

MitraClip-related infective endocarditis in a frail, elderly patient: a case report

Kevin Leow ^{1*}, Courtney Isreb ¹, and Martin Brown ^{1,2}

¹Department of Cardiology, Northern Beaches Hospital, 105 Frenchs Forest Road West, Frenchs Forest, New South Wales 2086, Australia; and ²The Faculty of Medicine, Health and Human Sciences, Level 3, 75 Talavera Rd, Macquarie University, New South Wales 2109, Australia

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Background

The incidence of infective endocarditis (IE) following a MitraClip is rare with 17 reported cases in the literature. The reported mortality rate is high, at 41%, despite both medical and surgical therapies. To date, this is the first documented case of IE following a MitraClip procedure in Australia.

Case summary

An 88-year-old male presented with a 1-week history of confusion and dyspnoea. Clinical examination was significant for a temperature of 37.7°C, a pansystolic murmur and bilateral pitting oedema to mid-shin, but no peripheral stigmata of IE. His history included a MitraClip procedure 11 weeks prior for severe mitral regurgitation. Initial blood cultures grew enterococcus faecalis. A transthoracic echocardiogram did not identify vegetations on the MitraClip. Subsequent transoesophageal echocardiogram (TOE) identified a 4 mm × 2 mm echodensity on the posterior mitral valve leaflet suggestive of IE. He was deemed not suitable for surgical intervention due to poor cognitive reserve and his medical comorbidities, so he commenced intravenous (IV) Ampicillin and Ceftriaxone which was later changed to Benzylpenicillin. Repeat TOE 2 weeks later showed the vegetation to have increased to ~1 cm in length, so his treatment was reverted to Ampicillin. A further TOE 4 weeks later showed reduction in size to 5 mm × 2 mm. After 6 weeks of IV antibiotics, the patient was discharged on lifelong oral antibiotics.

Discussion

Infective endocarditis following MitraClip procedure is rare. This disease has a high mortality rate despite optimal medical and surgical therapy. Increased awareness amongst clinicians is important given an increasing volume of MitraClip procedures.

Keywords

MitraClip • Infective endocarditis • Case report

Learning points

- Infective endocarditis following MitraClip device insertion is less common than following prosthetic valve replacement or transcatheter aortic valve implantation.
- The most common causative organism is *Staphylococcus aureus*.
- With an increasing volume of MitraClip procedures being performed worldwide, clinicians need to be increasingly aware of this potentially fatal complication.

* Corresponding author. Tel: +61 402 522 810, Email: kcleow93@gmail.com

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Introduction

Although infective endocarditis (IE) following a prosthetic valve replacement is a well-documented complication, the incidence of IE following a MitraClip is rare with 17 reported cases in the literature. The reported mortality rate is high, at 41%, despite both medical and surgical therapies. To date, this is the first documented case of IE following a MitraClip procedure in Australia. As the incidence of MitraClip procedures increases, awareness of this complication and its management in patients deemed high-risk surgical candidates is essential.

Timeline

3 months prior to admission	MitraClip insertion for severe mitral regurgitation
Day 0	Presented to hospital with increased confusion and fevers. Commenced on Ampicillin, Flucloxacillin, and Gentamicin for fever of unknown origin
Day 2	Gram-positive cocci identified on blood culture
Day 3	Bacteria identified as enterococcus faecalis. Continued on Ampicillin and commenced on Ceftriaxone
Day 6	A 4 mm × 2 mm MitraClip vegetation identified on transoesophageal echocardiography
Day 14	Changed from Ampicillin to Benzylpenicillin to help with ease of administration of antibiotics
Day 22	Repeat transoesophageal echocardiogram (TOE) demonstrating increase in vegetation size up to 10 mm. Changed back from Benzylpenicillin to Ampicillin
Day 42	Repeat TOE demonstrating decrease in vegetation size to 5 mm × 2 mm, with an 8 mm strand on the atrial side
Day 46	Final dose of intravenous antibiotics, to complete a 6-week course
Day 47	Discharged home on lifelong oral Amoxicillin
4 weeks after discharge	Patient did not attend follow-up appointment

