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Case Report

Pacemaker and pacemaker lead infections due to *Ochrobactrum anthropi*: a case report

Ochrobactrum anthropi'ye bağlı olarak gelişen pacemaker ve pacemaker kablosu enfeksiyonu: olgu sunumu

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ABSTRACT

Pacemakers are foreign bodies which often used in the treatment of arrhythmias. Infection of pacemaker and the parts associated with pacemaker is extremely rare. The most important risk factors for development of infection; duration of the procedure, complications during operation and immunodeficiency of the patient. These infections are often seen when the pacemaker was inserted or removed as a result of the contamination. Although pacemaker infections are rare, the mortality rate is high. The most common causative agent is staphylococcus, gram negative bacteria and fungi may also be rarely causative agents. *Ochrobactrum anthropi* is a gram-negative, aerobic, oxidase positive, urease positive, motile and non-lactose-fermenting bacillus previously known as "*Achromobacter* group". It is an opportunistic pathogen that can cause infection in especially immunosupressive patients with permanent central venous catheter. The main infections reported due to this agent; bacteremia, central venous catheter-related sepsis, endocarditis, endophthalmitis, pancreatic abscess, urinary tract infections, meningitis, pelvic abscess and osteomyelitis. In the literature, just one case has been reported which developed pacemaker infection due to this agent. In this manuscript, fifty-four-year-old Afghan nationality patient was presented with the diagnosis of pacemaker and pacemaker lead infections.

Keywords: pacemaker, infection, *Ochrobactrum anthropi,* case report

ÖZ

Pacemakerlar aritmi tedavisinde sıklıkla kullanılan yabancı cisimlerdir. Pacemaker ve pacemaker ile ilişkili kısımların enfeksiyonu oldukça nadir görülür. Enfeksiyon gelişmesi açısından en önemli risk faktörleri; işlemin süresi, işlem sırasında komplikasyon gelişmesi ve hastanın immün yetmezlik durumudur. Pacemaker enfeksiyonları nadir görülmekle birlikte, mortalite oranı yüksektir. Pacemaker enfeksiyonuna en sık neden olan etkenler Stafilokoklar olup, nadiren Gram-negatif bakteriler ve mantarlar da etken olabilir. *Ochrobactrum anthropi (O. anthropi)* daha önce *Achromobacter* cinsinde yer alan Gram-negatif, aerob, oksidaz pozitif, üreaz pozitif, hareketli ve non-fermantatif bir basildir. Özellikle kalıcı santral venöz kateteri olan immunsüpresif hastalarda enfeksiyona neden olabilen fırsatçı bir patojendir. Bu etkene bağlı olarak bildirilmiş başlıca enfeksiyonlar;bakteriyemi, santral venöz kateterle ilişkili sepsis, endokardit, endoftalmit, pankreatik apse, üriner sistem infeksiyonu, menejit, pelvik apse ve osteomyelittir. Literatürde bu etkene bağlı olarak pacemaker enfeksiyonu gelişen yalnızca bir olgu bildirilmiştir. Bu yazıda, *O. anthropi*'nin neden olduğu pacemaker ve pacemaker kablo enfeksiyonu olan 54 yaşında Afgan uyruklu erkek bir olgu sunuldu.

Anahtar kelimeler: pacemaker, enfeksiyon, *Ochrobactrum anthropi,* olgu sunumu

INTRODUCTION

Cardiac pacemakers and intra-cardiac defibrillators (ICDs) are commonly used in today's practice in the treatment of patients with arrhythmias. These implanted devices are foreign bodies, and may cause foreign body infections as seen with other prostheses and central venous catheters. The infections caused by pacemakers and devices connected to the pacemaker are rare foreign body infections. The incidence of cardiac pacemaker infection ranges from 0.13 to 20%, and the rate of mortality associated with these infections ranges from 27 to 65% [1]. Erythema, elevated tissue temperature, and purulent discharge from the pacemaker implantation site are the local manifestations of pacemaker pocket infection, which can be accompanied by fever.

