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Left Ventricular Outflow Tract Endocarditis as a Sequela of Pneumonia in a Patient without Valvular Abnormalities

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Abstract

A 50-year-old woman with underlying end stage renal disease on hemodialysis developed large isolated staphylococcal infective endocarditis over the left ventricular outflow tract when she had pneumonia, without apparent valvular involvement. She subsequently had successful surgery for excision of vegetation.

Keywords: Vegetation, Infective endocarditis, LVOT, MSSA

1. History of presentation

A 50-year-old woman presented to the emergency department for fever, and lethargy for 1 week. She had intermittent productive cough for the past 1 month, and was previously well with no recent admission.

Upon arrival, she was alert but septic with temperature of 38.3 °C, her blood pressure was 160/100 mm Hg, pulse rate of 110 beats per minute, and peripheral oxygen saturation of 95% on room air. Furthermore, chest examination demonstrated left lower zone crepitations, and no murmurs present.

2. Past medical history

She had hypertension, dyslipidemia and ESRD secondary to diabetic kidney disease and was on hemodialysis via her arteriovenous fistula for the past 1 year.

2.1. Differential diagnosis

The differential diagnosis includes community acquired pneumonia either bacterial or viral,

including possible COVID-19 infection or tuberculosis. Further laboratory and imaging work-up is required to establish the final diagnosis.

2.2. Investigations

Chest radiography showed cardiomegaly with left lower zone opacity (Fig. 1). Laboratory investigation reveals leukocytosis with white cell count of $12.5 \times 10^9/L$ and C-reactive protein level of 33.82 mg/dL. COVID-19 PCR was negative. Initial impression was community acquired pneumonia based on the preliminary findings, and broad-spectrum intravenous antibiotics, amoxycillin and clavulanic acid were initiated. Despite 48 h of antibiotics, she persistently had fever and cultures from sputum and peripheral blood grown as MSSA.

TTE was ordered to rule out presence of vegetation. It showed an oscillating mass at the septal part of the LVOT (Fig. 2), which was later confirmed with TOE. Detailed assessment from TOE, showed a papillary mass measuring 1.95×0.48 cm at the interventricular septum just 1.5 cm from the aortic annulus. The aortic valve was normal with no

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significant regurgitation (Fig. 3). Her ejection fraction was also normal at 65%. There were also no regional wall motion abnormality and left ventricular hypertrophy.

2.3. Management

Intravenous antibiotics was changed to cefazolin as diagnosis was revised to MSSA infective endocarditis secondary to pneumonia. The patient was counselled for surgical excision of the vegetation because of its large size and risk of embolization; however she was not keen. After 1 week of

Abbreviations

AMVL	anterior mitral valve leaflet
ESRD	end stage renal disease
H&E	Hematoxylin and eosin
IS	Interventricular septum
LV	Left ventricle
LVOT	Left ventricular outflow tract
ME	Mid oesophageal
MSSA	Methicillin sensitive staphylococcal aureus
PCR	Polymerase chain reaction
SA	Subvalvular apparatus
TOE	Transoesophageal echocardiography
TTE	Transthoracic echocardiography

Fig. 1. Chest radiography on admission showing cardiomegaly with left lower zone opacity.

antimicrobial therapy, the patient was still febrile, and counselled again for surgery, in which she ultimately agreed. Pre-operative coronary angiography showed mild coronary artery disease.

The patient was originally planned for manubriotomy access to minimize complications. However due to right atrium low position, the cardiothoracic surgeons opted for complete median sternotomy and pericardiotomy. The patient was put on bypass for 108 min and cross clamp time was 66 min. Aortotomy was done with thoracoscopic device inserted through the incision, and the vegetation was excised and sent for histopathological examination (Fig. 4). Further inspection of the aortic valve, chordae, papillary muscles, and remaining part of the LVOT were all normal. However, there were multiloculated collection over the right thoracic cavity with adhesions over the parietal pleura, likely secondary to the pneumonia. Post

Fig. 2. (A) Still image of parasternal long axis view of TTE with arrow pointing at the vegetation at the septal part of the LVOT. (B) Still image of apical five chamber view of TTE with arrow pointing at the vegetation.

