Case Report

Late Prosthetic Valve Infective Endocarditis by *Enterococcus durans*

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Abstract

Enterococcus durans is an extremely rare cause of infective endocarditis. We have reported the first case where a 56-year-old female presented with late prosthetic valve infective endocarditis on a mechanical mitral valve. Medical management failed and eventually lead to the demise of the patient.

Keywords: *Enterococcus durans*, infective endocarditis, late prosthetic valve infective endocarditis, mechanical valve infective endocarditis

Introduction

Enterococcal endocarditis is a potential cause of devastating condition with a high morbidity and mortality rate. *Enterococcus durans* infective endocarditis is an extremely rare condition evident from the fact that it has only been reported seven times in the literature worldwide. Late prosthetic valve *E. durans* infective endocarditis of a mechanical mitral valve that failed medical management has never been reported in the literature.

Case Report

A 56-year-old Caucasian female with a history of mechanical mitral valve replacement presented to the emergency room with acute kidney injury. The patient also reported the presence of low-grade fever, fatigue, weight loss of 24 pounds, and decreased appetite for 3 months. During the period of subacute symptoms, the patient presented to the health-care system several times. The patient denied the presence of any night sweats, chills, skin rash, viral symptoms, or hemoptysis. Past medical history was positive for diabetes mellitus type 2, hypertension, and atrial fibrillation, whereas the patient had surgical history of mitral valve replacement due to severe mitral valve regurgitation, coronary artery bypass grafting, carotid endarterectomy, aortic valve repair, and placement of a surgical mesh after urinary bladder surgery. Medications at the time of admission included warfarin, amiodarone, and metoprolol. The patient was vitally stable; however, physical examination revealed a 4/6 diastolic murmur on the apical area along with significant tenderness on the left upper chest wall which radiated toward the back. The patient. had no Janeway lesions and had no exposure to tame animals.

Blood workup showed pancytopenia and elevated creatinine of 5.9 mg/L, potassium of 6.1 mEq/L, C-reactive protein of 61 mg/dL, and International Normalized Ratio (INR) of 4.78. Urine analysis showed hematuria with mild proteinuria and mixed cellular cast. Light microscopic study of urine, liver function tests, serology for viral hepatitis, antinuclear antibody, antineutrophil cytoplasmic antibodies, and cryoglobulin were within the normal range. Bacterial isolates were recovered from four of four blood cultures within 14–28 h of collection using the standard automated instrumentation (BacT-Alert System, FA Plus and FN Plus bottles, BioMeriuex, Durham, NC, USA). Following subculture to sheep blood agar, isolated colonies of Gram-positive cocci were evaluated in

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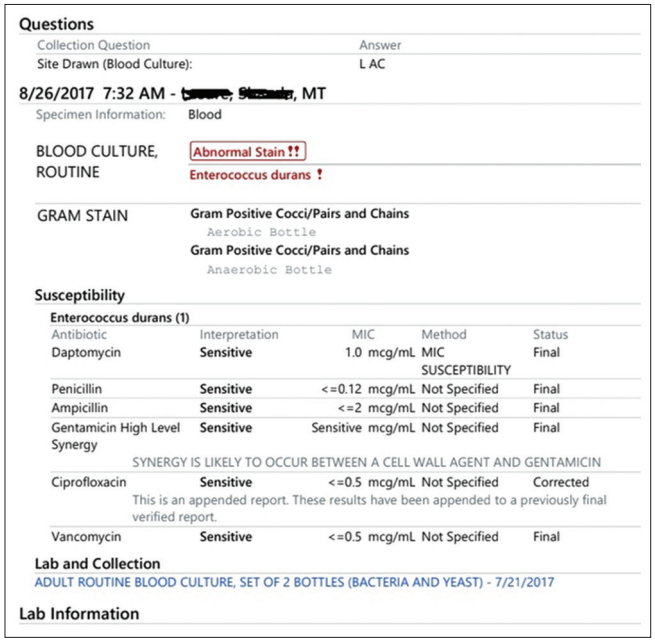
duplicate from each of the four cultures using MALDI-TOF mass spectrometry (Vitek MS, BioMeriuex), with all giving uniformly high probability scores (99.9%) for the identity of *E. durans*.[1] Antimicrobial susceptibility testing was performed on a representative isolate from each bacteremia episode using an automated phenotypic method (Vitek 2, GP75, BioMeriuex) or standard disc diffusion and gradient diffusion (*E*-test, BioMeriuex) [Figure 1]. Transesophageal echocardiogram (TEE) showed vegetation of 0.8 cm × 0.3 cm on the medial aspect of the annulus of the mechanical mitral valve [Figure 2a]. An abdominal computed tomography (CT) scan showed splenomegaly with splenic infarction. After the initial assessment, the patient was admitted to the medicine ward, and multidisciplinary teams, including nephrology, infectious disease, radiology, and cardiac surgery, were consulted.

