Butterfly in the Heart: Infective Endocarditis after MitraClip Procedure

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INTRODUCTION

The MitraClip procedure (Abbott Vascular, Santa Clara, CA) was introduced in 2003. As of July 2017, >50,000 patients have been treated worldwide.1 Six cases of infective endocarditis (IE) after repair with the MitraClip have been reported.2 Three of the six were caused by Staphylococcus aureus, and two of these patients died. Most of the patients were treated surgically.2,3 Echocardiography plays a vital role in the diagnosis of IE. Transesophageal echocardiography (TEE) has higher sensitivity and specificity in diagnosing IE compared with transthoracic echocardiography (TTE).4,5 We describe a patient who developed IE after MitraClip implantation, showing the importance of the role of echocardiography, especially TEE, after negative results on TTE.

CASE DESCRIPTION

A 60-year-old man with a history of coronary artery disease, diabetes mellitus, hypertension, and chronic kidney disease underwent angioplasty of a chronic total occlusion of the left circumflex coronary artery in July 2014 and subsequently the mid left anterior descending coronary artery in May 2016. The patient presented in March 2017 with dyspnea on minimal exertion (New York Heart Association class III). TTE revealed a severely depressed left ventricular ejection fraction of 25%, a nondilated mitral annulus, and tethering of the posterior mitral valve leaflet with restricted motion of anterior mitral valve leaflet, resulting in a severe functional mitral regurgitation (MR) jet with a central jet of MR (Figure 1). Quantitative assessment using the proximal isovelocity surface area method showed an effective regurgitation orifice area of 0.33 cm² and regurgitant volume of 51 mL. Preprocedural TEE also showed severe MR with central jet direction (Figure 2, Video 1). Following discussion with our heart team, while taking into consideration the patient’s multiple comorbidities and poor left ventricular systolic function, we decided to proceed with MitraClip implantation for the patient. The patient underwent MitraClip implantation, with one clip placed centrally at A2-P2 (Figure 3, Video 2), and received a prophylactic antibiotic before implantation.

There was a significant reduction of the severe MR to mild in the postprocedural analysis (Figure 4, Video 3).

Nine days after implantation, the patient presented to another hospital with dyspnea and cough. He was initially treated for hospital-acquired infection with intravenous piperacillin/tazobactam, which was then switched to intravenous vancomycin following positive blood cultures for methicillin-resistant Staphylococcus aureus. TTE showed possible vegetation on the anterior mitral valve leaflet, and the patient was transferred to our hospital for further management. Repeat TTE was performed in our center. In the parasternal long-axis view and modified apical four-chamber view (Videos 4 and 5), an irregular mass was seen attached over the A2-P2 segment, but it was not conclusive for vegetation (Figures 5 and 6).

Working with a strong suspicion of IE, TEE was performed to confirm the diagnosis. In the midesophageal 90° view, a mobile echogenic mass was seen (Figure 7, Video 6). When viewed from the en face left atrial view on three-dimensional TEE, the mass seemed to originate from the implanted MitraClip (Figure 8, Video 7). No mitral valve regurgitation or significant gradient was observed across the valve (mean gradient across the mitral valve, 4 mm Hg). The patient was then referred to cardiac surgery, but at the time, he was too ill to undergo emergency surgery. Unfortunately, the patient passed away on the same day. Our final diagnosis was methicillin-resistant S aureus bacteremia secondary to IE after MitraClip placement.

DISCUSSION

In a select group of patients, the MitraClip procedure can be a viable option for symptomatic relief of severe MR.6 Currently, as the only center in Malaysia that performs the MitraClip procedure, we have adapted the European Society of Cardiology strategy in the implantation of the MitraClip for patients with degenerative as well as functional MR (recommendation class IIb, level of evidence C).7 Earlier studies have shown that MitraClip therapy has a low periprocedural complication rate with a significant reduction in MR and no significant difference in mortality compared with surgery.8,9 As with any foreign device implanted into the heart, physicians must have high suspicion of IE whenever patients present with fever, kidney impairment, and positive blood cultures. Hence, echocardiography is a vital modality in making the diagnosis of IE. In a patient with suspected IE, negative results on TTE must be followed by TEE. This is because the sensitivity of TTE for the diagnosis of vegetation ranges from 62% to 79%, compared with TEE, which has >90% sensitivity and specificity.10

So far, including our case, four patients have been found to have IE after MitraClip implantation due to S aureus, and three of these four patients died. To date, there is only a guideline on prophylactic antibiotic use before high-risk dental procedures for patients who have undergone MitraClip implantation.11

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Keywords: Mitraclip, Infective endocarditis, Transesophageal echocardiogram, Butterfly

Conflicts of interest: The authors reported no actual or potential conflicts of interest relative to this document.

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2468-6441

https://doi.org/10.1016/j.case.2017.10.006
**Figure 1** Apical four-chamber view showing severe functional MR.

**Figure 2** TEE in the midesophageal two-chamber view also showed severe MR.

**Figure 3** Intraprocedural three-dimensional left ventricular view of the mitral valve showing one clip placed centrally at A2-P2.

**Figure 4** TEE in the midesophageal long-axis view showed significant reduction of MR after MitraClip implantation.

**Figure 5** Transthoracic short-axis view at the mitral valve level. The yellow arrow shows a possible mass over the A2-P2 segment.

**Figure 6** Modified apical four-chamber view. The yellow arrow shows a possible mass at the mitral valve.
CONCLUSIONS

MitraClip implantation carries a very low risk for IE. Thus, prompt diagnosis with sound clinical judgment and noninvasive modalities such as echocardiography is vital in improving patient outcomes.

SUPPLEMENTARY DATA

Supplementary data related to this article can be found at https://doi.org/10.1016/j.case.2017.10.006.

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