Herein, we report a 54-year-old Afghan-born male case who sustained a fatal pacemaker and pacemaker lead infection caused by *Ochrobactrum anthropi* (*O. anthropi*) in the light of the literature data.

CASE REPORT

A fifty-four-year-old Afghan-born male patient presented to the cardiology outpatient clinic complaining of swelling, tenderness, and redness on the pacemaker implantation site. The patient underwent pacemaker implantation in India 10 months prior. He was hospitalized with a preliminary diagnosis of pacemaker pocket infection, and was placed on an empiric treatment with intravenous ampicillin/sulbactam (SAM). The patient had not received antibiotic treatment previously. The pacemaker was removed on day 4 of the treatment, and the abscess within the pacemaker pocket was drained off.

While the patient had no fever on day 7, his general condition deteriorated and he was transferred to the intensive care unit for the consultation by an infectious diseases specialist. On physical examination, his general condition was poor, he was conscious, and he had hypothermia (35 ˚C) and hypotension (80/40 mmHg). There was a 6x10 cm tissue defect on the left pectoral area after the removal of the pacemaker with persistent purulent discharge. Laboratory test results were as follows: white blood cell (WBC): 17.700/mm^3, erythrocyte sedimentation rate (ESR): 16 mm/hour, C-reactive protein (CRP): 8.8 mg/dL, aspartate aminotransferase (AST): 916 U/L, alanine aminotransferase (ALT): 1048 U/L, alkaline phosphatase (ALP): 213 U/L, and gamma-glutamyl transpeptidase (GGT): 220 U/L. Based on his findings, severe sepsis and multiple organ failure were diagnosed. Vasopressor treatment was started. The patient was from Afghanistan and had no previous echocardiography reports. Blood cultures were negative. Transthoracic echocardiography did not reveal a mass of vegetation on the pacemaker lead; however it showed decreased ejection fraction (25%), second-degree tricuspid regurgitation, third-degree mitral regurgitation, enlarged right heart chambers, and an increased pulmonary artery pressure (pulmonary artery pressure [PAP]: 60 mmHg). Due to unresponsiveness to SAM treatment, empiric antibiotherapy with intravenous meropenem 1 g tid and intravenous vancomycin 1 g bid was initiated.

The bacteria growing in the culture material obtained during abscess drainage and in the culture of pacemaker and pacemaker lead was reported as *O. anthropi* using conventional methods (Gram staining, oxidase test, IMVIC test) and automated microbiology identification system (Phoenix Automated System, Becton Dickinson, USA).

Antibiotic susceptibility was performed by using disk-diffusion test according to EUCAST recommendations [2]. Antibiotic susceptibility testing showed that the bacteria were sensitive against amikacin, ciprofloxacin, gentamicin, imipenem, meropenem, and netilmicin, and resistant to piperacillin-tazobactam, cefepime, ceftazidime, and aztreonam. Vancomycin treatment was discontinued on day 7, based on the results of antibiotic susceptibility testing, and meropenem was initiated. There was no *O. anthropi* infection in our clinic beforehand.Tissue defect at the pacemaker implantation site was closed using local flaps at the department of plastic reconstructive and aesthetic surgery clinic due to regression of infection symptoms with antibiotherapy and wound dressing. Hypervolemic hyponatremia which developed during follow-up was corrected with medical treatment, and ultrafiltration was performed due to findings of overloading which did not respond to diuretics. Signs and symptoms of the patients disappeared with ultrafiltration and he underwent coronary angiography (CAG) at cardiology clinic after which surgical treatment was planned for mitral and tricuspid regurgitation. A pacemaker was implanted during surgery, and the heart was resuscitated. In addition, the mitral valve was resected and replacement was performed, and as tricuspid regurgitation was deemed to be insignificant, valvular replacement was cancelled. Unfortunately, the patient developed hypotension on day 2 following surgery and died due to cardiac arrest. There was no endocarditis finding in the patient. Autopsy was not performed and the heart valves were not sent to the pathological examination.

A written informed consent was obtained from the patient on day 5 of hospitalization for publication.

