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Unusual Colonization of my Heart: A Case of Corynebacterium Striatum Endocarditis in 59-Year-Old Male

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Abstract

Infective Endocarditis (IE) is a severe condition characterized by infection of the endocardium and heart valves. Gram-positive bacteria, particularly streptococci, staphylococci, and enterococci, account for 80-90% of cases, with Staphylococcus aureus being predominant [1]. Corynebacterium species causing IE are exceedingly rare and often dismissed as contaminants in cultures. A review of the Swedish Registry of Infective Endocarditis identified 30 cases of Corynebacterium-related endocarditis between 2008 and 2017, predominantly Corynebacterium striatum in patients with prosthetic valves, with a median age of 71 years [2].

Keywords: Corynebacterium Striatum Endocarditis; Infective Endocarditis; Heart Valves; Streptococci; Staphylococci; Enterococci

Case Report

A 59-year-old male presented to the Emergency Room with worsening dyspnea over 2 weeks. He reported using more pillows to sleep comfortably and experienced palpitations, paroxysmal nocturnal dyspnea, lower extremity edema, body aches, cold sweats, non-quantified fever, and chills during this period. The patient had a history of weight loss following a colostomy for strangulated hernia five years prior but had not sought medical attention until now. He denied chest pain, recent travel, prolonged immobilization, respiratory symptoms, gastrointestinal complaints, dizziness, or syncope.

The patient, a former long-term construction worker and substance user (alcohol, cocaine, crack, marijuana, and heavy smoking), had quit all substances 15 years ago. His medical history included type 2 diabetes mellitus, hypertension, coronary artery disease with stent placement, heart failure with reduced ejection fraction (status post ICD implantation), and end-stage renal disease on hemodialysis thrice weekly. Surgical history included colostomy, herniorrhaphy, digital amputation due to diabetic neuropathy, and below-knee amputation.

On examination, the patient appeared alert but had fluctuating confabulation. Physical findings included dry skin, temporal wasting, icteric sclera, crackles on lung auscultation, abdominal scars with tenderness, and bilateral lower extremity pitting edema.

Laboratory investigations revealed hypoxemia, leukocytosis with neutrophilia, normocytic anemia, moderate thrombocytopenia, electrolyte disturbances, elevated renal and hepatic markers, and pending blood culture results.

Chest X-ray demonstrated a 3.2 cm nodular opacity in the left upper lobe, a bandlike opacity suggestive of atelectasis or pneumonia in the left midlung, and a small right pleural effusion. Subsequent chest CT confirmed multifocal pneumonia with associated pleural effusions but no pulmonary masses.

The patient was admitted with a provisional diagnosis of Multifocal Pneumonia, Suspected Bacteremia, End-Stage Renal Disease on Hemodialysis, and Suspected Endocarditis. Empirical treatment with ceftriaxone and azithromycin was initiated and escalated to cefepime and vancomycin by Infectious Diseases specialists.

Blood cultures were positive for Corynebacterium striatum. Repeat cultures confirmed the organism's presence, ruling out contamination. Antibiotic therapy was adjusted to piperacillin/tazobactam and vancomycin based on sensitivities.

Echocardiography revealed an ejection fraction of 35-40% with vegetations on the tricuspid valve, consistent with endocarditis. The patient initially refused transesophageal echocardiogram (TEE) due to perceived risks versus benefits but later consented after psychiatric evaluation diagnosed Adjustment Disorder with Depressed Mood.

TEE confirmed moderate left ventricular dysfunction, severe tricuspid valve regurgitation, and a large echogenic structure attached to the RV lead (3.32 x 2.32 cm), indicative of prosthetic cardiac device endocarditis.

Infectious Disease recommended device removal and a 42-day course of antibiotics. Electrophysiology consultation advised transfer to a facility with cardiothoracic surgery for device extraction, with potential for emergent conversion to open heart surgery. Despite comprehensive counseling, the patient declined the procedure, leading to a fatal outcome due to complications from untreated infection.

