



Trans-catheter mitral valve repair with MitraClip for mitral regurgitation. A case report of an unusual and acute complication of MitraClip migration in the left atrium

Despoina G. Sarridou^{1,2,4}, Sophia Anastasia Mouratoglou³, Christos Chamos⁴, Theofilos Manos¹, Sokratis Tsagkaropoulos⁵, Georgios Theodoros Karapanagiotidis⁵

1 Anesthesiology and Intensive Care Department, AHEPA University Hospital of Thessaloniki, Thessaloniki, Greece

2 Aristotle University of Thessaloniki, Thessaloniki, Greece

3 Third Cardiology Department, Aristotle University of Thessaloniki, Hippokrateion General Hospital of Thessaloniki, Thessaloniki, Greece

4 Cardiac Anesthesia Department, Guy's and St Thomas' NHS Foundation Trust, London, United Kingdom

5 Cardiothoracic Surgery Department, AHEPA University Hospital of Thessaloniki, Greece

Corresponding author: Despoina Sarridou, Department of Anesthesiology and Intensive Care, AHEPA University Hospital, 1 Kyriakidi St., 54636 Thessaloniki, Greece; Email: dodasarri@yahoo.gr

Received: 21 May 2024 ♦ **Accepted:** 11 June 2024 ♦ **Published:** 24 February 2025

Citation: Sarridou DG, Mouratoglou SA, Chamos C, Manos T, Tsagkaropoulos S, Karapanagiotidis GT. Trans-catheter mitral valve repair with MitraClip for mitral regurgitation. A case report of an unusual and acute complication of MitraClip migration in the left atrium. *Folia Med (Plovdiv)* 2025;67(1): e127944. doi: 10.3897/folmed.67.e127944.

Abstract

Transcatheter mitral valve repair with the MitraClip device has become an established therapeutic option for the treatment of symptomatic patients with mitral regurgitation and prohibitive surgical risk. Despite its safe profile when performed in experienced centers, complications such as MitraClip device detachment or migration into the left atrium can occur and pose a significant risk. We report a MitraClip device migration into the left atrium short after its placement in a patient with symptomatic mitral valve regurgitation and a history of previous coronary artery bypass grafting and aortic valve replacement.

Keywords

acute heart failure, cardiac anatomy, management, medical management, mitral insufficiency, TEE

Introduction

Mitral valve regurgitation, either of degenerative or functional origin, is a common structural heart disease, usually treated with valve repair or replacement using open heart surgery. A MitraClip (Abbot Vascular, CA, USA) is a clip device that is commonly used by interventional cardiologists for the correction of mitral regurgitation (MR) in patients deemed to be of increased surgical risk. The device

has a dual-arm structure with grippers to capture the mitral valve leaflets and bring them together to reduce regurgitant blood volume on a beating heart. Although it was designed for degenerative MR related to primary leaflet abnormalities, several studies have shown that it is quite effective for functional MR from annular or ventricular distortion on high-risk surgical population.^[1] It is a minimally invasive technique usually performed in catheterization laboratories

under transesophageal echocardiographic guidance; therefore, it lacks all the recognized complications of open-heart surgery and is especially friendly to high-risk populations such as the elderly and patients with various combinations of multiple comorbidities.^[2]

Case report

Background

A 74-year-old male patient of Asian origin presented for treatment of a severe symptomatic mitral regurgitation. Seven years prior to the onset of new symptoms, he had undergone open heart surgery for coronary artery bypass grafting and aortic valve replacement with a tissue valve. As a result, he was at high risk for open mitral valve replacement and was scheduled for transcatheter MitraClip device placement. His medical history included persistent atrial fibrillation and chronic kidney disease. He was regularly on warfarin for his atrial fibrillation with adequate rate control on bisoprolol with a baseline heart rate of around 80 beats per minute. His left and right ventricular function were preserved with some mild tricuspid regurgitation with a well seated bioprosthetic aortic valve as suggested from the transthoracic echocardiogram imaging. A coronary angiogram showed patent grafts and a chest computed tomography scan showed a reduction in the distance between the sternum and the right ventricle, findings that led to the decision to avoid open-heart surgery at the multidisciplinary mitral valve meeting.

