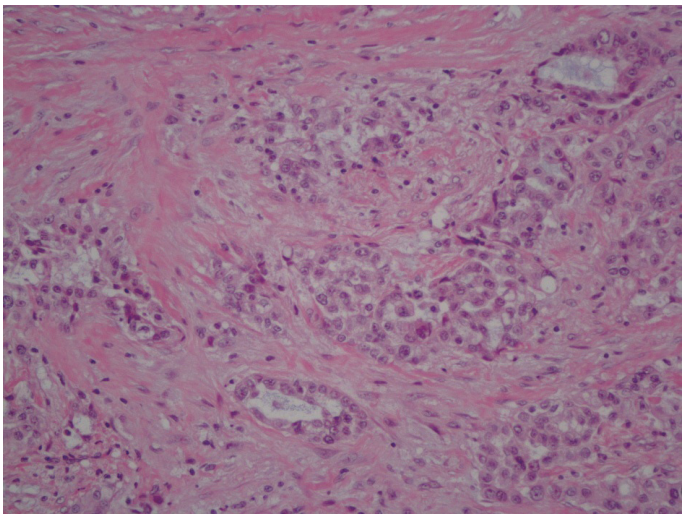

Figure 3. Microscopic appearance of the tumor (H&E stain, x100)

posure to asbestos is correlated with the onset of pleural and peritoneal mesothelioma; a link to asbestos has not been shown. Echocardiography is the most commonly used initial investigative tool. CT and magnetic resonance imaging are useful in showing the extent of involvement of contiguous structures and the degree of constriction. The treatment options for this rare tumor are surgery, radiotherapy, and chemotherapy. Operative intervention in pericardial mesothelioma is primarily for effusion control, cytoreduction before multimodal therapy, or to deliver and monitor innovative intrapericardial therapies (4, 5).

F-18 FDG, an analogue of glucose, provides valuable functional information based on increased glucose uptake and glycolysis of cancer cells and depicts metabolic abnormalities. FDG PET/CT with its ability for whole body fusion imaging is used for detection of primary tumors and distant metastases in most of the cancers, including primary cardiac tumors (6–9). In our case, pericardial malignancy was highly suspected from the imaging results. Absence of abnormal uptake suggests primary malignancy at a distant site in F-18 FDG PET/CT and reinforces the possibility of PPM in these cases. Exact diagnosis of PPM could be established by histopathology. Pleural and peritoneal effusions were the only signs of pericardial constriction.

Conclusion

Primary pericardial malignant mesothelioma is an extremely rare neoplasm. To determine the exact etiology of constrictive pericardial disease, clinical suspicion, imaging modalities, and histopathological examination are needed. F-18 FDG PET scan is useful to evaluate the pericardial metabolic activity in assessing the etiology of constrictive pericardial disease.

Video 1. Whole body F-18 FDG MIP PET images of the patient. A diffuse intense F-18 FDG uptake of heart is seen (video image). Co-registered PET/CT images of thorax showed increased FDG activity of thickened pericardium, Figure 2.

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An extremely rare but possible complication of MitraClip: embolization of clip during follow-up

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Introduction

Although surgical mitral valve repair or replacement is the treatment of choice for patients with severe mitral regurgitation (MR), up to 50% of these patients are denied surgery due to advanced age, poor left function, or comorbidities (1, 2). Percutaneous mitral valve repair using the MitraClip device (Abbott

Laboratories, Abbott Park, IL, USA) has evolved as a less invasive therapeutic alternative for severe MR in patients who are inoperable or at a high risk for surgery (3, 4). Herein we report the case of a patient with severe MR who underwent percutaneous MitraClip implantation and suffered from embolization of one of the MitraClips in the right axillary artery during follow-up.

Case Report

A 29-year-old woman with a history of peripartum cardiomyopathy was referred to our clinic for heart failure and severe MR. Transthoracic echocardiography (TTE) demonstrated a dilated left ventricle with decreased systolic function (ejection fraction: 25%) and severe MR (vena contracta: 8 mm, effective regurgitant orifice area: 0.33 cm^2, regurgitant volume: 52 mL, and regurgitant jet area: 12 cm^2). Subsequent transesophageal echocardiography (TEE) confirmed the presence of severe MR between A2–P2 scallops and mild-to-moderate MR between A3–P3 scallops (Fig. 1). MitraClip procedure for severe MR was planned in order to improve her symptoms while waiting for a suitable donor.

A total of four MitraClip devices were implanted to reduce MR. The first MitraClip device was implanted in relation to the origin of the main regurgitant jet, between A2 and P2 scallops. Unfortunately, MR reduction was still not satisfactory after implantation of the second device. The third MitraClip device was implanted lateral to the first one with residual 2+ MR. We planned to terminate the procedure at that moment; however, after several minutes, TEE revealed severe MR due to detachment of the third MitraClip device from the posterior leaflet. Then, a fourth clip was implanted in order to stabilize the third clip. However, there was still a residual 3+ MR on the final control. Mean transmitral gradient was 6 mm Hg after implantation of the fourth MitraClip device. The patient refused to undergo further operation because of its high risk.