Fig. 3. (A) Still image of modified five chamber view of midoesophageal TOE showing a large vegetation measuring 1.95×0.48 cm at the septal part of LVOT. (B) Still image of long axis view of midoesophageal TOE showing normal aortic valve with no obvious regurgitation during diastole.

Fig. 4. Intraoperative thoracoscopic image of the LV cavity retrogradely from the aortotomy with arrow pointing at the vegetation at the inter-ventricular septum (IS) opposite the anterior mitral valve leaflet sub-valvular apparatus (AMVL SA).

operatively, the patient had considerable bleeding from the median sternotomy wound due to her osteoporotic sternum and possible platelet dysfunction, which is common in patients with ESRD, however she recovered uneventfully with packed cell transfusion.

The histopathological examination of the excised sample showed mass composed of fibrin and red blood cells admixed with lymphocytes, plasma cells, neutrophils, and hemosiderin laden macrophages, suggestive of vegetation (Fig. 5). No cardiac tissue was also present. A tissue culture was also sent;

however, no growth was detected after 5 days, probably because patient was given antibiotics up to a week.

2.4. Follow-up

She was discharged from the hospital after completion of six weeks of intravenous antibiotics after culture clearance. Repeated TTE upon completion of antibiotics showed resolution of the vegetation (Fig. 6). Repeated chest radiography showed resolution of the left lower zone opacity.

Upon review in clinic after 2 months, she remained well without any long term sequelae. She will be followed up in the cardiology clinic in the future.

3. Discussion

This was a rare case of isolated MSSA LVOT endocarditis without valvular abnormalities. There are only a handful reports of confirmed LVOT endocarditis in the literature, as it is an uncommon site for vegetation implantation [1–3]. However, most of the cases had some degree of valvular abnormalities such as bicuspid aortic valve, and aortic regurgitation that could explain the predisposition for vegetation formation. This patient also never had any cardiac procedures such as alcohol septal ablation or myomectomy, and any LVOT calcification that could disrupt the normal endocardial structure of the LVOT.

We had chronological and microbiological evidence to prove that the patient developed pneumonia first before developing the endocarditis.

Fig. 5. Histopathological examination of the vegetation. (A) Section shows a vegetation composed of fibrin and red blood cells admixed with lymphocytes, plasma cells, neutrophils, and hemosiderin laden macrophages. (H&E stain, magnification $\times 40$). (B) H&E stain, magnification $\times 100$.

Fig. 6. (A) Still image of parasternal long axis view of TTE with no more vegetation over the LVOT. (B) Still image of apical five chamber view of TTE with no more vegetation over the LVOT.

Previous TTE which was done over a year ago for cardiac assessment pre hemodialysis, did not mention any abnormality over the LVOT. Furthermore, the histopathological examination showed the excised mass was consistent with vegetation, with no cardiac tissue present. As the patient was an ESRD patient on hemodialysis, she was predisposed to infections especially pneumonia and developing endocarditis as a complication [4,5]. Therefore, measures to prevent endocarditis through strict aseptic technique during access cannulation is vital. Prophylactic antibiotic administration in these patients is controversial, as the risk is low if proper measures were enforced [6].

Conservative treatment was not contemplated for our patient, as the vegetation was large and susceptible for embolization [7]. She was also a good surgical candidate as there were no neurological involvement.

4. Conclusion

Isolated LVOT endocarditis is rare in the literature and more so in patients without valvular abnormalities. Multidisciplinary approach in treating this ailment is required to give the patient the best option of recovery.

Learning objectives

1. To understand the risk of endocarditis after pneumonia in immunocompromised patients.
2. To understand the possibility of vegetation to affect other than valvular surface in infective endocarditis.
3. To learn the management of large vegetation in infective endocarditis and multidisciplinary approach involved.

Author contribution

Conception and design of Study: MAR, PS. Literature review; Data collection: MAR, PS, MII, SHP, HHCH. Research investigation and analysis: SHP. Drafting of manuscript; Revising and editing the manuscript critically for important intellectual contents: MAR. Data preparation and presentation: MAR, PS, HHCH. Supervision of the research; Research coordination and management; Funding for the research: HHCH.

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Conflicts of interest

The authors have no disclosures to declare.

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