Cardiovascular implantable electronic device infection with rapidly growing mycobacteria

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ABSTRACT

Cardiovascular implantable electronic devices, which are frequently utilized for many cardiovascular diseases, can become infected, leading to significant morbidity and mortality. This case highlights an unusual presentation of pacemaker generator pocket infection with *Mycobacterium fortuitum*.

KEYWORDS Cardiovascular implantable electronic device; *Mycobacterium fortuitum*; pacemaker generator pocket infection; rapidly growing mycobacterium

Cardiovascular implantable electronic devices (CIEDs) are used for many cardiovascular diseases. CIED infections are commonly caused by staphylococcal species, are life threatening, and have increased mortality.¹ Infections with *Mycobacterium fortuitum* are rare. *M. fortuitum*, one of the most commonly isolated rapidly growing mycobacteria in clinical specimens, causes human infection primarily by direct inoculation, including primary skin and soft tissue infections, surgical wound infections, and catheter-related sepsis. It has also been implicated in prosthetic valve endocarditis, cervical lymphadenitis, and pulmonary disease.

CASE DESCRIPTION

A 77-year-old man with ischemic cardiomyopathy, a mechanical aortic valve, and third-degree atrioventricular block with dual-chamber pacemaker placement 1 week prior presented with complaints of pain and drainage of pus and blood from the pacemaker site for 3 days. He denied fever, chills, shortness of breath, productive cough, weight loss, diaphoresis, night sweats, and palpitations. The physical exam was suggestive of induration and drainage from the pacemaker site on the left chest wall. Significant laboratory results included a white blood cell count of $7.8 \times 10^3/\mu\text{L}$; normal renal and liver function tests; negative blood cultures, including acid-fast bacilli blood cultures; and smear-negative wound cultures. Chest x-ray and computed tomography of the thorax were normal. Transthoracic and transesophageal

echocardiography showed no vegetations on the valve or lead wires. The CIED was removed and a temporary pacer was placed. The patient was initially started on piperacillin-tazobactam and vancomycin for concern of *Staphylococcus* infection. Wound cultures grew acid-fast bacilli identified as *M. fortuitum*, and antibiotics were changed to amikacin, cefoxitin, and levofloxacin once the culture data returned (*Table 1*). After a week, a new pacemaker and epicardial lead were inserted on the right side. The patient developed acute kidney injury secondary to amikacin. He was eventually discharged with a planned 6-week course of intravenous imipenem and oral doxycycline followed by a 6-month course of oral doxycycline and linezolid.

DISCUSSION

M. fortuitum is a rapidly growing mycobacterium. Rapidly growing mycobacteria are environmental organisms that usually grow in cultures within a week. They are most commonly found in nonrespiratory specimens and act mostly by direct inoculation causing skin and soft tissue infections² as well as wound infections.³ Between 1997 and 2015, there were 33 reported cases of *Mycobacterium* infecting CIEDs; 23 were rapidly growing mycobacteria, of which 15 were *M. fortuitum*.⁴ Rarely, they cause prosthetic valve endocarditis and pulmonary disease.^{5,6} CIED infections have increased morbidity and mortality. Infections affect only the skin pocket during insertion and can lead to overt bacteremia and eventually endocarditis by infecting the lead wires.

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Table 1. Sensitivity results of the *Mycobacterium fortuitum* wound culture

Antibiotic	MIC (μg/mL)	Interpretation
Amikacin	≤1	Susceptible
Cefoxitin	32	Intermediate
Ciprofloxacin	≤0.12	Susceptible
Clarithromycin	8	Resistant
Doxycycline	≤0.12	Susceptible
Imipenem	≤2	Susceptible
Linezolid	4	Susceptible
Minocycline	≤1	Susceptible
Moxifloxacin	≤0.25	Susceptible
Tigecycline	0.06	No interpretation
Trimethoprim/sulfamethoxazole	1/19	Susceptible

MIC indicates minimum inhibitory concentration.

Early identification of the mycobacterial species is important to determine susceptibilities. *M. fortuitum* is resistant to conventional antitubercular drugs. Treatment should include removal of the CIED. Drugs used for treatment are usually an aminoglycoside with cefoxitin, imipenem, or levofloxacin. Initial parenteral therapy is recommended with two antibiotics for 2 to 6 weeks until clinical improvement is noted.⁷ For severe skin and soft tissue infections, a minimum of 4 to 6 months of therapy with at least two agents is recommended to achieve a higher cure rate.⁸ It is important to monitor for adverse reactions of antibiotics given the long-term use.

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