During follow-up periods at 1, 3, and 6 months after the procedure, TTE showed that three MitraClips were anchored to their site, whereas one MitraClip was solely attached to the anterior leaflet and MR remained to be 3+ (Fig. 2). After 1 year, she was admitted to our hospital with worsening heart failure symptoms. Chest X-ray showed an embolized MitraClip in her right axilla (Fig. 3). The patient reported no symptoms in the right upper extremity. Any vascular events related to embolized clip have not occurred since then.

Discussion

Partial clip detachment, embolization of clip, mitral valve stenosis, and clip entanglement in the chordae have been identified as potential complications specifically related to the MitraClip device (5). A total of nine patients (4.8%) were found to have partial detachment of the device within the first 12 months in the EVEREST II trial. After 12 months, one additional patient was found to have attachment of the device to a single leaflet (5). In

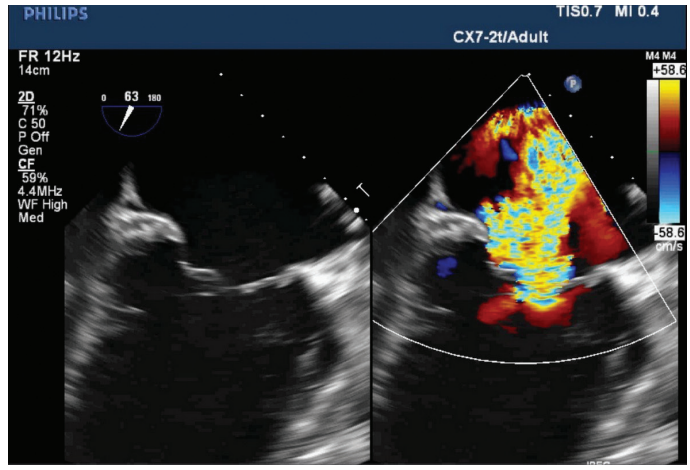

Figure 1. Transesophageal echocardiography demonstrates severe mitral regurgitation between A2–P2 scallops and mild-to-moderate regurgitation between A3–P3 scallops

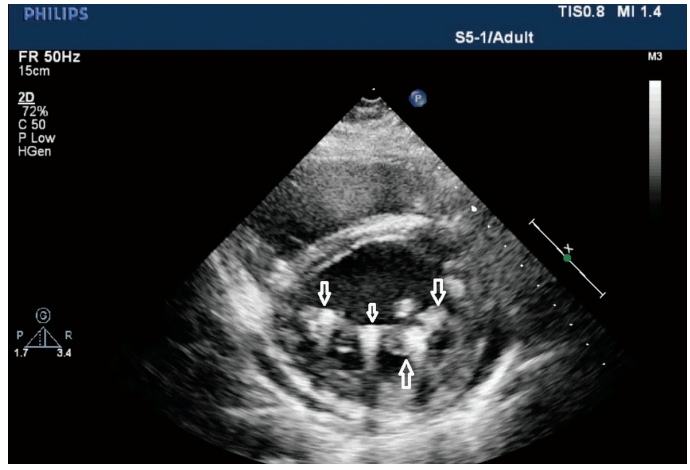

Figure 2. Parasternal short-axis view in transthoracic echocardiography demonstrates four MitraClips on the mitral valve position after 6 months (white arrows)

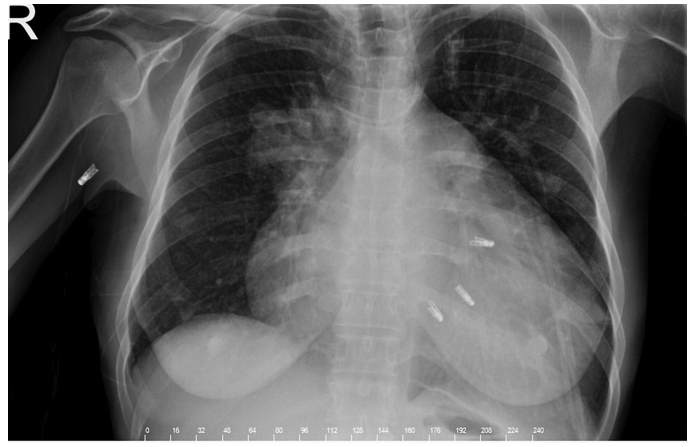

Figure 3. Chest X-ray demonstrates embolized MitraClip in the axillary artery and three MitraClips on the mitral valve position

ACCESS-EU study, single leaflet device detachment was reported in 4.8% of cases. There have been no reports of MitraClip device embolization in the ACCESS-EU study (6). Actually, only two

cases of MitraClip embolization have been reported worldwide till date. One case with complete clip detachment and embolism has been reported in the study by Paranskaya et al. (7). The other case was that of a patient treated with surgery immediately after MitraClip implantation due to clip embolization. During surgery, one of the implanted MitraClips was not found on the valve and was detected in the renal artery (8).

During the procedure, one of the most important steps is imaging of proper grasping of the leaflets between the device arms. In our patient, the third implanted MitraClip detached from the posterior leaflet. We tried to stabilize this clip with a fourth MitraClip; unfortunately, we were not able to successfully reduce MR at the end. After 1 year, the detached MitraClip embolized to the axillary region.

Conclusion

Experience from our patient suggests that the use of multiple MitraClips may impose a higher risk for clip detachment, and embolization of the detached clip may occur at any time after the procedure.

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