DISCUSSION

Infective complications caused by the pacemaker and related devices are rarely seen infections which are foreign body reactions with high rates of mortality. These complications can occur at the insertion site of the pacemaker or be localized within the pacemaker pocket, leading to further complications including infective endocarditis, septic embolism, and septicemia. The risk factors for these infections include the procedure time, development of hematoma during the procedure, experience of the operating surgeon, and immune status of the patient. The infection often occurs after changing the pacemaker and electrodes [3].

Pacemaker infections can be classified as early and late infections. Early infections usually occur within the first four weeks which are caused by contamination during implantation or change of the pacemaker. *Staphylococci* (*S. aureus* and coagulase-negative *Staphylococci* [CNS]) are the most common causes of infections [4]. Late infections, on the other hand, are rare and often occur one year after the implantation, caused by contamination of the implantation site due to mechanical erosion of the battery. The cause of infection is mostly *S. aureus* in early infections and CNS in late infections. Infections caused by CNS are often associated with foreign body reactions. Hematogenous spread from a distant infection focus is typically seen with *S. aureus* bacteremia [1].

Gram-negative bacilli (i.e., *Enterobacter*, *E. coli*, *Serratia* spp., *Pseudomonas aeruginosa*, and *Klebsiella* spp.) are less often associated with the infections, and fungal agents are rarely reported as the causative agents [5].

In a case series involving 123 patients (87 permanent pacemaker infections and 36 ICD infections) reported from the Cleveland Clinic in the US, CNS (68%), *S. aureus* (24%), and *Enteric Gram-negative bacilli* (17%) were reported as the most common causative agents with similar distribution in the two groups [1,4].

O.anthropi has recently emerged as an opportunistic agent causing infections in immunosuppressive patients with an indwelling central venous catheter [6]. There are several reports of mostly central venous catheter infections, rarely bacteriemia, sepsis associated with central venous catheter, endophthalmitis, infective endocarditis, pancreas abscess, urinary tract infection, meningitis, pelvic abscess, and osteomyelitis associated with this agent [7,8] Review of the literature reveal only one case of pacemaker infection associated with *O. anthropi*, although there are several reports of central venous catheter infections related to this organism.

Earth et al. [9] reported a case of pacemaker lead infection caused by *O. anthropi,* and found that CNS and *O. anthropi* were reproduced in the culture of the pacemaker lead. *O. anthropi* was found to be susceptible to trimethoprim/sulfamethoxazole (TMP-SMX), ciprofloxacin, imipenem, and gentamicin and, therefore, the patient was treated with vancomycin, ciprofloxacin, rifampicin, and TMP-SMX for six weeks. The wound healed and symptoms did not recur.

In the present case, pacemaker and pacemaker lead infection occurred 7 days following admission. An empiric treatment with vancomycin and meropenem was initiated. Afterwards, *O.anthropi* was reproduced in cultures obtained from the pacemaker and lead and from the abscess, and

vancomycin treatment was discontinued on day 7 based on the results of antibiotic susceptibility testing. Mitral valve replacement was performed at the department of cardiovascular surgery. However, the patient died from cardiac arrest on day 43 of hospitalization.

Soloag et al. [8] reported a male case of central venous catheter infection caused by *O. anthropi*. Bacterial identification was performed using API and VITEK 1 automated identification system. In addition, Berman et al. [10] reported bilateral endophthalmitis caused by *O. anthropi* in an immunosuppressive case with a central venous catheter.

Colbay et al. [3] also reported pacemaker infection caused by *Aspergillus fumigatus* in a 52-year-old male patient. The patient's clinical findings disappeared after the initiation of intravenous treatment with amphotericin-B.

In another report from Turkey, Sipahi et al. [11] presented a case of bacteriemia associated with *O.anthropi* following cholangiopancreatography. However, this patient was reported to have a Klatskin tumor as a risk factor for this infection.

In conclusion, it should be kept in mind that pacemaker and pacemaker lead infections can be caused by rarely seen agents such as *O.anthropi*, and the treatment must be planned according to the results of the antibiotic susceptibility testing.

DECLARATION OF CONFLICT OF INTEREST

The author declared no conflicts of interest with respect to the authorship and/or publication of this article.

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