Mitral-aortic intervalvular fibrosa pseudoaneurysm with rupture into the left atrium: a three-dimensional trans-esophageal echocardiographic approach

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Introduction

Mitral-aortic intervalvular fibrosa (MAIVF) pseudoaneurysm is detected by echocardiography as a pulsatile structure at the mitral-aortic junction near the left ventricular outflow tract. Depending upon the severity of fistulization into the left atrium, acute mitral deficiency like clinical conditions may develop (1). Aortic valve endocarditis is the most commonly known etiological condition (2). Although both transthoracic echocardiography (TTE) and transesophageal echocardiography (TEE) have proven to be valuable in diagnosis and management of the condition, the three-dimensional (3-D) TEE approach has the potential to provide important clues that may prove crucial for the management of MAIVF pseudoaneurysm.

Case Report

A 44-year-old male patient complaining of fatigue, chills, high fever, and night sweats was admitted to our emergency service department. Patient had no disease history, except hypertension. Although vital signs were normal, a systolic murmur of grade 4/6 was detected at the apex during physical examination; fine crackles were also heard at the basal segments of the lungs upon auscultation. A cardiology consultation was requested subsequent to the detection of pericardial effusion and hepatosplenomegaly by a thoracoabdominal computerized tomography scan performed to investigate the etiology of high fever. Increases in sedimentation rate (33 mm/h, reference value: 0–20 mm/h) and CRP level (38.8 mg/L, reference value: 0–8 mg/L) were remarkable. Bicuspid aortic valve morphology and aortic regurgitation were observed on two-dimensional TTE. Additionally, an aneurysm image at the MAIVF area and an eccentric turbulent flow secondary to fistulization from the same toward the posterolateral side of the left atrium were also observed (Fig. 1a, b; Video 1).

Using TEE, an aneurysm with a dimension of 0.9 × 2.0 cm was detected at the MAIVF area (Fig. 2a, b; Video 2). Aortic regurgitation

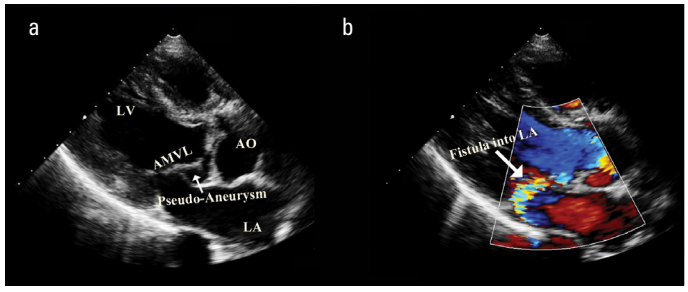

Figure 1. a-b. (a) Two-dimensional echocardiography of MAIVF pseudoaneurysm. (b) Eccentric turbulent flow secondary to fistulization into the left atrium.

AO - aorta; AMVL - anterior mitral valve leaflet; MAIVF - mitral-aortic intervalvular fibrosa; LA - left atrium; LV - left ventricle

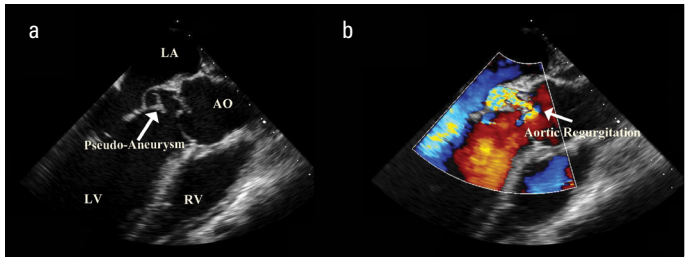

Figure 2. a-b. (a) Two-dimensional transesophageal echocardiography of MAIVF pseudoaneurysm. (b) Pseudoaneurysm cavity filled with aortic regurgitation