Discussion

Corynebacterium Striatum Endocarditis

Corynebacterium striatum endocarditis is notably rare and has been infrequently reported in the literature. Recent studies show that while Corynebacterium species account for a small fraction of endocarditis cases, their prevalence is increasing, particularly in patients with prosthetic devices or a history of substance abuse [1,2]. Our case aligns with findings from these studies, demonstrating that Corynebacterium striatum can lead to severe endocarditis, albeit infrequently. For instance, Gaifer et al. (2023) and Blackberg et al. (2021) reported similar challenges in managing infections caused by Corynebacterium striatum, attribut-

ed to its biofilm-forming capabilities and resistance patterns.

This case underscores the need for early identification and aggressive management in Corynebacterium striatum endocarditis, including consideration of device removal. The severity of the patient's condition contrasts with some reports where early surgical intervention and appropriate antibiotic therapy led to better outcomes. The literature emphasizes that timely and comprehensive management is crucial for improving patient outcomes in such cases [3,4].

Antibiotic Regimen

The initial empirical treatment with ceftriaxone and azithromycin was chosen to cover a broad range of potential pathogens, including common Gram-positive bacteria associated with endocarditis. Upon identification of Corynebacterium striatum, the regimen was adjusted based on susceptibility testing, transitioning to piperacillin/tazobactam and vancomycin. Corynebacterium striatum is known to exhibit resistance to penicillins and cephalosporins due to beta-lactamase production and alterations in penicillin-binding proteins [5].

Current guidelines for treating Corynebacterium endocarditis recommend a combination of vancomycin with either piperacillin/tazobactam or a similar beta-lactam agent due to the organism's resistance profile [6]. The adjustment to this regimen aimed to achieve effective coverage against this resistant pathogen, aligning with recommended treatment strategies.

Resistance Mechanisms

Corynebacterium striatum's resistance to penicillins is primarily due to the production of beta-lactamases and alterations in penicillin-binding proteins, complicating treatment options [7]. Vancomycin remains effective against this pathogen, and linezolid is a viable alternative when vancomycin is not suitable. This case highlights the importance of tailoring antibiotic therapy based on resistance patterns to improve outcomes in endocarditis caused by resistant pathogens.

Ethical Considerations and Patient Communication

The patient's refusal of recommended interventions presented significant ethical and clinical challenges. Balancing patient autonomy with medical recommendations required careful consideration. The healthcare team provided comprehensive information about the risks and benefits of the proposed procedures, including the potential fatal outcomes of declining treatment.

Effective communication strategies were employed, including detailed discussions about the potential benefits of device removal and the risks of not undergoing the procedure. A psychiatric evaluation further supported these discussions, addressing the patient's psychological readiness for the interventions. Despite these efforts, the patient's decision reflected his personal values and concerns, underscoring the complexity of managing such cases where patient autonomy intersects with critical medical recommendations.

Conclusion

This case underscores the potential for Corynebacterium striatum, a typically low-virulence organism, to cause severe and life-threatening infective endocarditis, particularly in patients with a history of illicit drug use and prosthetic devices. Despite its rarity, Corynebacterium striatum should be considered in the differential diagnosis of endocarditis, especially in patients presenting with a prosthetic device or known risk factors for Gram-positive infections.

The patient's outcome highlights the critical importance of early recognition and aggressive management in such cases. Although Corynebacterium striatum is generally resistant to many antibiotics, appropriate treatment regimens, such as the combination of vancomycin with piperacillin/tazobactam, are essential for effective management. Furthermore, this case demonstrates the significant impact of patient autonomy on treatment decisions, especially in the context of complex and high-risk medical interventions.

A holistic approach, incorporating early surgical intervention and thorough patient communication, is vital for improving outcomes. The importance of balancing re-

spect for patient choices with clinical recommendations cannot be overstated, particularly in cases involving resistant pathogens and prosthetic devices. This case contributes to the growing body of literature on Corynebacterium striatum endocarditis, emphasizing the need for heightened awareness and preparedness in managing such challenging infections.

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