CASE SERIES

Vegetation on the chordae and papillary muscle of the mitral valve: a diagnostic and therapeutic enigma

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Abstract

Vegetations on the high-pressure side of the mitral valve, particularly the chordae tendineae, are rare. We report two cases of infective endocarditis (IE) with atypical presentations. Case 1: A 34-year-old male with pulmonary aspergilloma, who presented with fever and respiratory distress. Blood cultures grew Staphylococcus species, and echocardiography revealed a 16 × 8 mm vegetation on the mitral valve chordae. Surgery was deferred due to disseminated fungal infection, and the patient improved with antimicrobial therapy. Case 2: A previously healthy 36-year-old male presented with fever, vomiting, dyspnoea, and headaches. Blood cultures were positive for Methicillin-resistant Staphylococcus aureus (MRSA), and echocardiography detected a 13 × 7 mm vegetation on the mitral valve chordae. The patient responded well to intravenous antibiotics, with complete resolution on follow-up. These cases highlight the need for high clinical suspicion, thorough imaging, and individualised management strategies in atypical presentations of infective endocarditis.

Keywords: Infective endocarditis, Chordae vegetation, Echocardiography, Staphylococcus species, Fungal endocarditis, Valve dysfunction.

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Introduction

Infective endocarditis (IE) is a rare infection that occurs when microorganisms enters the heart and adheres to its valves through the blood. People with existing heart problems including valvular and congenital heart disease and prosthetic devices or leads are at risk of IE, which can be severe if untreated.[1-4] Untreated IE can cause valvular insufficiency, heart failure, and myocardial abscesses.[4,5] During infection, organisms adhere to cardiac valves, forming vegetations that produce toxins and enzymes, causing valve cusp perforation, conduction pathway damage, sinus of Valsalva rupture, and valvular incompetence in the affected areas.[1,6]

Vegetations in infective endocarditis consist of fibrin, platelets, and bacteria bound by agglutinating antibodies.[6] Vegetations typically occur on the low-pressure side of the valves but can rarely appear on the opposite side, mural endocardium or ascending aorta in infective endocarditis cases.[4,7]

Intravenous antibiotics are the mainstay for infective endocarditis, with choice based on the organism. European Society of Cardiology (ESC) guidelines[4] allow oral antibiotics in select cases. Surgery may be required, making close monitoring essential.[8,9] The site of vegetation is important from the point of view of management.

Here, two cases which were seen on 27/July/2023 and 8/Aug/2023 respectively. These cases are being presented that were seen at the inpatient department of Aga Khan University Hospital, Karachi. Diagnosed with IE and vegetation on the mitral valve chordae and papillary muscle, it is a rare occurrence not widely documented in the literature.

Case # 1

A 34-year-old man, recently diagnosed with aspergilloma of the lung on imaging and lung biopsy, presented to the emergency department with the complaints of fever, cough and worsening dyspnoea. Clinical examination revealed a blood pressure of 90/50mmHg, pulse 138 beats/min, respiratory rate of 32 breaths/min, temperature 38°C, and oxygen saturation of 97% on 10 litres of supplemental oxygen. Respiratory examination revealed decreased air entry and coarse crepitation on the right side of the chest, while cardiovascular examination was unremarkable. Initial blood gases showed severe metabolic acidosis and the patient was electively intubated.

Blood workup showed leukocytes count 18.5 $\times 10^9$/L (4.0 – 10.0 $\times 10^9$/L) and X-ray of the chest showed consolidation on mid and lower zone of the right lung. The patient was started on antibiotics along with antifungal medication. Blood cultures came out to be positive for Staphylococcus species (not S. aureus). A CT scan of the chest, abdomen, and pelvis revealed enhanced lesions in the right half of

