

An Unusual Case of Isolated Native Pulmonic Valve *Enterococcus faecalis* Endocarditis

Maria Angela Matabang¹, Ma. Carla Angela Evangelista¹, and Kenneth Ong¹

¹Lincoln Medical Center

May 18, 2023

An Unusual Case of Isolated Native Pulmonic Valve *Enterococcus faecalis* Endocarditis

Abstract

A patient with long standing history of End Stage Renal Disease (ESRD) on hemodialysis (HD) and breast cancer is admitted for weakness and fever. Blood culture showed *Enterococcus faecalis*. Transthoracic echocardiogram revealed a 0.8 cm circular echodensity on ventricular surface of pulmonary valve protruding into RV during diastole. She was successfully treated with IV antibiotics.

Keywords : pulmonic valve, endocarditis, pericardial effusion

Abbreviations : wound vacuum assisted closure (VAC), arteriovenous fistula (AVF), coronary artery disease (CAD), below the knee amputation (BKA), End-Stage Renal Disease (ESRD), transthoracic echocardiogram (TTE), peripherally inserted central catheter (PICC), infective endocarditis (IE), intravenous drug use (IVDU), tricuspid valve (TV), pulmonary valve endocarditis (PVE), congenital heart disease (CHD), transesophageal echocardiography (TEE)

History of Presentation

A 53 year old woman was transferred from her out-patient hemodialysis center to our institution for persistent generalized weakness accompanied by fatigue and abdominal distension. On admission, she is normotensive, non-tachycardic, non-tachypneic, saturating 100% on room air. A faint murmur was present at the left sternal border. A pericardial friction rub was also detected. The abdomen is distended with evidence of ascites. The hospital course was unremarkable until the third hospital day when she developed fever of 100.3F. She has no chills, cough, colds, abdominal pain, dysuria, diarrhea.

Past Medical History

Past history includes coronary artery disease (CAD), hypertension, dyslipidemia, diabetes mellitus, right below the knee amputation (BKA), end-stage renal disease (ESRD) on hemodialysis. A prior transthoracic echocardiogram (TTE) showed eccentric left ventricular hypertrophy with calculated ejection fraction between 35 to 40%, global hypokinesis, mild right atrial enlargement, normal-appearing tricuspid and pulmonic valves with mild to moderate tricuspid and pulmonic regurgitation. She was recently diagnosed with Invasive Ductal Carcinoma. She underwent mastectomy which was complicated by hematoma and she was discharged on wound vacuum assisted closure (VAC) due to persistent high output seroma. The VAC remains in-situ at the time of admission.

Differential Diagnosis

Given the presence of fever, new onset heart murmur and ascites in an immunocompromised person, infective endocarditis, pericarditis and/or spontaneous bacterial peritonitis were considered. Other possibilities include COVID pneumonia, hospital acquired pneumonia, AVF infection, surgical site (right breast) infection.

Investigations

Initial work up included a complete blood count which showed microcytic hypochromic anemia (7.1; normal 12-16 g/dL). The white blood cell and platelet counts were within normal limits. The patient had a positive COVID test on admission but her chest x-ray (Figure 1) did not show any consolidation or effusion. Blood cultures are positive with *Enterococcus faecalis*. In the setting of fever, positive blood cultures and heart murmur, an echocardiogram was done showing a new finding of 0.8 centimeter circular echo density on the ventricular surface of the pulmonary valve protruding into the right ventricle during diastole (Video 1) (Video 2). Serial cardiac troponin T (cTnT) was elevated at 0.541 ng/mL and at 0.595 ng/mL (normal < = 0.010 ng/mL).

Management

The patient was empirically treated initially with Piperacillin Tazobactam and Vancomycin which was subsequently changed to Ampicillin-Sulbactam and Ceftriaxone after the TTE results. She was given aspirin and colchicine for pericarditis.

The patient continued to have episodes of shortness of breath accompanied by reduction in oxygen saturation which improved with supplemental oxygen. CT angiogram of the Chest excluded the possibility of septic pulmonary embolism. However patchy ground glass infiltrates consistent for viral pneumonia and right middle lobe consolidation was present. She was treated for hospital acquired pneumonia with subsequent resolution of symptoms. A peripherally inserted central catheter (PICC) line was placed and patient was transferred to a subacute rehabilitation center for completion of antibiotics. She responded well to the course of antibiotics with plan for repeat echo on follow up.

Discussion

The incidence of infective endocarditis (IE) in the United States is steadily increasing despite updates in prophylaxis guidelines. It has increased from 11 to 15 cases per 100 000 people per year. Compared to the widespread data on left-sided IE, right-sided IE is reported less frequently. Right-sided IE accounts for only 5% to 10% of all IE cases with intravenous drug use (IVDU) as the most common risk factor (1). Tricuspid valve (TV) is involved in majority of reported right-sided endocarditis cases, which makes isolated pulmonary valve endocarditis (PVE) a rare entity accounting for 1.5% to 2% of cases (2). Isolated pulmonary valve involvement is uncommon. Importantly, native PV involvement is rarer with an estimate occurrence of 0.2% to 1.2%. The majority of native valve endocarditis affects the left-sided heart valves (3)(4). Table 1 summarizes the most common organisms in right sided-IE with *Staphylococcus aureus* being the predominant organism (1). For enterococcal bacteremia, gastrointestinal and urinary tracts, intravascular catheters and wounds (ulcers, burns) must be considered as possible entry points. The relative risk of *E. faecalis* bacteremia for endocarditis, though higher compared to other enterococcal species, is still relatively low and usually associated with prolonged bacteremia of community onset, with unclear source or with prosthetic valve.