Case presentation

An 88-year-old male presented to our hospital with acute confusion. He had a 1-week history of increasing confusion prior to this presentation, as well as increasing dyspnoea. On examination he was pyrexial at 37.7°C, with a pansystolic murmur on auscultation, pitting oedema to his mid-shins bilaterally and signs of chronic venous insufficiency. He had no peripheral stigmata of IE or other signs of infection. His history was significant for a MitraClip operation performed 11 weeks prior to the current presentation for severe mitral

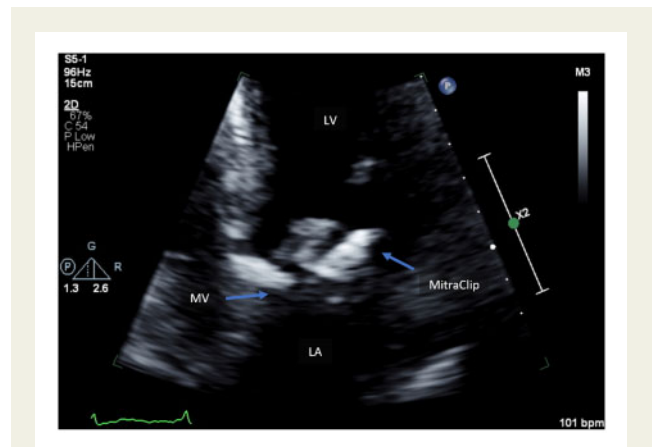


Figure 1 Initial transthoracic echocardiogram showing MitraClip but no vegetations. LA, left atrium; LV, left ventricle; MV, mitral valve.

regurgitation (MR). Post-MitraClip implantation the patient had received 24 h of intravenous (IV) Cefazolin. Other history included stenting to the left anterior descending artery, chronic kidney disease (creatinine 187.2 mg/L, normal range < 3.0 mg/L), cognitive impairment, and previous back surgery. Admission medications included Pantoprazole, Aspirin, Clopidogrel, Pregabalin, Furosemide, Ramipril, Macuvison, and Chlorvescent. A septic screen was performed including blood and urine cultures and he received IV Gentamicin and Flucloxacillin to cover for sepsis of unknown origin. His c-reactive protein was significantly elevated at 187.2 mg/L (normal range < 5), with an initial normal white cell count. A computed tomography (CT) chest was performed which was consistent with interstitial lung disease. The following day he went into new atrial fibrillation with rapid ventricular response. Blood cultures showed Gram-positive cocci (enterococcus faecalis), sensitive to Ampicillin, Amoxicillin, and Vancomycin. The urine culture was negative, and a magnetic resonance imaging of the brain demonstrated global atrophy and microvascular change, without evidence of septic foci.

His antibiotic regime was changed to IV Ampicillin 2 g 4 hourly. He underwent a CT abdomen pelvis which did not identify a source for enterococcus faecalis bacteraemia. Considering his MitraClip, and with no other source of bacteraemia identified, he underwent a transthoracic echocardiogram (Figure 1) which did not identify any conclusive vegetations. He subsequently underwent a transoesophageal echocardiogram (TOE) which confirmed the presence of a 4 mm × 2 mm echodensity on atrial side of the prolapsing posterior mitral valve leaflet, concerning for a vegetation (Figure 2). Other findings included moderate mitral stenosis, persistent mild-moderate mitral regurgitation (Video 1), and likely ruptured chordae. Differentials for this lesion included thrombus, fibrin, redundant leaflet tissue, or malignancy. However, these did not fit the clinical picture of an enterococcus faecalis sepsis of unknown source and recent MitraClip procedure.

Due to his age and the presence of a concurrent delirium on the background of underlying cognitive impairment, he was deemed unsuitable for surgical mitral valve replacement. His treatment plan was

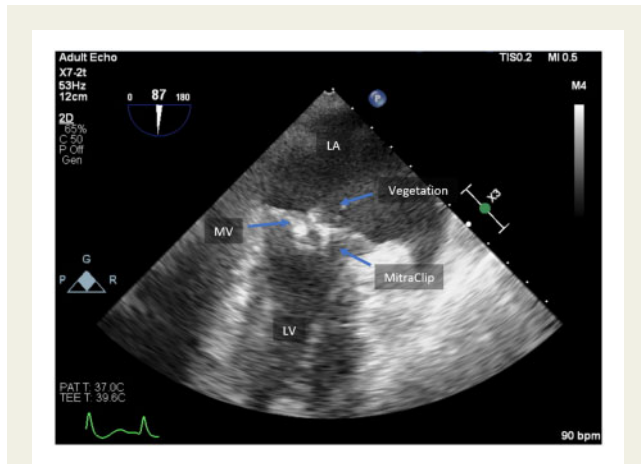


Figure 2 First transoesophageal echocardiogram, demonstrating an echodensity on the atrial side of the posterior mitral valve leaflet suggestive of endocarditis. LA, left atrium; LV, left ventricle; MV, mitral valve.