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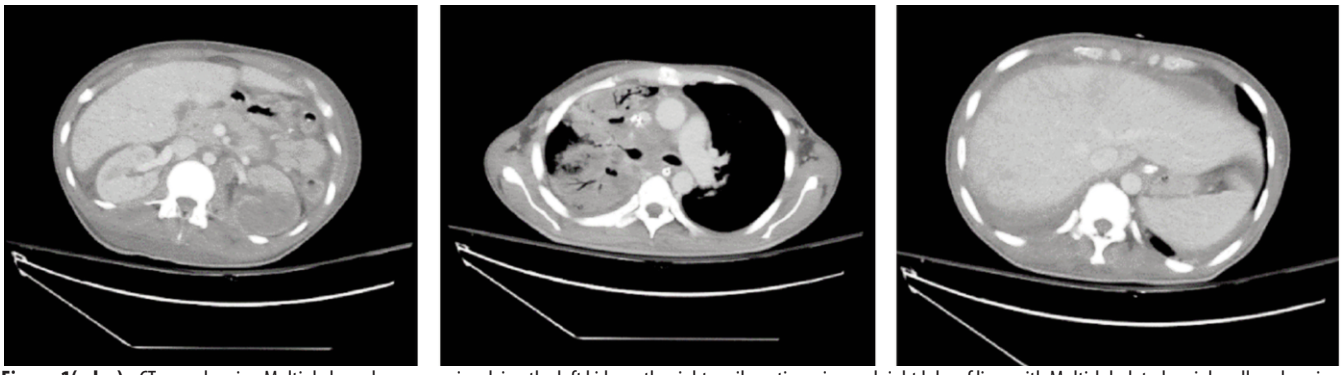

Figure-1(a,b,c):- CT scan showing Multiple hypodense areas involving the left kidney, the right perihepatic region and right lobe of liver with Multi-lobulated peripherally enhancing lesions in the right hemithorax..

Figure-2a: Transthoracic Echocardiography showing 16x8mm vegetation .

Figure-2c: Transesophageal echocardiography showed vegetation attached to chordae of mitral valve.

the chest, the left kidney, the region around the right liver, and the right lobe of the liver. (Figure 1).

Transthoracic Echo was done to rule out infective endocarditis which revealed a large echogenic density on

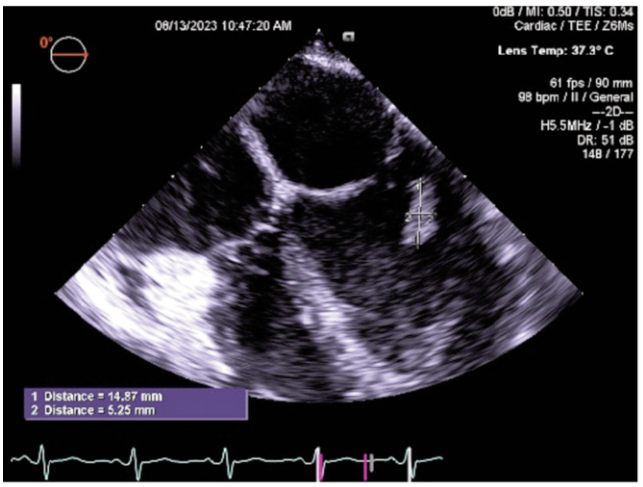

Figure-2b: Transesophageal Echocardiography showing 15x5mm vegetation at chordae,

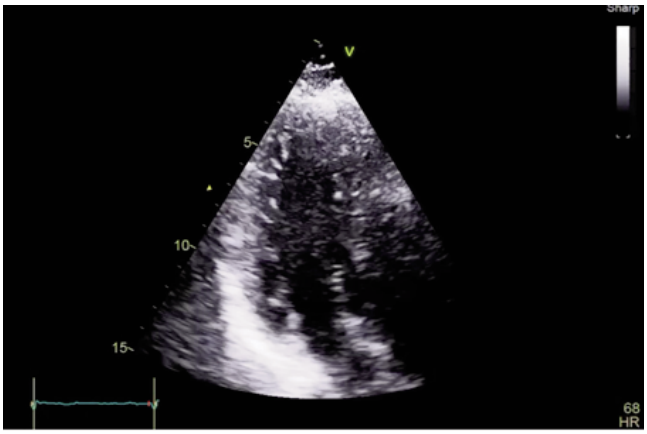

Figure-3: Transthoracic Echocardiography after 5 weeks showing resolution of vegetation.

the mitral valve chordae, with overall appearance suggestive of vegetation. (Figure 2a) Trans-oesophageal Echo confirmed the presence of vegetation measuring up to 15 x 5 mm, attached to the chordae of mitral valve

(Figure 2b, 2c). Cardiothoracic surgery team was consulted but surgery for the large vegetation was deferred due to disseminated fungal infection.

