CASE REPORT

Large mitral valve aneurysm with infective endocarditis

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SUMMARY

A 63-year-old man with infective endocarditis (IE) was admitted to our hospital after experiencing acute heart failure. A two-dimensional transthoracic and transesophageal echocardiography revealed vegetation attached to both aortic and mitral valves, a very large mitral valve aneurysm, a severe mitral regurgitation jet issuing from a mitral valve perforation and severe aortic regurgitation. Three days after admission, both the aortic and mitral valves were replaced. The patient received antibiotic therapy for 6 weeks postoperatively and recovered with no neurological complications. Although the patient was discharged without recurrence of IE, his transthoracic and transesophageal echocardiography showed periprosthetic mitral regurgitation, requiring him to receive close follow-up monitoring. This case report exemplifies the rather unusual, but important, complications of aortic valve IE, and suggests some suitable forms of intervention.

BACKGROUND

Mitral valve aneurysms and perforations are uncommon, but are nonetheless very important complications of infective endocarditis (IE) of the aortic valve due to their potential to lead to acute heart failure. Patients presenting this condition require emergency surgery.^{1–5} Even after appropriate surgical intervention and antibiotic therapy, some patients develop periprosthetic abscesses, which constitute a risk factor for IE recurrence. The patient in this case report displayed the typical course of aortic valve IE with a very large mitral valve aneurysm and perforation. This case report aims to document these important complications of IE so as to facilitate future diagnoses and ensure that appropriate treatment is provided to patients with IE.

CASE PRESENTATION

A 63-year-old man with a fever, general fatigue and α -streptococcus-positive blood culture was referred to our hospital from another hospital for suspected IE. He had no history of valvular heart disease, or recent dental procedures. He had been suffering from fever and painful, red, raised lesions on the palms for 2 months. His blood pressure was 102/44 mm Hg, his pulse rate was 83/min and his body temperature was 38.9°C. Auscultation revealed a Levine 2/6 early diastolic murmur along the left sternal border, a 2/6 pansystolic murmur at the apex, and a 2/6 systolic murmur along the left sternal border. There were no Osler's nodes in his palms. A chest X-ray showed cardiomegaly and pulmonary venous congestion. Routine blood

tests showed an elevated white cell count of 10 760/mm³ and mild anaemia with haemoglobin at 9.5 g/dL. Two-dimensional (2D) transthoracic echocardiography (TTE) revealed mobile vegetation attached to the anterior mitral leaflet (AML) and aortic valve, and an aneurysm of the AML. The left ventricle was enlarged but systolic function was preserved. A Doppler examination showed severe aortic and mitral regurgitation. There was no pulmonary hypertension (figure 1). Two-dimensional transesophageal echocardiography (TEE) revealed a large aneurysm of the AML with several perforations. The aortic root was free from abscesses. A Doppler examination showed an aortic regurgitant jet striking the AML, and a mitral regurgitant flow issuing from the ruptured aneurysm (figure 2). CT and MRI showed no neurological complications.

TREATMENT

Immediately after admission, antibiotic therapy consisting of a large dose of penicillin and gentamicin was started. Three days after admission, the aortic and mitral valves were replaced with 23 and 29 mm St Jude mechanical prosthetic valves, respectively (St Jude Medical, Inc, St Paul, Minnesota, USA). During the surgery, a large saccular 30×15 mm structure containing a thrombus was found protruding towards the left atrium in the medial portion of the AML. There were two perforations at the base and top of the aneurysm (figure 3). The patient received antibiotic therapy for 6 weeks postoperatively.

OUTCOME AND FOLLOW-UP

The patient promptly recovered from heart failure without neurological complications, and was discharged on day 53 postadmission. Although the postoperative TTE and TEE showed no abscess or vegetation, they revealed two moderate, periprosthetic mitral regurgitation jets issuing from the lateral and medial aspects of the prosthetic valve. These periprosthetic mitral regurgitation jets suggested valve dehiscence and the possibility of IE recurrence. Accordingly, the patient was required to visit the hospital every month to check for recurrence of IE.

DISCUSSION

Mitral valve aneurysms are rarely found in echocardiography laboratories. Their prevalence is 0.2–0.29% of the TEE studies,^{2–5} and they are most frequently seen in association with IE of the aortic valve.^{1–3–5} Gonzalez-Lavin *et al* reported that 2 of 58 patients (3.4%) who underwent aortic valve surgery for IE presented with a mitral leaflet aneurysm.⁶ Vilacosta

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Figure 1 Two-dimensional transthoracic echocardiography with colour Doppler. Apical long-axis view (A and B) showing a saccular structure on the mitral valve (arrowhead) with colour Doppler imaging. Vegetation is seen on the mitral and aortic valves (arrow) (A). LV, left ventricle; LA, left atrium; Ao, aorta.

