CASE REPORT

Pacemaker pocket infection due to *Mycobacterium goodii*, a rapidly growing mycobacteria

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SUMMARY

A woman aged 74 years with an implanted dual-chamber pacemaker presented with pacemaker site infection after failing empiric antimicrobial therapy. The pathogen was later identified as *Mycobacterium goodii*, a rapidly growing mycobacteria species. The pacemaker was subsequently removed and the patient was treated with oral ciprofloxacin and doxycycline with clinical improvement. In this article, we describe a rare case of pacemaker site infection by *M. goodii*.

BACKGROUND

Implantable cardiac devices are associated with a high risk of introducing an infection which, if not successfully treated, can lead to devastating complications, including bacteraemia and infective endocarditis. Common pathogens involved in surgical site infections are Gram-positive cocci of the skin flora and empiric antimicrobial therapy such as vancomycin is used to target these species. Atypical organisms are involved in cases of non-response to empiric therapy.

Rapidly growing mycobacteria are rare but increasingly recognised causes of pacemaker site infection. *Mycobacterium goodii* was first identified by Brown *et al*¹ to be distinct from *Mycobacterium smegmatis*, which the pathogen was previously categorised. Since then, *M. goodii* infections were reported mostly in postsurgical settings. As of date, there are two documented reports of *M. goodii* infection complicating the pacemaker site.^{2,3} We describe the third documented case of pacemaker site infection by *M. goodii*. Here, we highlight the importance of recognising rapidly growing mycobacteria as causes in treatment-resistant pacemaker site infections.

CASE PRESENTATION

A woman aged 74 years with sinus node dysfunction with symptomatic lethargy and chronotropic incompetence had a dual-chamber ventricular pacemaker implanted on 23 February 2016. Almost 1 month after pacemaker insertion, she developed erythema and brown purulent discharge at the site of insertion. She was initially assessed at a local hospital and was prescribed cefprozil with no improvement. She subsequently finished courses of clarithromycin and cephalexin with no clinical response. She was then admitted to the London Health Sciences Centre for consideration of removal of her implanted pacemaker and an Infectious Diseases consultation. Her pacemaker was removed on 4 May 2016.

At the time of initial assessment, she reported no fevers or other constitutional symptoms. Her main symptoms were tenderness, swelling and purulent discharge from the surgical site. Of questionable significance, she was known to work with sheep and had been in contact with the animals after the insertion of pacemaker. However, no other suspicious contacts or travel history were noted. She had no risk factors for HIV or had no reasons for immunosuppression.

On initial examination, she was not systemically ill. There was an obvious sinus tract at the site of pacemaker insertion with surrounding erythema and yellowish-brown purulent discharge with warmth and tenderness surrounding the site.

Her medical history included bicuspid aortic valve, hypothyroidism, type 2 diabetes mellitus, gastro-oesophageal reflux disease, asthma and carpal tunnel syndrome. Her surgical history included bilateral total knee arthroplasties. She was born and grew up in Canada with no history of intake of alcohol, tobacco or illicit drugs. There was no relevant family history. Her medication list included levothyroxine, terbutaline inhalers, budesonide/formoterol combined inhaler, lansoprazole and combined diclofenac/misoprostol pill. Her allergies included rash secondary to sulfa-containing medications and rash secondary to codeine.

INVESTIGATIONS

Initial cultures from the serum and wound were negative for bacteria. However, acid-fast bacilli species were grown after 5 days of incubation categorised as rapidly growing mycobacteria. This was confirmed to be *M. goodii*, speciated by Genotype Mycobacterium test from the Public Health Ontario Laboratory in Toronto, Canada. Susceptibility testing revealed the pathogen to be susceptible to amikacin, ciprofloxacin, doxycycline, imipenem, linezolid, tobramycin and trimethoprim/sulfamethoxazole, but resistant to clarithromycin. She was never bacteraemic. Transthoracic echocardiography did not reveal any presence of endocardial vegetations or intracardiac abscesses.

DIFFERENTIAL DIAGNOSIS

Differential diagnoses for pacemaker-site infections non-responsive to initial empiric therapy include resistant pathogens such as methicillin-resistant *Staphylococcus aureus*, Gram-negative bacilli species such as *Pseudomonas aeruginosa*, non-bacterial infections such as infections due to *Candida* species,

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zoonotic infections such as Q fever and *Brucella* species or rapidly growing mycobacterial species.

TREATMENT

The patient was treated with intravenous cefazolin for 7 days following removal of the pacemaker. When cultures identified *M. goodii* as the pathogenic organism, cefazolin was switched to oral ciprofloxacin 500 mg twice a day and oral doxycycline 100 mg twice a day with a planned duration of 6 months of therapy.

OUTCOME AND FOLLOW-UP

At the latest outpatient appointment, the patient remains clinically stable on therapy and the surgical site had completely healed with no signs of infection. The pacemaker will be reimplanted at a later date once her antibiotic course is finished.

DISCUSSION

We report a third documented case of *M. goodii*-associated pacemaker-site infection. Here, we highlight the importance of testing for acid-fast bacilli in culture-negative infections related to a foreign device. Rapidly growing mycobacteria infections of pacemaker are rare but increasingly recognised with cases reported in the literature including but not limited to *Mycobacterium fortuitum*,^{4 5} *Mycobacterium chelonae*⁶ and *Mycobacterium phlei*.⁷ *Mycobacterium goodii* was first identified by Brown *et al*¹ from *M. smegmatis* species, and was previously implicated in prosthetic valve endocarditis,⁸ prosthetic joint infection,⁹ postcataract endophthalmitis,¹⁰ hernia repair mesh infection¹¹ and a nosocomial outbreak associated with surgical implants.¹² It was also implicated in pulmonary infections in patients with achalasia.¹³

The first documented case of *M. goodii*-associated pacemaker infection was reported by Chrissoheris *et al*² with successful

treatment by 8 weeks of trimethoprim–sulfamethoxazole therapy and removal of the pacemaker. Another case reported by Marchandin *et al*³ documents successful treatment without the removal of pacemaker but with combination of intravenous ofloxacin and oral doxycycline for 6 months. Here, we document successful treatment with 6 months of therapy with oral ciprofloxacin and doxycycline and removal of the infected device.

Based on the literature, we recommend including acid-fast smear and cultures in routine screening for patients with culture-negative device-related infections to prevent complications such as infective endocarditis and recurrent bacteraemia.

In summary, we describe a rare case of pacemaker-site infection with *M. goodii*. We hope that the addition of our case to the literature would help highlight rapidly growing mycobacteria as important causes of surgical site infections.

Contributors DKY was responsible for conducting the chart review, relevant literature review and compiling the initial draft of the manuscript. SMH-M is the primary physician and was responsible for conceptualising the work and the critical revision of the manuscript. All authors were involved in the final revision of the manuscript.

Competing interests None declared.

Patient consent Obtained.

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Learning points

- ▶ Implantable devices are increasingly common in modern medical practice and are associated with infections due to atypical organisms.
- ▶ Rapidly growing mycobacteria such as *Mycobacterium goodii* are rare but relevant pathogens of surgical site infections.
- ▶ Non-response to empiric antibiotic therapy should prompt a search for an atypical cause such as non-tuberculous mycobacteria.
- ▶ Mycobacterial smear and culture should be performed in all culture-negative device-related infections due to risk of developing infective endocarditis.
- ▶ Successful treatment can be accomplished with prompt pathogen, targeted multidrug combination therapy and removal of the infected material.

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