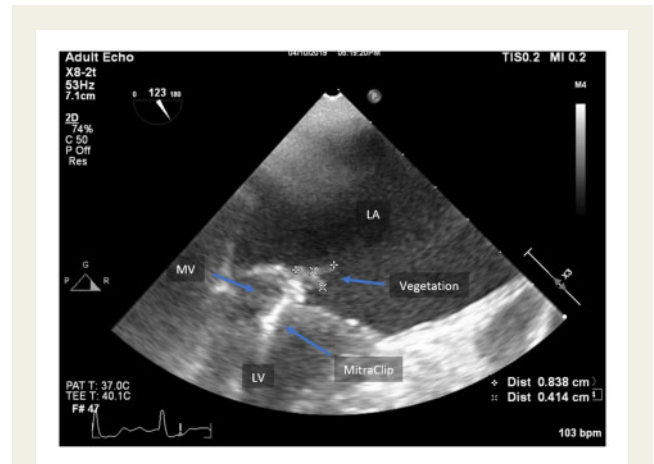
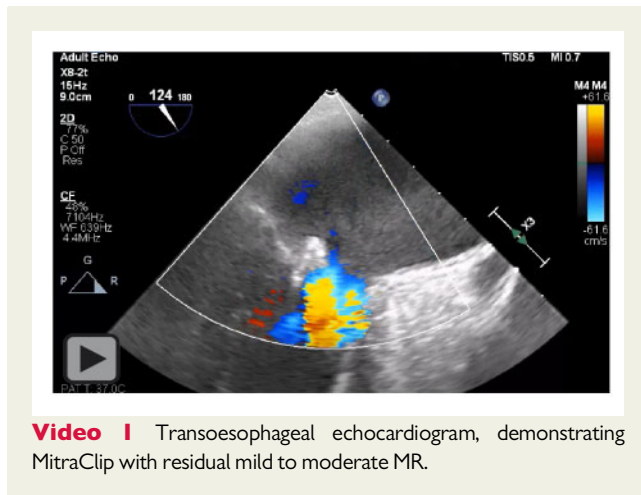


Figure 3 Second transoesophageal echocardiogram, demonstrating an increase in vegetation size despite antibiotics. LA, left atrium; LV, left ventricle; MV mitral valve.



Video 1 Transoesophageal echocardiogram, demonstrating MitraClip with residual mild to moderate MR.

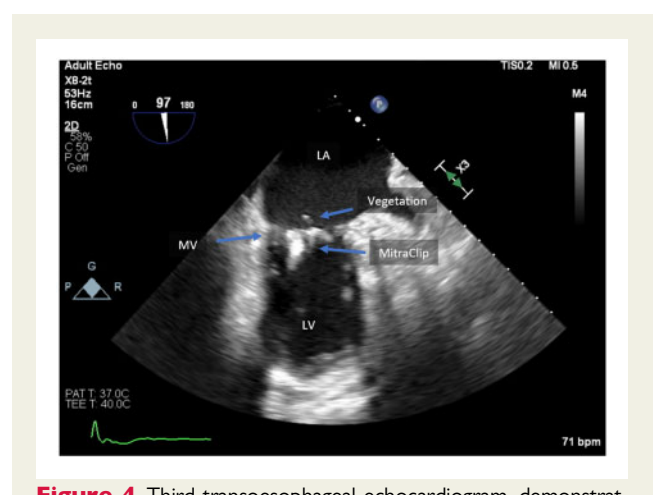


Figure 4 Third transoesophageal echocardiogram, demonstrating improvement in vegetation size. LA, left atrium; LV, left ventricle; MV, mitral valve.