The patient underwent an uneventful MitraClip (Abbot Vascular, CA, USA) prosthesis under general anesthesia and 2D transesophageal echocardiographic guidance in the catheter laboratory. The patient was intubated, mechanically ventilated, and transferred to the cardiac intensive care unit with minimal vasopressor support. Intraoperative 2D transesophageal echocardiography revealed residual mitral regurgitation with a central jet, raising minor concerns about the sizing and placement of the device, but the result was deemed acceptable.

The patient was successfully extubated 8-hours post intervention and mobilized on first postoperative day. Shortly after mobilization and breakfast, the patient became gradually agitated showing lack of cooperation, eventually presenting signs of confusion and hemodynamic compromise. The latter was manifested as hypotension and peripheral angiospasm, which, although initially attributed to frailty and mobilization, was accompanied by an increased need for vasopressor and inotropic support, suggesting a low cardiac output state.

Re-intubation was deemed necessary and inotropic support was commenced while a transesophageal echocardiogram was performed. Very impressively, the clip was displaced and migrated into the left atrium, leaving a free flow torrential mitral regurgitation jet (Fig. 1). The cardiothoracic team was called and an intra-aortic balloon pump was inserted under transesophageal echocardiographic guidance to reduce left ventricular afterload. This resulted in temporary hemodynamic stabilization and the patient was taken to the operating room for emergency open heart surgery and mitral valve replacement. Despite the high risk

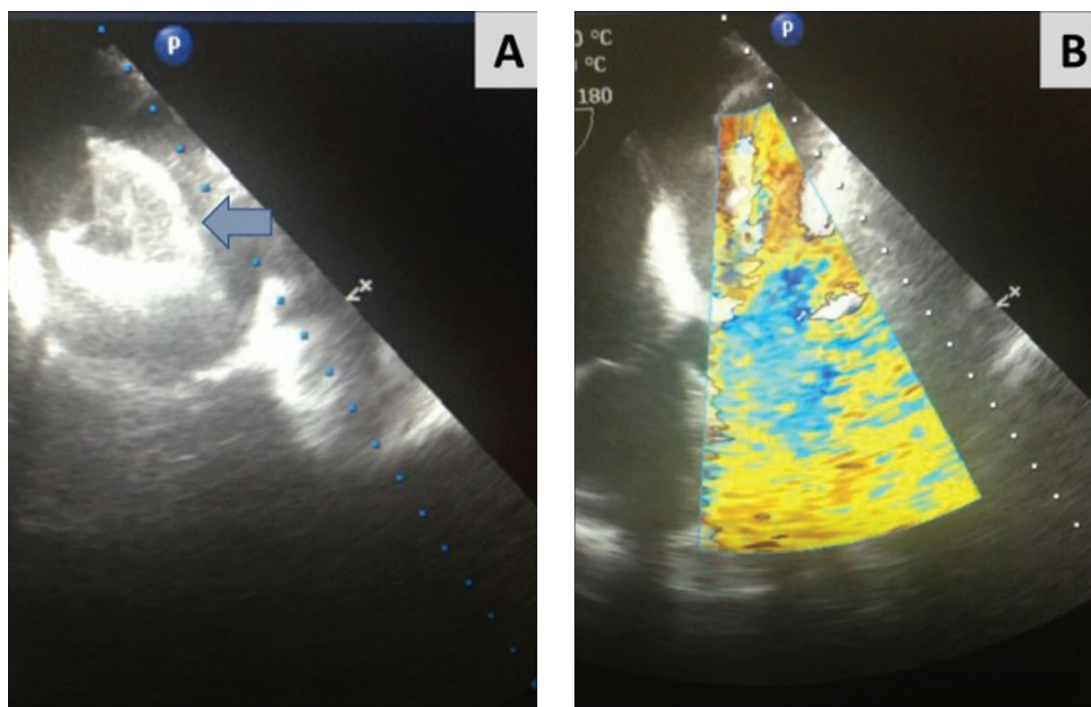


Figure 1. Transesophageal echocardiogram performed after hemodynamic decompensation. Images revealed a migrated MitraClip device (arrow) floating into the left atrium (panel A) and a torrential acute mitral valve regurgitation with central jet (panel B).

of mortality, a bioprosthetic mitral valve was successfully implanted and the patient was transferred to the intensive care unit, where he had a very long stay of several weeks, complicated by acute kidney injury and sepsis, with a guarded prognosis that led to his death a few weeks after his admission.

