hg. No thrombus was visualised. Continuous wave Doppler interrogation across the mitral valve prosthesis was grossly abnormal with an increased peak velocity of 3 m/s (normal peak velocity for a bileaflet mitral prosthesis is <1.9 m/s). Furthermore, the peak gradient was also raised at 41.5 mm Hg (normal peak gradient for a bileaflet mitral prosthesis would be <10 mm Hg) with loss of the normal biphasic filling pattern, indicating prosthetic valve dysfunction (figure 1).¹ Urgent cine fluoroscopic examination demonstrated reduced disc motion (video 1) consistent with thrombotic obstruction.

DIFFERENTIAL DIAGNOSIS

The clinical presentation of prosthetic valve thrombosis can be variable, depending on the size and position of the thrombus, and on the degree of obstruction. This can vary from loss of prosthetic valvular sounds and dyspnoea

Figure 1 Continuous wave Doppler interrogation across the mitral valve prosthesis with loss of biphasic filling pattern (prethrombolysis).

Video 1 Cine fluoroscopy of the mitral valve prosthesis demonstrating reduced valve disc motion consistent with thrombotic obstruction.

to overt heart failure.² It can also be associated with embolic phenomena and fever, in which case multiple blood cultures are required to rule out infective endocarditis.

TREATMENT

Once diagnosis is confirmed using echocardiography and cine fluoroscopy, several treatment strategies can be considered. Obstructive prosthetic valve thrombosis requires either surgery or thrombolysis.³ Emergency operation is reasonable for patients with a thrombosed left-sided prosthetic valve (ACC/AHA: Class IIa recommendation).

Fibrinolytic therapy can be considered as first-line therapy in those patients with a low clot burden and NYHA status I–II or in those patients for whom emergency surgery is deemed to be high risk or not available (ACC/AHA: Class IIb recommendation). Fibrinolytic therapy for a left-sided prosthetic valve obstructed by thrombus is associated with significant risks, with cerebral emboli occurring in 12–15% of cases, making surgery the preferred option if available. Thrombolysis can also be considered as first-line therapy for thrombosed right-sided prosthetic valves (ACC/AHA: Class IIa recommendation).⁴

OUTCOME AND FOLLOW-UP

Given the rate of clinical deterioration in this case and following discussion with the cardiologist and cardiothoracic surgeon, immediate fibrinolytic therapy was recommended. Tissue plasminogen activator was administered as a 10 g bolus followed by 90 g over 90 min, leading to immediate clinical improvement. The following morning the patient reported full symptomatic resolution and remarked that she could ‘now hear her valve ticking again’. A repeat echocardiogram revealed a normal trans-mitral flow pattern on Doppler, consisting of a high-velocity E wave corresponding to the early ventricular filling phase followed by a lower-velocity A wave that occurs with atrial contraction (figure 2). She remains well at follow-up with excellent anticoagulation control.

DISCUSSION

Prosthetic valve thrombosis is a rare and potentially life-threatening complication of heart valve replacement. Echocardiography is usually diagnostic, but cine fluoroscopy can also be helpful to confirm the diagnosis. Current AHA/ACC guidelines recommend either thrombolysis or emergency surgery.

Figure 2 Pulse wave Doppler interrogation across the mitral valve prosthesis with normal flow (postthrombolysis).

Learning points

- ▶ Prosthetic valve thrombosis is a serious complication of valve replacement that requires prompt consideration and investigation.
- ▶ Important clinical findings consist of signs of heart failure and muffling or loss of prosthetic valvular sounds.
- ▶ The diagnosis can be confirmed using echocardiography and cine fluoroscopy.
- ▶ Thrombolysis can be considered as the first-line approach for a thrombosed right-sided prosthetic valve, or a thrombosed left sided prosthetic valve where surgery is high risk or unavailable.

Competing interests None.

Patient consent Obtained.

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