Case Report

**Mycobacterium fortuitum causing infection of a biventricular pacemaker/implantable cardioverter defibrillator**

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**ABSTRACT**

Increased utilization of cardiovascular implantable electronic devices (CIED) has seen a corresponding rise in related infections. Non-tuberculosis mycobacteria (NTM) are rarely the cause. Treatment involves susceptibilities, antimicrobials, and device removal. This study presents a patient who underwent a biventricular implantable cardioverter defibrillator upgrade with a multi-drug resistant *Mycobacterium fortuitum* located at the pocket site and a lead infection.

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**Case report**

A 56-year-old African American man with a history of non-ischemic cardiomyopathy, biventricular failure with left ventricular ejection fraction of 15%, left ventricular thrombus on chronic anticoagulation meds, Mobitz type II and complete heart block status post a permanent pacemaker, with cocaine and alcohol use, was transferred to the coronary intensive care unit after an elective right atrial lead revision 3 years after the original device implant. Four months previous, he had undergone a biventricular implantable cardioverter defibrillator (BiV ICD) upgrade with the insertion of a new right ventricular (RV) ICD lead and new left ventricular lead. On a follow-up device check, the chest radiograph showed a slight retraction of the right atrial (RA) lead and upon interrogation revealed high pacing impedance, decreased P-wave sensing and markedly increased pacing threshold. The patient then underwent an RA lead revision, during which an area seen under the RA lead sleeve suggested purulent discharge; cultures were obtained and sent to the lab. A small hematoma was noted at the pacer pocket post-op day 1 of the revision, and observation in the hospital was recommended though the patient requested to be discharged. During a follow-up appointment at another medical center,
Cardiovascular implantable electronic devices (CIED) have been increasingly utilized over the years in the management of various cardiovascular diseases. Between 1997 and 2004, PPM implantation rates have increased by 19%; and ICDs by 60% [1]. Along with the rise of the utilization of CIEDs, CIED infection rates and hospitalizations relating to CIED infections have also risen [2–5]. PPM infection rates have been previously reported to range between 0.13% and 19.9%; ICD infection rates have been estimated to be 0.5% for pectoral devices and 3.2% for abdominal devices. Staphylococcus species and CoNS are the most commonly involved in CIED infections. Non-Candidal fungi and NTM are rarely the cause of CIED infections [6]. To date, review of the literature has revealed 10 cases of rapidly growing NTM (M. fortuitum, M. abscessus, M. chelonea, M. margaretense, M. avium complex) as pathogens involved in CIED infections [7–15]. NTM CIED infections most commonly present with purulent discharge and pain at the pocket site and fever, and involve the generator pocket site, and epicardial and transvenous leads. NTM CIED infections may also result in endocarditis [16–18]. Treatment of rapidly growing NTM CIED infections are based on culture susceptibilities and usually involve a combination of Macrolides, Fluoroquinolones, and amino glycosides for a duration of 6 weeks up to 6 months [18]. The majority of cured cases of NTM device infections have involved removal of the device, along with lead extraction [5–15]. Pastor et al. reported a cured case of antimicrobial therapy with a Macrolide and Fluoroquinolone for 6 weeks [12]. Manifestation of NTM CIED infections from the initial date of device implantation to diagnosis has ranged from 13 days to 20 years with 6 months being the most common. This study presents a patient who underwent a BiV upgrade two years after initial device implant and was discovered to have a multi-drug resistant, rapidly growing M. fortuitum generator at the pocket site and lead infection, followed by CoNS bacteremia.

According to the Infectious Disease Society of America (IDSA) Emerging Infections Network (EIN), reports of mycobacterial infections have been increasing. Epidemiological data is lacking on NTM infections overall since the latter are not reported to public health departments. Mycobacteria species are found in soil, dust, water, rocks and can survive extreme pH, temperature and nutrient conditions. NTM are found in aquatic systems and have a high incidence in the United States’ mid-Atlantic and southeastern areas due to their presence in the soil. M. fortuitum, M. chelonea, M. abscessus have been found in cold water systems and form biofilms for survival. Rapidly growing NTM has been shown to be resistant to disinfectants, such as chlorine, organomercurials and alkaline glutaraldehydes [17–19]. M. fortuitum has been involved in a pseudo-outbreak on a human immunodeficiency virus (HIV) ward resulting from a contaminated ice machine, with the mechanism involving colonization of the respiratory tract. M. fortuitum commonly affect immunocompromised hosts and has been reported to be the pathogen in Nosocomial and catheter-related, suture material, mammoplasty, sternal wound, skin and soft tissue, and intrathecal drug delivery device infections [11–23]. Misidentification of M. fortuitum for gram-positive bacilli, Nocardia spp., Rhodococcus spp., and Corynebacterium spp. has occurred. The rise of rapidly growing NTM CIED infections over the years proposes an alternate, less common pathogen as the etiology. NTM should be considered in cases in which the host is immunocompromised or with a propensity for slow wound healing, as well as considered when a surgical site has to be re-opened and re-manipulated. Treatment of NTM CIED infections is case-dependent, involves multiple broad antimicrobials and is dependent on susceptibilities. The case presented herein exemplified the importance of considering multidrug resistant NTM early in the course of a CIED infection and the poor outcomes that may be associated with these infections.

Discussion

Cardiovascular implantable electronic devices (CIED) have been increasingly utilized over the years in the management of various cardiovascular diseases. Between 1997 and 2004, PPM implantation rates have increased by 19%; and ICDs by 60% [1]. Along with the rise of the utilization of CIEDs, CIED infection rates and hospitalizations relating to CIED infections have also risen [2–5]. PPM infection rates have been previously reported to range between 0.13% and 19.9%; ICD infection rates have been estimated to be 0.5% for pectoral devices and 3.2% for abdominal devices. Staphylococcus species and CoNS are the most commonly involved in CIED infections. Non-Candidal fungi and NTM are rarely the cause of CIED infections [6]. To date, review of the literature has revealed 10 cases of rapidly growing NTM (M. fortuitum, M. abscessus, M. chelonea, M. marginetense, M. avium complex) as pathogens involved in CIED infections [7–15]. NTM CIED infections most commonly present with purulent discharge and pain at the pocket site and fever, and involve the generator pocket site, and epicardial and transvenous leads. NTM CIED infections may also result in endocarditis [16–18]. Treatment of rapidly growing NTM CIED infections are based on culture susceptibilities and usually involve a combination of Macrolides, Fluoroquinolones, and amino glycosides for a duration of 6 weeks up to 6 months [18]. The majority of cured cases of NTM device infections have involved removal of the device, along with lead extraction [5–15]. Pastor et al. reported a cured case of antimicrobial therapy with a Macrolide and Fluoroquinolone for 6 weeks [12]. Manifestation of NTM CIED infections from the initial date of device implantation to diagnosis has ranged from 13 days to 20 years with 6 months being the most common. This study presents a patient who underwent a BiV upgrade two years after initial device implant and was discovered to have a multi-drug resistant, rapidly growing M. fortuitum generator at the pocket site and lead infection, followed by CoNS bacteremia.

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Conflict of interest

The authors have no conflicts of interest.
REFERENCES


