

Case Report

Aneurysm of the Anterior Mitral Valve Complicating Infectious Mitro-Aortic Endocarditis in a Bicuspid Aortic Valve: About a Case

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Abstract

Mitral valve aneurysm is a rare condition usually associated with aortic valve endocarditis. The mechanism, poorly understood, generally includes a regurgitant infectious flow originating from the aortic valve, direct contact with vegetation and direct propagation, through adjacent structures, such as the mitro-aortic intervalvular fibrous body. This report details the case of a 56-year-old patient followed for severe bicuspid aortic insufficiency of the aortic valve for 4 months and admitted to heart failure due to infectious endocarditis with a fatal outcome. Physical examination revealed aortic and mitral insufficiency syndrome and congestive heart failure. Transthoracic echocardiography revealed type 1 L-R bicuspid heart disease and leaking polyvalvulopathy with severe eccentric aortic and severe mitral regurgitation. The aortic and mitral valves were the seat of the vegetations. The mitral valve was the seat on its atrial side of a contained aneurysmal sac with thrombosed hyperechogenicity. Blood cultures were positive for streptococci and probabilistic dual antibiotic therapy was started. The patient was unable to benefit from surgical treatment. However, the patient died following complications such as ischemic stroke and septic shock. A necropsy was not done.

Keywords

Anterior Mitral Valve Leaflet Aneurysm, Infectious Endocarditis, Bicuspid Aortic Valve

1. Introduction

Anterior mitral valve aneurysm (AVM) is a rare entity. It is defined as a protuberance located on the atrial side of the mitral leaflet presenting systolic expansion and diastolic collapse [1]. It is frequently associated with infective endocarditis in aortic insufficiency [2, 3]. Cases of congenital mitral aneurysms [4], connective tissue defect or degeneration of valve tissue have also been described [5]. This report

presents the case of an aneurysm of the anterior mitral valve due to infective endocarditis in a bicuspid aortic joint with fatal outcome.

2. Observation

56-year-old patient, followed for 4 months for severe aortic

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insufficiency with left ventricular systolic dysfunction. Two weeks before admission, the patient reported symptoms consisting of onset of dyspnea and progressive worsening, admitting an orthopneic component, a deterioration in general condition and fever. Upon admission, the patient exhibited tachycardia at 107/min, a normal temperature of 36.2 °C, a blood pressure of 113/49 mm Hg and an SpO₂ of 99% on ambient air. Physical examination revealed clear consciousness with a Glasgow Coma Scale score of 15/15, a fairly good general condition, a displaced and diffuse apex beat to the left at the anterior axillary line, regular heart sounds with a soft, blowing diastolic murmur at the left sternal border, a holosystolic murmur at the mitral area with a jet-like quality, peripheral signs of aortic insufficiency (bounding pulses, hyperpulsatility of the neck vessels, widened pulse pressure...), clear lung fields with well-perceived vesicular breath sounds, and signs of global heart failure (NYHA stage 4 dyspnea with an orthopneic component, spontaneous jugular vein distension, congestive liver, and mild lower limb edema). The surface electrocardiogram showed a sinus tachycardia at 101 cycles/min, an anterior hemiblock, and a left ventricular hypertrophy (Figure 1).

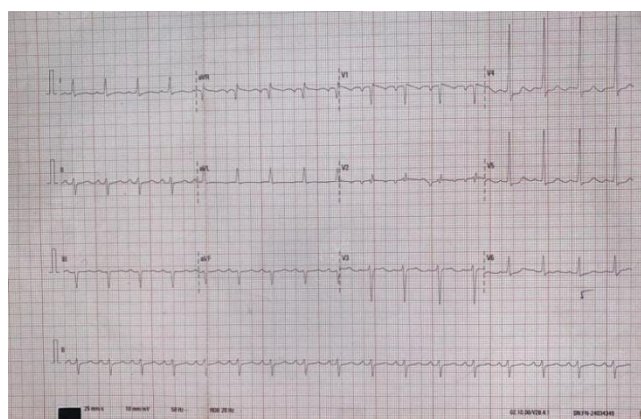


Figure 1. Regular sinus tachycardia with anterior hemiblock and left ventricular hypertrophy.

The frontal chest x-ray revealed global cardiomegaly with a supradiaphragmatic point, a double contour appearance of the right lower arch. At the level of the parenchyma, the presence of an encysted effusion on the right, a subpleural nodule above the fissure which itself is the site of a scissuritis were noted.

Biology had revealed a non-specific biological inflammatory syndrome with leukocytosis at 13100/mm³ with a predominance of polynuclear neutrophils, normochromic normocytic anemia at 9 g/dl and a positive CRP at 48 mg/l. Renal function was normal and hyponatremia was noted at 127.3 mEq/L on the blood ionogram, the kaliemia and chloremia were normal. Blood cultures were positive for strep-

tococcus.