for 6 weeks of IV antibiotics (Ampicillin 2 g 4 hourly as well as Ceftriaxone for synergistic therapy), followed by lifelong oral amoxicillin. After 2 weeks on IV therapy, he was changed from Ampicillin to Benzylpenicillin to assist with the logistics of administration on discharge. A follow-up TOE (Figure 3) was performed ~3 weeks into treatment which showed an increase in vegetation size to ~1 cm, compared to a previous 4 mm. In discussion with the infectious disease team, this was thought secondary to the development of a mature biofilm. At that point he was switched back from Benzylpenicillin to Ampicillin, with synergistic Ceftriaxone. He also received 1 week of Metronidazole to cover for a presumed aspiration pneumonia 3 weeks after presentation. After completing 6 weeks of IV, a repeat TOE (Figure 4) showed a reduction in size of the vegetation to 5 mm × 2 mm, with a mobile 8 mm strand on the atrial side of the mitral valve. He was discharged on lifelong oral Amoxicillin 1 g 6 hourly and was to be followed up by a cardiologist after 4 weeks. The patient did not attend for follow-up at 4 weeks and their status is unknown at this time.

Discussion

The incidence of IE following prosthetic valve replacement ranges from 1% to 6%,¹ with these rates falling to between 0.5% and 3.1%^{2–4} for transcatheter aortic valve implantation (TAVI). By comparison, IE following MitraClip procedure is a rarer occurrence, with large international registries reporting the incidence to be somewhere between 0% and 2.4%.^{5–10} We conducted a comprehensive literature search within MEDLINE and Google Scholar. The search terms that were used were ‘MitraClip’ and ‘Endocarditis’. The search terms were combined with the Boolean ‘AND’ to find all potentially relevant papers. A hand search of the reference lists was also undertaken. We identified 17 cases of IE^{11–15} following MitraClip procedure. To date, there has not been any report of IE cases post-MitraClip procedure in Australia.

The average age of the cases from our review was 70.3 years and patients tended to have multiple, complex medical comorbidities (including previous coronary artery bypass surgery, chronic obstructive pulmonary disease, chronic kidney disease/dialysis, or previous stroke).

The most common organism was *Staphylococcus aureus*, accounting for 47.1% of cases. There have only been two prior reported cases with enterococcus faecalis as the causative organism (11.8% of cases). There have also been isolated reports of *Bartonella henselae*, *Staphylococcus epidermidis*, Methicillin-resistant *Staphylococcus aureus*, and α -haemolytic *Streptococcus* as the causative organism. It is interesting to note that although a seemingly rare cause of IE post-MitraClip procedure, enterococcus faecalis is one of the more common causative organisms of IE post-TAVI accounting for up to 21%³ of cases. In the majority of cases, surgical intervention (70.6%) remained the treatment of choice though post-operative mortality remained high (33%) in this patient population. This is likely reflective of the significant patient comorbidities, with an average preoperative EuroSCORE of 35.94% indicating a high probability of post-procedural in-hospital death. In the cases where medical therapy was utilized, surgical management was often deemed too high risk given underlying patient comorbidities and high preoperative EuroSCORE. This is similar to our case, in which a poor baseline cognition combined with multiple medical comorbidities made our patient a poor surgical candidate. Of the reported cases that were managed medically, mortality was high at 60% with multiorgan failure identified as the main cause of death.

Within a select group of patients with severe mitral regurgitation, MitraClip procedure remains a viable option. Although there is a relatively low incidence rate of IE post-MitraClip compared to other valvular procedures, IE remains a significant post-procedural complication with high mortality and morbidity. Given the increasing volume of MitraClip procedures being performed, it is important that proceduralists remain wary of this potentially fatal complication and its management.

Lead author biography



Dr Kevin Leow (MBBS) is a physician trainee with Northern Beaches Hospital. His areas of interest include primary prevention of cardiac diseases and cardiac imaging.

Supplementary material

Supplementary material is available at *European Heart Journal - Case Reports* online.

Slide sets: A fully edited slide set detailing this case and suitable for local presentation is available online as [Supplementary data](#).

Consent: The author/s confirm that written consent for submission and publication of this case report including image(s) and associated text has been obtained from the patient in line with COPE guidance.

Conflict of interest: none declared.

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