At admission, the patient was placed on intravenous fluids as conservative management for kidney injury and empiric antibiotic therapy consisting of daptomycin, cefepime, and metronidazole was initiated, whereas warfarin was halted due to supra-therapeutic INR levels. Daptomycin was eventually switched to combination ampicillin and ciprofloxacin when blood cultures revealed *E. durans* sensitive to ampicillin, ciprofloxacin, daptomycin, gentamicin, and vancomycin. Gentamicin was avoided due to kidney injury. Blood cultures after 72 h of antibiotics therapy were sterile. The patient improved significantly, and on the 10th day of hospitalization, the patient was discharged home with the recommendation to complete a 6-week course of intravenous antibiotics. Meanwhile, warfarin was resumed as INR stabilized at 2.33 mg/dL. In the 5th week of therapy, the patient developed peripheral eosinophilia; therefore, ampicillin was switched to daptomycin.



Questions

Collection Question	Answer
Site Drawn (Blood Culture):	L AC

8/26/2017 7:32 AM - [redacted], MT

Specimen Information: Blood

BLOOD CULTURE, ROUTINE: Abnormal Stain !! — Enterococcus durans !

GRAM STAIN: Gram Positive Cocci/Pairs and Chains — Aerobic Bottle; Gram Positive Cocci/Pairs and Chains — Anaerobic Bottle

Susceptibility

Enterococcus durans (1)

Antibiotic	Interpretation	MIC	Method	Status
Daptomycin	Sensitive	1.0 mcg/mL	MIC SUSCEPTIBILITY	Final
Penicillin	Sensitive	<=0.12 mcg/mL	Not Specified	Final
Ampicillin	Sensitive	<=2 mcg/mL	Not Specified	Final
Gentamicin High Level Synergy	Sensitive	Sensitive mcg/mL	Not Specified	Final
	SYNERGY IS LIKELY TO OCCUR BETWEEN A CELL WALL AGENT AND GENTAMICIN			
Ciprofloxacin	Sensitive	<=0.5 mcg/mL	Not Specified	Corrected
	This is an appended report. These results have been appended to a previously final verified report.			
Vancomycin	Sensitive	<=0.5 mcg/mL	Not Specified	Final

Lab and Collection

ADULT ROUTINE BLOOD CULTURE, SET OF 2 BOTTLES (BACTERIA AND YEAST) - 7/21/2017

Lab Information

Figure 1: Shows the culture and sensitivity on initial presentation of the patient

Three months after the completion of antibiotic therapy, the patient presented to the emergency department with hemiplegia, left-sided facial palsy, and aphasia. Laboratory studies showed creatinine of 7.27 mg/dL, blood urea nitrogen of 79, and INR of 7.2. CT scan of the brain showed right frontal intraparenchymal hemorrhage with subarachnoid extension and a 3-mm leftward midline shift. Repeated CT scan showed a progression of hemorrhage; therefore, the patient underwent right decompressive craniotomy. Four sets of blood cultures were drawn and through above-mentioned modality, they were positive for *E. durans* [Figure 3]. Transesophageal echocardiography was negative for any vegetation [Figure 2b]. Combination antibiotic therapy was initiated, and follow-up blood culture after 48 h was sterile. The patient remained intubated and underwent continuous renal replacement therapy. Despite the definitive management, the patient developed multiple organ failure. A discussion with the family was arranged where they decided to move patient to the inpatient hospice for comfort measures where she eventually died on the 26th day of admission.