Transthoracic echocardiography showed bicuspid aortic type 1 LR (Figure 2). The aortic sigmoids were thickened, mutilated seats of vegetations hanging on the ventricular side (Figure 3) and responsible for an eccentric and severe leak (isthmic end-diastolic velocity of 75m/s) directed towards the mitral valve. On the mitral valve were noted the presence of vegetations on its ventricular side, at the level of the cords and on the atrial side (Figure 4). The atrial side was also the site of an aneurysmal sac with hyperechoic contents, probably thrombosed (Figure 4). On Doppler there was a severe mitral leak with a regurgitated volume of 122 ml/min and an orifice surface area of 0.86 cm².

The diagnosis of mitro-aortic infectious endocarditis decompensating an aortic insufficiency on a bicuspid aortic valve with global heart failure was established, and the patient was started on diuretics and appropriate antibiotic therapy.

The evolution was complicated by the occurrence of a stroke and septic shock, leading to the patient's death after 34 days of hospitalization. No necropsy was done.

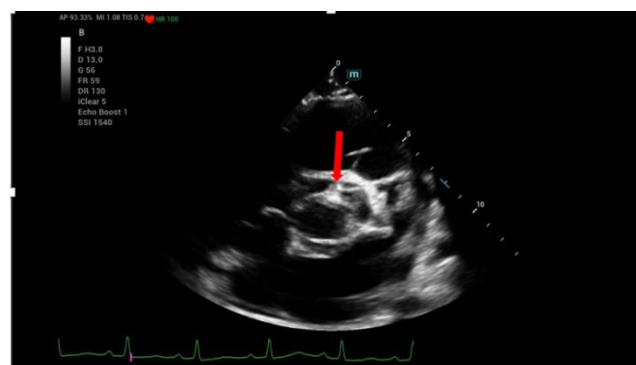


Figure 2. Transthoracic echocardiography in parasternal short axis trans aortic section showing type 1 bicuspid L-R (raphe red arrow).

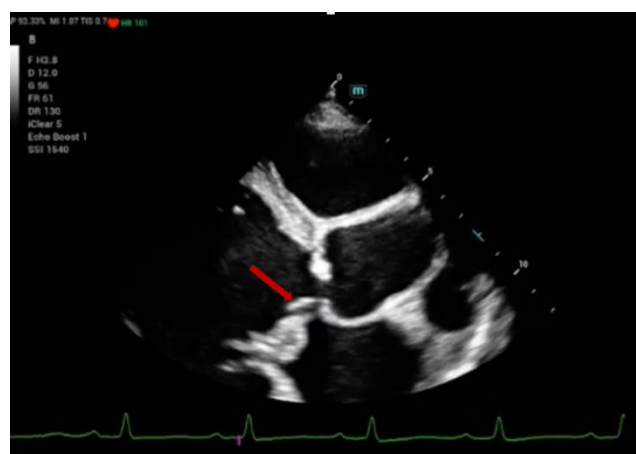


Figure 3. Transthoracic echocardiography in long axis parasternal section revealing thickened sigmoid bones with the visualization of vegetation (red arrow).