Fever, together with predominantly pulmonary symptoms (dyspnea, pleuritic chest pain, cough, hemoptysis) remains to be the most common symptom in PVE (5). A low pitched, short diastolic murmur describes PV regurgitation, which can be easily missed (6). The absence of cardiac symptoms, common risk factors or involvement of other valves leads to a delayed diagnosis (5).

The primary imaging modality used to detect right-sided IE is echocardiography. TTE optimally provides critical information since the right-sided structures are located anteriorly and close to its transducer. However, for cardiac-device related IE, transesophageal echocardiography (TEE) is usually used as TTE has limited sensitivity for the detection of pacemaker lead vegetations (1).

Valvular insufficiency, abscess formation and septic pulmonary embolism are the most common complications of right-sided IE (Table 2) (1). Like left-sided IE, intravenous antibiotics remains the cornerstone of treatment in right-sided IE. Surgical intervention which includes vegetation removal, radical debridement of vegetations,

and infected tissue and valve repair may be warranted in certain circumstances as summarized in Table 3 (1).

Conclusion(s)

We present a case of acute pulmonic valve IE. Although it is difficult to identify an isolated native pulmonic valve endocarditis by physical examination, a high level of suspicion and prompt recognition of risk factors should always be considered. A timely work up and treatment is importance to avoid dreaded complications of IE.

References

1. Shmueli H, Thomas F, Flint N, et al. Right-Sided Infective Endocarditis 2020: Challenges and Updates in Diagnosis and Treatment. *J Am Heart Assoc.* 2020 Aug 4;9(15):e017293. doi: 10.1161/JAHA.120.017293. Epub 2020 Jul 23. PMID: 32700630; PMCID: PMC7792231.
2. Samaroo-Campbell J, Hashmi A, Thawani R, et al. Isolated Pulmonic Valve Endocarditis. *Am J Case Rep.* 2019 Feb 4;20:151-153. doi: 10.12659/AJCR.913041. PMID: 30713335; PMCID: PMC6369649.
3. Jhaveri S, Saarel EV, Stewart RD, et al. Isolated Endocarditis of Native Pulmonary Valve in a Pediatric Patient: The Unusual within the Unusual. *CASE (Phila).* 2019 Nov 15;4(2):69-73. doi: 10.1016/j.case.2019.10.004. PMID: 32337393; PMCID: PMC7175791.
4. Mohamed S, Patel AJ, Mazhar K, et al. Native pulmonary valve endocarditis requiring pulmonary valve replacement in adulthood: a case series. *J Surg Case Rep.* 2022 Apr 18;2022(4):rjac137. doi: 10.1093/jscr/rjac137. PMID: 35444791; PMCID: PMC9015772.
5. Saleem M, Ahmed F, Patel K, et al. Isolated Pulmonic Valve Endocarditis: Case Report and Review of Existing Literature on Diagnosis and Therapy. *CASE (Phila).* 2019 Jul 19;3(5):227-230. doi: 10.1016/j.case.2019.05.003. PMID: 31709375; PMCID: PMC6833121.
6. Miranda WR, Connolly HM, DeSimone DC, et al. Infective Endocarditis Involving the Pulmonary Valve. *Am J Cardiol.* 2015 Dec 15;116(12):1928-31. doi: 10.1016/j.amjcard.2015.09.038. Epub 2015 Oct 9. PMID: 26611123.

Figure 1: Chest X-ray. No lung consolidation, pleural effusion or pneumothorax. Enlarged cardiac silhouette. Right axillary stent and clips overlying the right lower hemithorax.

Video 1: Transthoracic Echocardiogram. There is a circular echodensity, 0.8 cm in diameter on the ventricular surface of the PV which protrudes into the RV during diastole.

Video 2: Transthoracic Echocardiogram. Color doppler shows moderate pulmonic valvular regurgitation.

Hosted file

Table 1.docx available at <https://authorea.com/users/619855/articles/644153-an-unusual-case-of-isolated-native-pulmonic-valve-enterococcus-faecalis-endocarditis>

Hosted file

Table 2.docx available at <https://authorea.com/users/619855/articles/644153-an-unusual-case-of-isolated-native-pulmonic-valve-enterococcus-faecalis-endocarditis>

Hosted file

Table 3.docx available at <https://authorea.com/users/619855/articles/644153-an-unusual-case-of-isolated-native-pulmonic-valve-enterococcus-faecalis-endocarditis>