Discussion

Enterococcus is a major cause of hospital-acquired infections that potentially affect the urinary tract system, soft tissues, heart, and prosthesis. It is known for being resistant to commonly used antibiotics, requiring prolonged antibiotic therapy, and causing significant morbidity and mortality. *Enterococcus* is further classified into *Enterococcus faecalis, Enterococcus faecium,* and other rare subtypes.[2] *Enterococcus faecalis* is responsible for 97% of all infective endocarditis caused by Enterococci.[3,4] Rare subtypes such as *Enterococcus gallinarum, Enterococcus avium, Enterococcus casseliflavus, Enterococcus raffinosus, E. durans*, and *Enterococcus hirae* are seldom associated with human infections due to their low infectivity.[5]

Enterococcus is the third leading cause of infective endocarditis, following *Streptococcus* and *Staphylococcus*. It is responsible for 5%–20% of all cases of endocarditis. It causes endocarditis in both native and prosthetic valves. Patients with enterococcal endocarditis are relatively older and have significant comorbidities.[6]

E. durans is a nonfaecalis and nonfaecium *Enterococcus*. It is a part of gut flora with low virulence. It has a subacute

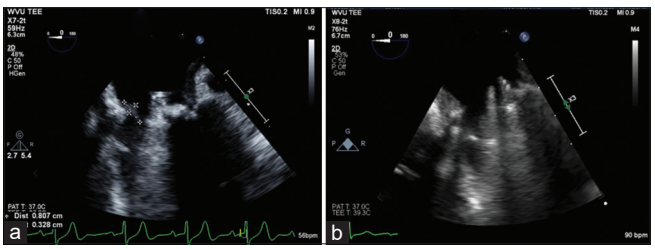
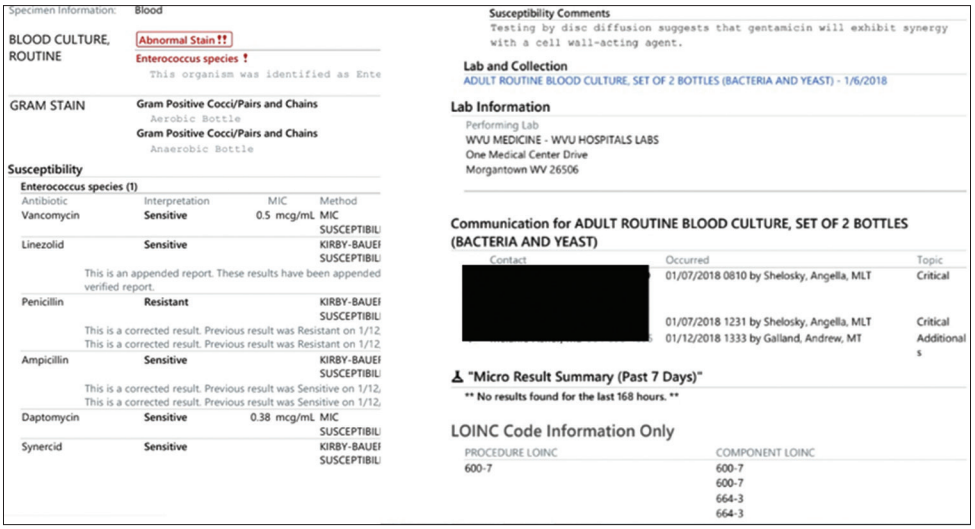


Figure 2: (a) Transesophageal echocardiogram done on initial admission shows vegetation on the medial aspect of the annulus of mechanical mitral valve. (b) Transesophageal echocardiogram done on final admission which is negative for any vegetation


Specimen Information: Blood

BLOOD CULTURE, ROUTINE — Abnormal Stain !!
Enterococcus species !
This organism was identified as Ente

GRAM STAIN — Gram Positive Cocci/Pairs and Chains
Aerobic Bottle
Gram Positive Cocci/Pairs and Chains
Anaerobic Bottle

Susceptibility
Enterococcus species (1)

Antibiotic	Interpretation	MIC	Method
Vancomycin	Sensitive	0.5 mcg/mL	MIC
			SUSCEPTIBILI
Linezolid	Sensitive		KIRBY-BAUEI
			SUSCEPTIBILI
	This is an appended report. These results have been appended verified report.		
Penicillin	Resistant		KIRBY-BAUEI
			SUSCEPTIBILI
	This is a corrected result. Previous result was Resistant on 1/12		
	This is a corrected result. Previous result was Resistant on 1/12		
Ampicillin	Sensitive		KIRBY-BAUEI
			SUSCEPTIBILI
	This is a corrected result. Previous result was Sensitive on 1/12,		
	This is a corrected result. Previous result was Sensitive on 1/12,		
Daptomycin	Sensitive	0.38 mcg/mL	MIC
			SUSCEPTIBILI
Synercid	Sensitive		KIRBY-BAUEI
			SUSCEPTIBILI

Susceptibility Comments
Testing by disc diffusion suggests that gentamicin will exhibit synergy with a cell wall-acting agent.