The patient showed gradual improvement on antibiotics and antifungal medications along with supportive treatment. He was successfully extubated with initial BI-PAP support and eventually maintaining oxygen saturation on room air before discharge. Follow-up echocardiographic images taken after five weeks showed resolution of vegetation. (Figure 3)

Case # 2

A 36-year-old gentleman with no known underlying health issues was hospitalised with a one-week history of fever, vomiting, dyspnoea, and headache and body aches. Clinical examination revealed blood pressure of 110/80mmHg, pulse of 110 beats/min, regular, respiratory rate of 24 breaths/min, temperature of 39.2°C. He was maintaining oxygen saturation up to 97% on room air. Initial assessments of his cardiovascular, respiratory, and neurological system showed no significant abnormality, although mild abdominal tenderness was observed during abdominal examination.

Blood tests showed leukocyte count 20 $\times 10^9$/L (4.0 – 10.0 $\times 10^9$/L), CRP levels 105 mg/L

(< 5 mg/L) and pro-calcitonin 7 ng/mL (< 0.05 ng/mL), while other laboratory parameters were within normal ranges. Initially, the patient was empirically treated for enteric fever, and blood cultures were sent for further evaluation. However, due to ongoing fever, an echocardiogram was done to rule out the possibility of infective endocarditis.

The echocardiogram revealed a sizable, highly mobile, echogenic mass measuring 13 x 7 mm located in the left ventricle (Figure 4), attached to the papillary muscle at its junction with the chordae, likely vegetation. Additionally, blood cultures came back positive for Methicillin-resistant Staphylococcus aureus (MRSA).

Consequently, the patient was started on broad-spectrum intravenous antibiotics according to the culture results. In the subsequent days, the fever subsided, and there was an improvement in the patient's CRP levels 45 mg/L. The patient was discharged on IV antibiotics, in a stable condition, and instructed to attend a follow-up clinic.

On follow-up, after six weeks of IV antibiotic therapy, an echocardiogram was done which revealed partial resolution of the vegetation, with a reduced size measuring 8 x 4 mm (Figure 5a). Antibiotic was continued for an additional 14 days, and a follow-up

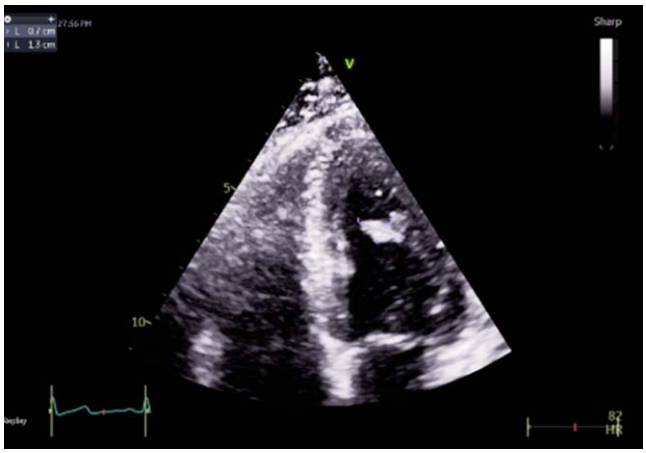

Figure-4: Transthoracic Echocardiography on admission showing 13x7mm vegetation at chordae.

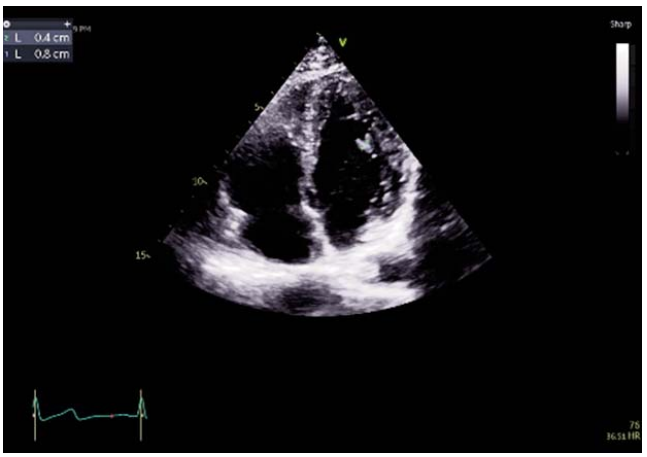

Figure-5a: Transthoracic Echocardiography showing 8x4mm vegetation at chordae after 6 weeks of IV antibiotics.