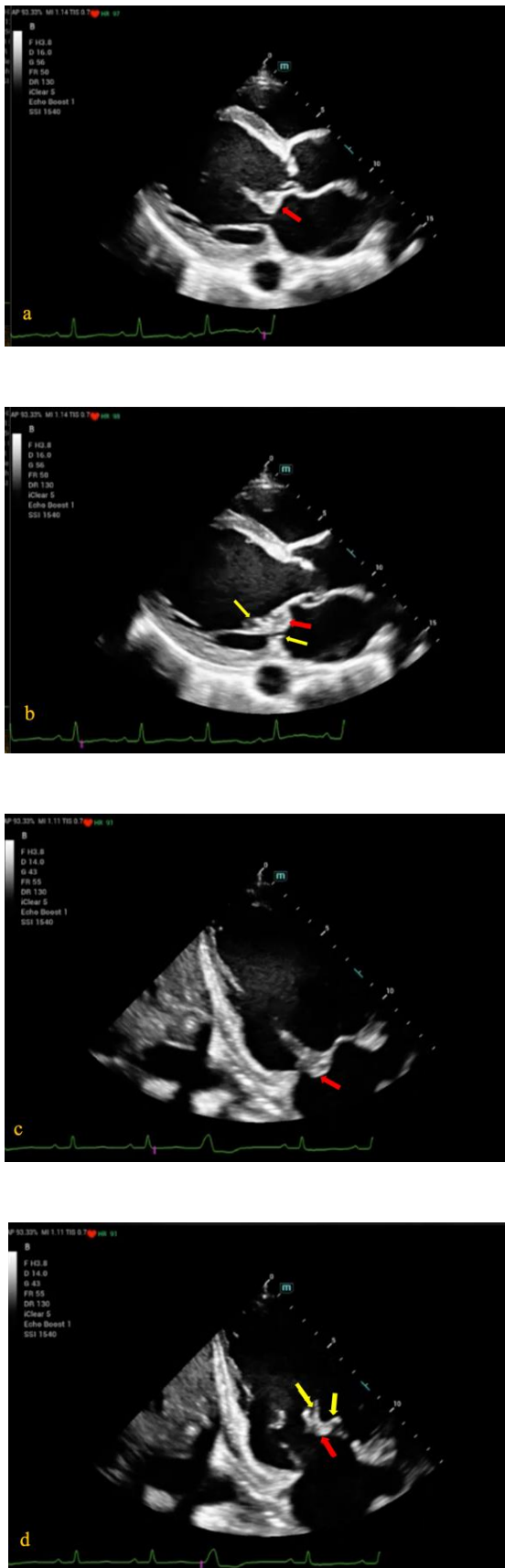


Figure 4. Transthoracic echocardiography in parasternal long axis section (a, b) and apical 2 cavities (c, d) showing the aneurysmal sac on the atrial side of the anterior leaflet of the mitral (red arrow) with thrombosed contents and the vegetations (yellow arrows) on the atrial and ventricular sides of the mitral.

3. Discussion

Aneurysm of the anterior mitral valve is a rare cardiac anomaly; its association with infective endocarditis of the aortic valve as in this patient is classic [6]. Occasional cases of mitral aneurysm in patients without endocarditis, such as those with connective tissue diseases, pseudoxanthoma elasticum, Marfan syndrome, and myxomatous valve degeneration have been described [5].

The patient described in this report presented with a bicuspid aortic joint which in itself constitutes a vulnerability factor to infective endocarditis compared to the general population [7]. The occurrence of a mitral valve aneurysm in the bicuspid aorta without any endocarditis has also been described [8].

The mechanism by which an aneurysm of the anterior mitral leaflet occurs in infective endocarditis remains poorly understood. Several hypotheses have been proposed, with the most widely accepted being that the infection induces inflammation and weakening of the valve tissue. This, combined with the mechanical forces exerted by the aortic regurgitation jet, leads to the formation of an aneurysmal sac on the mitral leaflet.

The clinical presentation is often that of structural heart disease generally associated with aortic insufficiency and/or mitral regurgitation. The diagnosis is made by transthoracic cardiac ultrasound, where the main diagnostic feature of mitral valve aneurysm remains the presence of a localized bulging structure of the mitral leaflet towards the left atrium, with systolic expansion and diastolic collapse. Transesophageal ultrasound and three-dimensional shows superiority due to the better characterization of the structures with better visualization of the atrial side of the mitral valve [9, 10]. The differential diagnoses that should be carefully considered, based on the ultrasound appearance, include mitral valve prolapse, mitral valve myxoma, a mitral valve cyst without endothelialization, or a (congenital) mitral valve diverticulum. Careful two-dimensional analysis helps distinguish the aneurysm from other abnormalities [11].

The cases of mitral valve aneurysm reported in the literature, particularly those described in a series of 13 cases by Vilacosta [2], indicate that aneurysmal damage to the valves exclusively affects the mitral valve, primarily involving its anterior leaflet. However, there are a few rare cases where aneurysms have been observed in the posterior leaflet [12].

The progression of the condition may lead to a rupture, which is a major concern due to its potential to cause significant mitral regurgitation. This can result in a swift and severe deterioration of hemodynamic status. Additionally, another possible complication involves embolism, where a thrombus that has formed within the aneurysmal sac, particularly after a rupture, can migrate and cause systemic embolic events. In reported patient, the aneurysmal sac was thrombotic, however, rupture could not be documented, although it could not be ruled out given the complications that occurred (notably a

stroke) and the deterioration of the hemodynamic status. Despite significant advances in antibiotic therapy, intensive care, and surgical techniques, mitral valve aneurysm remains fatal as it was in the described case, highlighting the importance of early diagnosis and appropriate management, which is primarily surgical [13]. The choice of therapeutic strategy, whether involving surgical intervention for the repairment or replacement of the mitral valve or a conservative management approach, will depend on the presence of ruptured or large aneurysms, severe hemodynamic disturbances, uncontrolled infections, or peripheral emboli [6]. Despite the enthusiasm of some authors for medical management, it is now widely accepted that the cornerstone of treatment remains surgery [12].

4. Conclusion

Anterior mitral valve aneurysm is a rare entity, usually a complication of aortic endocarditis. Its diagnosis is easy with echocardiography. Although the definitive treatment of MVA secondary to endocarditis is surgical, access to this procedure remains limited in sub-Saharan Africa due to insufficient technical resources.

Abbreviations

AVM Anterior Mitral Valve Aneurysm

Author Contributions

Marguerite T éning Diouf: Collecting the case, acquiring echocardiography image, editing images, writing-review and editing

Papa Adama Faye: Writing original draft

Papa Momar Guiss é Acquiring echocardiography image

Rest of authors: Supervision

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Data Availability Statement

The data is available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare no conflicts of interest.

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Biography



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Research Field

Marguerite T éning Diouf: Cardiac imaging, patient therapeutic education, heart failure, cardio oncology

Papa Adama Faye: Physiology, heart failure

Papa Momar Guiss é Cardiac imaging, heart failure, rehabilitation

Joseph Salvator Mingou: Interventional cardiology

Abdoul Kane: Valvular heart disease, cardiac imaging, heart failure, cardiac rehabilitation, interventional cardiology