AO - aorta; LA - left atrium; LV - left ventricle; RV - right ventricle

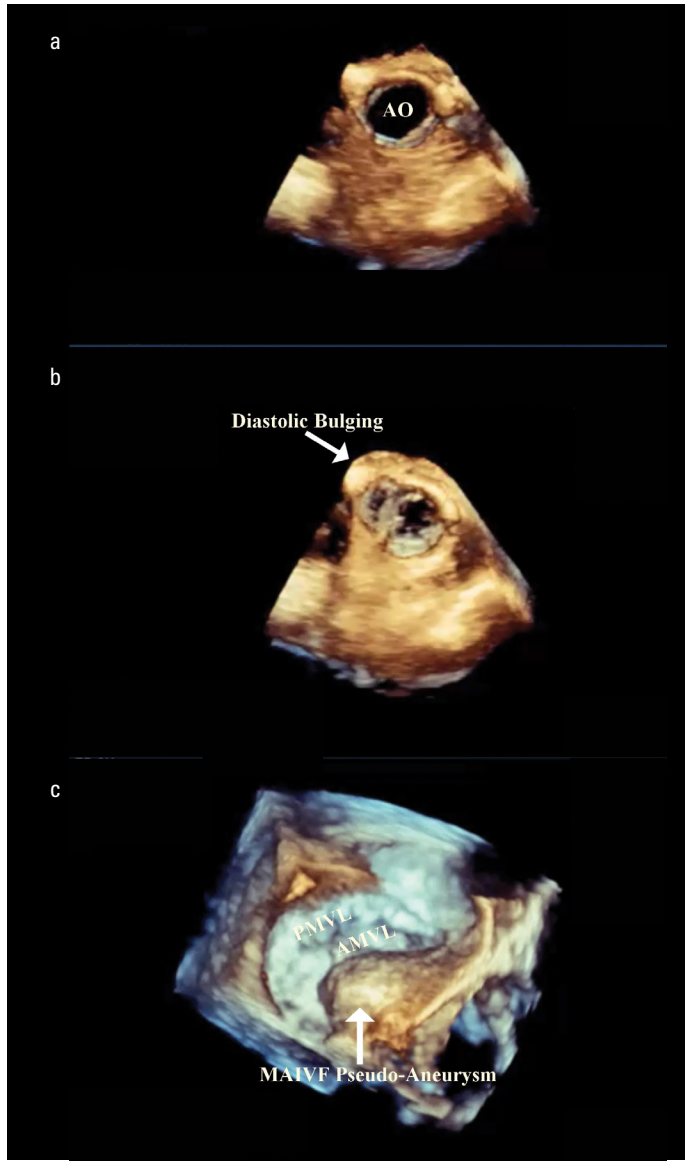

Figure 3. a, b, c. (a) Three-dimensional transesophageal echocardiographic view of the aortic valve in systole (b). Diastolic MAIVF bulging. (c). En face view of the mitral valve from the left atrium

AO - aorta; AMVL - anterior mitral valve leaflet; MAIVF - mitral-aortic intervalvular fibrosa; PMVL - posterior mitral valve leaflet

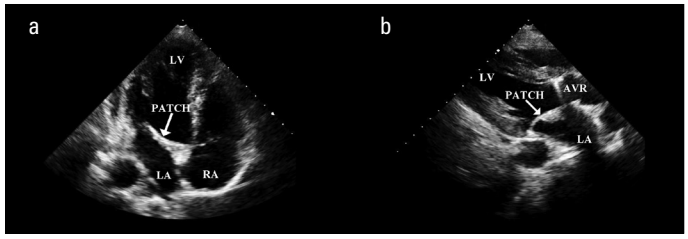

Figure 4. a, b. Transthoracic echocardiography after surgical repair. (a) Apical four-chamber view of patch. (b) Parasternal long-axis view of the prosthetic aortic valve and patch
AVR - aortic valve replacement; LA - left atrium; LV - left ventricle; RA - right atrium

was eccentric and directed toward the aneurysm. This pseudoaneurysm was fistulized from the area near the mitral valve toward the left atrium. Mobile fibrillary vegetations were observed inside the aneurysm. Using the 3-D assessment, a segment bulging towards the mitral valve in diastole was also observed. There was no detectable structural defect of the anterior mitral valve leaflet (Fig. 3a-c; Video 3). Blood cultures were positive for Streptococcus spp. The patient subsequently underwent surgical intervention together with antibiotic therapy. MAIVF pseudoaneurysm from the left atrium to aortic root was restored using bovine pericardium, and aortic valve replacement was also performed (Fig. 4a, b; Video 4).

Discussion

It is known that, MAIVF is more prone to trauma like infective endocarditis because of its relatively avascular structure. Although, the leading etiological causes of MAIVF aneurysms are infection and surgical trauma, aortic regurgitation jet is also a contributor to its formation (3). In the patient described in our case report, both infection and aortic regurgitation were considered to be responsible because diastolic MAIVF bulging in TEE images showed barotrauma to this area. 3-D TEE played an important role in designing surgical strategy for this patient because it revealed that any of the anterior mitral valve was affected from infective endocarditis.

Conclusion

In conclusion, 3-D TEE has the potential to make valuable contributions in designing surgical strategies because it can accurately evaluate mitral valve involvement, which is crucial in planning mitral valve interventions in patients with MAIVF pseudoaneurysm.

References

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Video 1. Two-dimensional transthoracic echocardiography showed a regurgitant jet extending from the pseudoaneurysm to the left atrium through a fistula

Video 2. Pseudoaneurysm cavity filled with aortic regurgitation jet on two-dimensional transesophageal echocardiography

Video 3. Diastolic mitral-aortic intervalvular fibrosa bulging and the assessment of mitral valve anatomy by three-dimensional transesophageal echocardiography

Video 4. Transthoracic echocardiography after surgical repair. Arrow represents patch

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