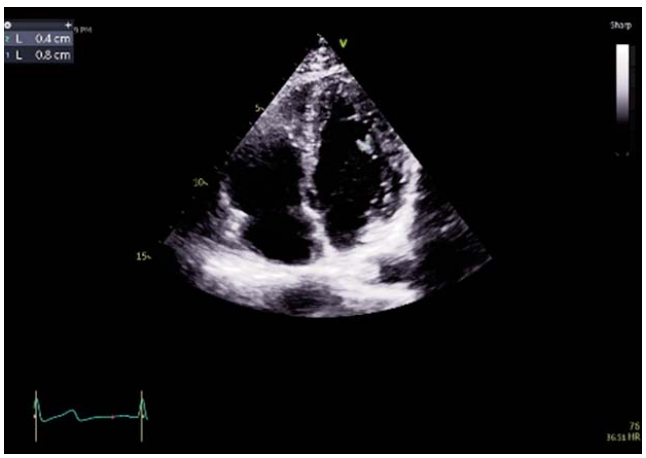

Figure-5b: Transthoracic Echocardiography shows complete resolution of vegetation after 14 days.

echocardiogram was done, which revealed complete resolution of the vegetation without any residual damage to the mitral valve apparatus or chordae (Figure 5b).

Discussion

Infective endocarditis (IE) is a rare but serious condition that demands prompt recognition and intervention.[1,4] While vegetations are a hallmark of IE, their usual location is on the low-pressure side of the valve, such as the atrial side of the mitral or tricuspid valves.[7] However, in the current cases, infective vegetations were identified on the high-pressure side of the mitral valve, particularly attached to the chordae tendineae/papillary muscle. This rare presentation of IE challenges our understanding of its pathophysiology and clinical implications.

Chordal vegetations in the context of infective endocarditis are a rarely documented occurrence in the existing medical literature. A case report by Soutar A et al. showed a vegetation at mitral valve chordae along with vegetation at superior vena cava catheter caused by streptococcus mitis.[14]

Patients with infective endocarditis may be prone to chordal ruptures, potentially caused by vegetations on the chordae or at critical mitral valve sites, such as the commissures or papillary muscles, leading to structural complications and worsening valvular dysfunction.[15] Presence of vegetation on papillary muscle is also a rare entity, however these vegetations are usually seen with multiple locations. [14,16,17]

IE diagnosis is challenging, requiring suspicion. Symptoms vary from fever and fatigue to specific signs like murmurs or embolic events.[2,6,10] The present cases highlight the importance of considering IE in patients with unexplained fevers, even in the absence of classic risk factors. Both patients in this series did not have underlying valvular heart disease or prosthetic heart valves, making the diagnosis even more unexpected.

The microbial aetiology of IE is diverse, with Staphylococcus and Streptococcus species being the common culprits.[6,11,12] In the current cases, Staphylococcus species were identified as the causative agents. This underscores the importance of blood cultures in guiding appropriate antibiotic therapy. Early initiation of broad-spectrum antibiotics is essential while awaiting culture results, especially in patients with severe septic presentations, as seen in case no. I.

The treatment of IE typically involves a prolonged course of intravenous antibiotics, often spanning several weeks.[4,11,13] Surgery is needed for severe valve dysfunction, abscess formation, heart failure, or uncontrolled infection. In case no. I, surgery was deferred due to disseminated fungal infection, while the second patient improved with antibiotics alone. These differing outcomes highlight IE's variable course and the importance of individualised treatment strategies.

Conclusion

In conclusion, these cases highlight the diverse presentation of infective endocarditis. While vegetations commonly occur on the low-pressure side, our findings show that IE can also affect high-pressure areas like the mitral valve chordae tendineae and papillary muscle.

Ethical Consideration: Consent was obtained; MR number used for identification only. Patient data remains confidential, accessible solely to the primary investigator.

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RAK: Concept, design, drafting and data interpretation.
MAT: Data collection and interpretation.
FATS: Concept, drafting and final approval.