Discussion

Although a single leaflet detachment is a recognized complication of the MitraClip mitral valve repair procedure, occurring in 4.9% of cases in the EVEREST II trial^[3] and in 0.2% in the German transcatheter mitral valve intervention (TRAMI) registry^[4,5], MitraClip device migration into left atrium is an extremely rare potential complication^[6], occurring due to inadequate tissue grasp between the MitraClip wing and the grippers. Parameters such as challenging anatomy or limitations in valvular imaging may be important contributors in the development of these complications.^[7] Although 3D transesophageal echocardiography is being increasingly used for the assessment of MitraClip placement, in our case, it is possible that the use of conventional imaging prohibited the adequate assess to clip anchoring.

MitraClip migration results in acute severe mitral regurgitation, with acute hemodynamic decompensation, requiring immediate medical support. Mitral valve surgery as salvage procedure is the only way forward in many cases after failed MitraClip device.^[8] As perhaps expected, the in-hospital and the one-year mortality rates are quite high after failed MitraClip procedures, fact that perhaps reflects the high-risk baseline profile of this specific patient group as indicated by an overview study by Melillo et al.^[9] The latter study demonstrated an in-hospital mortality rate of 15%, rate of postoperative strokes around 6%, and an all-cause death incidence after the first year of around 26.5%. On the other hand, another rare potential complication could be mitral stenosis resulting from inappropriate patient selection and unsuccessful sizing. The role of good planning and 3D transesophageal echo imaging in order to identify the pathology of the valve and the appropriate patient selection is well recognized.^[10]

Conclusion

MitraClip device migration is a very rare but unfortunately serious complication of the MitraClip mitral valve repair procedure. Correct sizing and good patient selection are of great importance in order to avoid complications. Our patient survived until he was taken to surgery with the support of inotropes, vasopressors, and intra-aortic balloon pump.

References

1. Devine K, Sheu R. To clip or not to clip: the use of MitraClip therapy for functional mitral regurgitation. *J Cardiothorac Vasc Anesth* 2020; 34:1681–7.
2. Ciobanu A, Bennett S, Azam M, et al. Incremental value of three-dimensional transesophageal echocardiography for guiding double percutaneous MitraClip® implantation in a 'no option' patient. *Eur J Echocardiogr* 2011; 12:E11.
3. Ailawadi G, Lim DS, Mack MJ, et al. One-year outcomes after MitraClip for functional mitral regurgitation. *Circulation* 2019; 139:37–47
4. Kalbacher D, Schäfer U, Bardeleben RS, et al. Long-term outcome, survival and predictors of mortality after MitraClip therapy: Results from the German Transcatheter Mitral Valve Interventions (TRAMI) registry. *Int J Cardiol* 2019; 277:35–41.
5. Mehr M, Karam N, Taramasso M, et al. Combined tricuspid and mitral versus isolated mitral valve repair for severe MR and TR: an analysis from the TriValve and TRAMI registries. *JACC Cardiovasc Interv* 2020; 13:543–50.
6. Takinami G, Nakajima Y, Tsuji S, et al. The rare case of a MitraClip device migrating into the left ventricular apex. *Gen Thorac Cardiovasc Surg* 2021; 69:1267–70.
7. Ge Z, Pan C, Li W, et al. Real-time monitoring and step-by-step guidance for transapical mitral valve edge-to-edge repair using transesophageal echocardiography. *J Interv Cardiol* 2021; 2021:6659261.
8. Rader F, Siegel RJ, Flint N, et al. Mitral valve surgery after failed MitraClip: a single-center experience. *J Invasive Cardiol* 2021; 33:E236–e243
9. Melillo F, Baldetti L, Beneduce A, et al. Mitral valve surgery after a failed MitraClip procedure. *Interact Cardiovasc Thorac Surg* 2021; 32:380–5.
10. Al-Azizi K, Szerlip M. Mitral stenosis after MitraClip: how to avoid and how to treat. *Curr Cardiol Rep* 2020; 22(7):50.