

Prosthetic mitral valve *Aspergillus fumigatus* endocarditis

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ARTICLE INFO

Article history:

Received 28 May 2020

Received in revised form 25 June 2020

Accepted 25 June 2020

Keywords:

Aspergillus fumigatus

Endocarditis

Mitral valve

Female

Heart valve prosthesis

Polymerase chain reaction

ABSTRACT

Aspergillus endocarditis is a fatal source of valvular infection with a near 100 % mortality rate if pharmacotherapy and valve-replacement surgery are not initiated swiftly after diagnosis. Complicating its diagnosis is the low yield for growth on standard blood culture and time requirements for molecular diagnostic tools to return a result. *Aspergillus* endocarditis of the mitral valve presents as valvular vegetations that reduce the caliber of the mitral valve and can cause syncope as in the case of mitral stenosis with subsequent valve failure, left atrial enlargement, and prospective cardiovascular failure. Reports of the management of *Aspergillus* endocarditis after serial mitral valve replacement are not prominent in the literature. We report the case of a 41-year-old female with previous mitral valve prosthesis who received a second prosthetic mitral valve after a syncopal episode. Vegetations resembling thrombi were noted on transesophageal echocardiogram, diagnosed as *Aspergillus fumigatus* endocarditis, and successfully treated with antifungal therapy in conjunction with removal of her dysfunctional prosthesis.

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Introduction

Aspergillus has the propensity to invade and cause severe local infections in a multitude of organ systems such as the central nervous system, the respiratory tree, and even the heart. The classic presentation of aspergillosis involves colonization of the lungs, especially in patients predisposed to immunodeficiency. More uncommon, however, is aspergillosis manifesting as endocarditis secondary to infection of bioprosthetic valves with subsequent leaflet dysfunction. Isolation of the pathogen in blood culture can pose to be an arduous undertaking. Additionally, dismissal of fungal blood cultures as erroneous contaminants may occur, especially in cases that do not pose a high baseline index of suspicion for cardiovascular disease of mycotic etiology [1–4].

Nevertheless, an astute clinician noting the potential association between invasive *Aspergillus* and endocarditis can serve to be indispensable when unraveling the underlying cause of leaflet

compromise and endocarditis in patients who initially present with more broad symptoms such as syncope, fever, and leukocytosis all masquerading as mitral stenosis. We report the case of infective endocarditis of prosthetic mitral valve due to *Aspergillus fumigatus*.

Case Presentation

A 42-year-old female with a past medical history of end stage renal disease on dialysis, recent mitral valve (MV) replacement for mitral valve regurgitation 4 months prior, and remote diagnosis of microscopic polyangiitis, presented to the emergency room after a syncopal episode. Given recent surgical history, a transthoracic echocardiogram was conducted to assess the MV and revealed movement of a single leaflet with an estimated MV area of 1.0 cm², mean gradient of 16 mmHg, and peak gradient of 30 mmHg (Fig. 1 and Supplementary Movies 1 and 2). Cinefluoroscopy was performed to evaluate the valve which revealed 25 mm bi-leaflet valve with soft tissue pivoting from the ventricular side under the posterior leaflet of the mechanical valve (Supplementary Movies 3 and 4). At this stage, it was presumed that no percutaneous options were available for resolution of valvular dysfunction, and a redo MV replacement was necessary, given the clinical status and concern for progressive deterioration of valve function. A pre-operative transesophageal echocardiogram (TEE) revealed an

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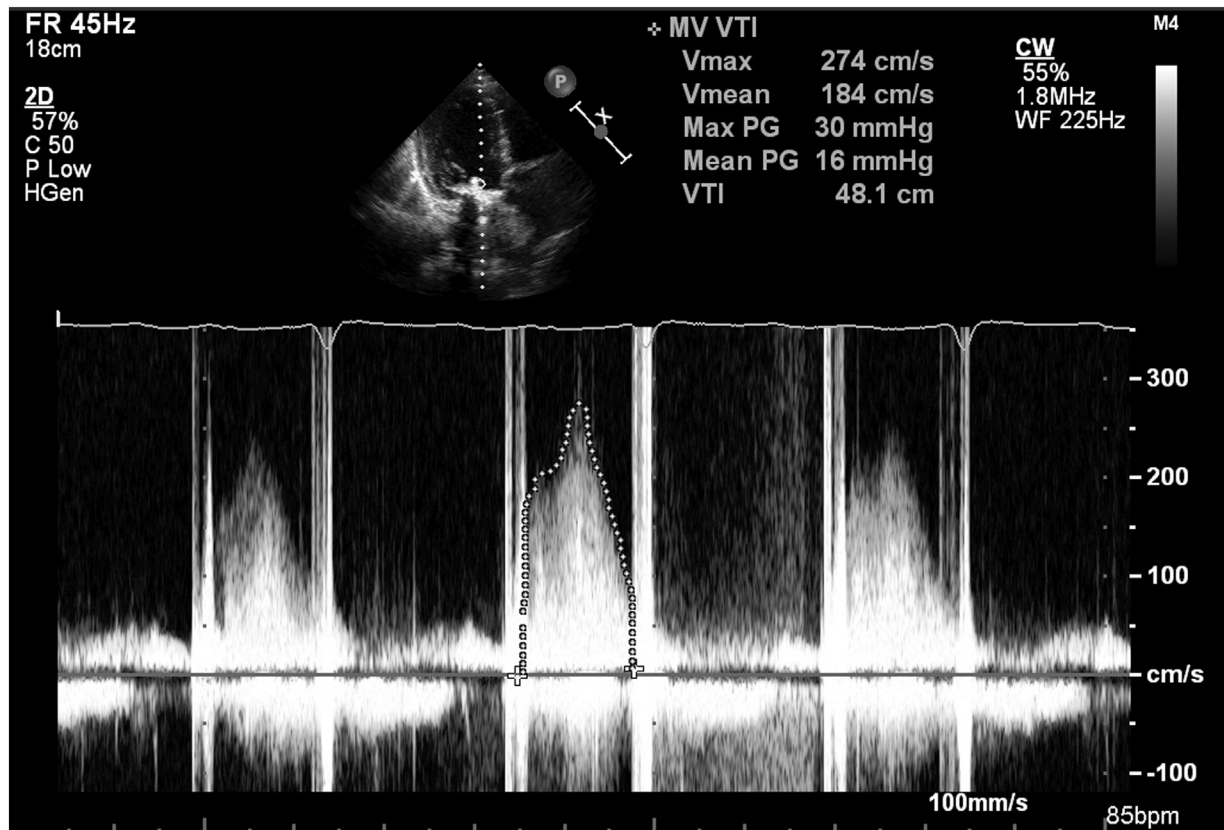