Lab and Collection
ADULT ROUTINE BLOOD CULTURE, SET OF 2 BOTTLES (BACTERIA AND YEAST) - 1/6/2018

Lab Information
Performing Lab
WVU MEDICINE - WVU HOSPITALS LABS
One Medical Center Drive
Morgantown WV 26506

Communication for ADULT ROUTINE BLOOD CULTURE, SET OF 2 BOTTLES (BACTERIA AND YEAST)

Contact	Occurred	Topic
[redacted]	01/07/2018 0810 by Shelosky, Angella, MLT	Critical
	01/07/2018 1231 by Shelosky, Angella, MLT	Critical
	01/12/2018 1333 by Galland, Andrew, MT	Additional s

"Micro Result Summary (Past 7 Days)"
** No results found for the last 168 hours. **

LOINC Code Information Only

PROCEDURE LOINC	COMPONENT LOINC
600-7	600-7
	600-7
	664-3
	664-3

Figure 3: Culture and sensitivity report of the patient on last presentation

progression of symptoms and rarely associated with peripheral signs such as Osler's nodes, Roth spots, and petechial lesions. *E. durans* endocarditis is an exceptionally rare entity that has been reported only seven times in the literature. Previous literature has emphasized on reporting *E. durans* as a rare cause of infective endocarditis,[7-10] infective endocarditis on bioprosthetic valve,[11,12] and gentamicin-resistant infective endocarditis.[13] However, there is no evidence in the literature reporting a late prosthetic valve *E. durans* infective endocarditis on a mechanical mitral valve that failed to be eradicated with medical management. In our case, the patient presented with subacute clinical symptoms for 3 months. Endocarditis was diagnosed on the basis of four sets of positive blood cultures, whereas further evidence was provided by the presence of vegetation on transesophageal echocardiography.

The recommended treatment for prosthetic valve enterococcal endocarditis is a combination therapy of beta-lactam and gentamicin for 6 weeks, whereas vancomycin is indicated in cases of ampicillin intolerance. Newer agents such as daptomycin, linezolid, quinupristin-dalfopristin, and other glycopeptides are alternative treatment options.[4,14,15] The ultimate management is through the replacement of the valve when there is the presence of persistent emboli, failure of medical therapy, relapse of infection, cardiac insufficiency, and heart block.[4,10]

In our case, combination therapy of ampicillin and ciprofloxacin was used. Although guidelines suggest combination ampicillin and gentamicin therapy, gentamicin was avoided due to renal compromise.[4] The patient completed the recommended 6 weeks of intravenous antibiotics therapy and the follow-up blood cultures did not show any bacterial growth. Three months after the completion of antibiotic therapy, the patient developed stroke and 4 sets of blood culture were drawn that demonstrated the presence of *E. durans,* whereas the transesophageal echocardiography did not show any vegetation.

The case of persistent and identical *E. durans* bacteremia with the disappearance of vegetation on the repeated TEE suggests that antibiotic therapy only reduced the size of vegetation on the mechanical mitral valve but did not completely eradicate the bacteria. Therefore, it strongly indicates that this was a case of *E. durans* infective endocarditis on a prosthetic valve that failed to be eradicated with medical management alone.

Conclusion

A case of late prosthetic mechanical mitral valve endocarditis that failed to be eradicated with medical management is reported in this study for the very first time. *E. durans* endocarditis on a mechanical valve is a complex entity that requires combination therapy for a longer duration. The outcomes of medical therapy are poor, and there is a higher chance of relapse after antibiotics are stopped. The ultimate recommendation for prosthetic valve endocarditis is to undergo valve replacement to avoid any relapse.

Research quality and ethics statement

The authors of this manuscript declare that this scientific work complies with reporting quality, formatting, and reproducibility guidelines set forth by the EQUATOR Network. We also certify that we have not plagiarized the contents in this submission and have done a Plagiarism Check.

Acknowledgments

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Nil.

Conflicts of interest

There are no conflicts of interest.

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