*et al*² reported the incidence of mitral leaflet aneurysm to be 9.6% among 135 patients with IE while the size of the aneurysms ranged from 3×3 to 30×25 mm. Mitral valve aneurysms also have been reported in association with isolated mitral valve IE,² mitral valve prolapse⁷ and connective tissue disease.⁸ To the best of our knowledge, our case, with IE of both the aortic and mitral valves, presented the second largest aneurysm (30×15 mm) ever reported in the literature.

Many reports offer explanations of the mechanism of mitral valve aneurysms in patients with IE. One such explanation suggests that the ‘jet lesions’ caused by the infected aortic regurgitant jet striking the AML could lead to a secondary infection of

the mitral valve resulting in the formation of a leaflet aneurysm. In this scenario the infected site of the AML could protrude towards the left atrium and become perforated.^{1 2 9} Indeed, in our case, the ‘jet lesions’ were likely to have caused the mitral valve aneurysm and perforation.

Although 2D echocardiography has played an essential role in the evaluation of patients with IE,⁴ three-dimensional (3D) echocardiography has also demonstrated great utility for this purpose. Schwalm *et al*¹⁰ reported that 3D TEE was helpful for assessing mitral leaflet perforations in patients with IE. Some studies have reportedly used 3D TTE to visualise the detailed morphology of ruptured mitral valve aneurysms in aortic valve

Figure 2 Two-dimensional transesophageal echocardiography with colour Doppler. Long-axis view (A and B) showing aneurysm of the anterior mitral leaflet (arrowhead). Short-axis view (C and D) showing mitral regurgitation jet issuing from the ruptured aneurysm of the mitral valve leaflet (arrow). LV, left ventricle; LA, left atrium; Ao, aorta.

Figure 3 Mitral valve with aneurysm (A and B) showing two perforations on the aneurysm (arrowhead) and thrombus contained in the aneurysm. AML, anterior mitral leaflet; PML, posterior mitral leaflet.

IE so as to obviate the need for preoperative TEE.^{11 12} Although 3D echocardiography was not used in this case, this method might be useful in preoperatively visualising the morphological details of affected sites, such as the aneurysm and the number of mitral valve perforations. Postoperatively as well, 3D echocardiography may assist in the follow-up monitoring of prosthetic valve regurgitation, as the prosthetic valves were better visualised in the present case using 3D echocardiography.¹³

The presence of a mitral leaflet aneurysm or perforation indicates emergent, or urgent surgery in patients with IE, because mitral valve destruction leads to acute heart failure.¹⁴ In this case, the patient was prevented from undergoing emergency surgical intervention as required due to the unavailability of surgical and operating room staff, and was required to wait 3 days for surgery following diagnosis. Although mitral valve repair is considered preferable to valve replacement in patients with infected mitral valves,^{4 15 16} the superiority of repairing the infected mitral valve is unclear in patients presenting a large valve aneurysm due to the rarity of this complication of aortic valve IE. Zhang *et al*¹⁷ reported on mitral valve repair for a mitral valve aneurysm in a patient presenting aortic valve IE without visible evidence of mitral valve infection. In our case, the presence of the aneurysm and vegetation on the mitral valve led to the decision to prioritise mitral valve replacement over mitral valve repair.

Following mitral valve repair, or replacement and antibiotic treatment, some patients nonetheless experience a recurrence of IE. The periprosthetic abscess is one of the factors related to the recurrence of IE,⁴ and prosthetic valve dehiscence is reportedly associated with abscess formation.¹⁸ TTE and TEE play an important role in the diagnosis and follow-up of IE.⁴ In our patient, the periprosthetic abscess was not detected either by postoperative TTE or TEE. However, the periprosthetic mitral regurgitation suggested prosthetic valve dehiscence. Although at present there is no evidence as to the optimal intervals for monitoring patients who have completed treatment, clinical assessment, blood samples and TTE at 1, 3, 6 and 12 months during the first year postdischarge are recommended.⁴ Our patient required more intensive monitoring because of his presentation of periprosthetic mitral regurgitation, which suggested the possibility of IE recurrence.

Learning points

- ▶ Mitral valve aneurysm and perforation are unusual but very important complications of aortic valve infective endocarditis (IE) because they may lead to acute heart failure and require emergency surgery.
- ▶ Two-dimensional transthoracic and transesophageal echocardiography are useful for the diagnosis and follow-up monitoring of IE.
- ▶ Close monitoring after discharge is required for patients with periprosthetic mitral regurgitation because it is one of the factors tied to the recurrence of IE.

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