Fig. 1. Continuous wave doppler of the mitral valve showing severe mitral stenosis evident by mean gradient of 16 mmHg.

echogenic highly mobile mass attached to the posterior annulus that intermittently caused incomplete opening and closure of the posterior leaflet. A dense echo mobile mass measuring 1.35cm \times 0.7cm crossing the MV annulus traversing left atrium (LA) and left ventricle (LV) was seen on TEE. Moreover, additional smaller mobile echodensities were seen along the anterior annulus and at the tip of the MV leaflets. It was believed that this mass represented a thrombosed native leaflet and residual chordae (Supplementary Movie 5). MV was subsequently replaced with a 27 mm porcine valve. Intraoperatively, multiple masses on the MV sewing ring were noted, the largest measuring to be roughly 1.5cm \times 1.0cm. These masses raised the index of suspicion for endocarditis, and the prosthetic valve as well as perivalvular masses were collected for pathological analyses.

Given history of vasculopathy, endocarditis was suspected to be infectious versus autoimmune. An extensive autoimmune workup was negative. Multiple negative blood cultures were collected throughout the postoperative course. The patient was started on broad spectrum antimicrobials and micafungin for fungal coverage under the presumptive diagnosis of culture-negative endocarditis. Polymerase chain reaction of MV tissue came back positive for *Aspergillus fumigatus*, at which the decision to start voriconazole was made. The patient improved clinically and serologically and was subsequently discharged on voriconazole 200 mg every 12 h.

Discussion

Bacterial endocarditis is responsible for the vast majority of cases of infective endocarditis [5]. Clinical attributes associated with endocarditis include rheumatic fever, intracardiac device placement, congenital heart defects, and in the case of our patient-

hemodialysis, chronic autoimmune conditions, and history of valve placement [6]. Fungal endocarditis remains a clinically significant source of infective endocarditis with *Candida albicans* representing the bulk of fungal endocarditis cases [7]. Characterization of mitral valve endocarditis due to *Aspergillus fumigatus* has not been reported extensively in the literature, with most accounts occurring in patients who have received solid organ transplantation or after cardiac surgery [8,9].

The diagnosis of *Aspergillus fumigatus* may be delayed given the difficulty of pathogen growth on blood cultures and can be exacerbated by a clinician not initially looking for *Aspergillus*. Moreover, our case deviates from traditional dogma-based off clinical evidence that suggests fungal endocarditis patients usually present with myalgias, cough, and fever with embolization of major vessels in roughly 60 % of case [10]. The pathogenesis of fungal endocarditis is believed to be due to injury of the endocardium, promoting the deposition of platelets and fibrin followed by subsequent inoculation with fungi that adhere to the endocardium in turbulent flow; all seen in the local environment during cardiac surgery. The latter is what constitutes the vegetation and it is believed that chronic inflammation surrounding the vegetation contributes to subsequent valvular degeneration [11]. Autoimmune conditions, such as the vasculopathy seen in our patient may exacerbate this underlying inflammation [12]. Diagnosis is preferably achieved through molecular testing, as it potentially shortens the time to diagnosis and initiation of treatment [13]. Optimal treatment of infective endocarditis due to *Aspergillus* is unknown, with guidelines suggesting voriconazole followed by surgical valvular intervention [14]. A lack of surgical intervention is believed to carry a near 100 % mortality rate [15]. It has been argued that lifetime voriconazole should be initiated due to the high risk of relapsing infection [4].

Conclusion

Given the high index of mortality coupled with specific considerations, it is prudent to consider fungal endocarditis in patients with vegetations and lack of delineated thrombi on imaging. *Aspergillus* endocarditis remains an emerging source of prosthetic valve infection, and a commentary on its presence in patients with serial mitral valve replacements are lacking in the literature. An early diagnosis of *Aspergillus* endocarditis is crucial as it allows for patients to receive optimal antifungal exposure and prompt life-saving surgery valvular replacement surgery.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

CRedit authorship contribution statement

Abdulrahman S. Museedi: Conceptualization, Investigation, Writing - review & editing, Visualization. **Mouhamed Nashawi:** Writing - original draft. **Abdullah Ghali:** Writing - original draft. **Abbas Alshami:** Writing - review & editing. **Ripa Chakravorty:** Supervision.

Declaration of Competing Interest

The authors declare no conflict of interest.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.idcr.2020.e00891>.

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