Cor et Vasa

Available online at www.sciencedirect.com

SciVerse ScienceDirect

journal homepage: www.elsevier.com/locate/crvasa

Kasuistika | Case report

Permanent pacemaker lead endocarditis due to *Staphylococcus hominis* and review of the literature

Suleyman Ercan[a], Gokhan Altunbas[b], Fethi Yavuz[a], Vuslat Bosnak[c], Vedat Davutoglu[a]

[a] *Departments of Cardiology, Gaziantep University, School of Medicine, Gaziantep, Turkey*
[b] *Department of Cardiology, Kilis State Hospital, Kilis, Turkey*
[c] *Departments of Infectious diseases, Gaziantep University, School of Medicine, Gaziantep, Turkey*

ARTICLE INFO

Article history:
Received: 21 June 2012
Received in revised form: 10 July 2012
Accepted: 11 July 2012
Available online: 20 July 2012

Keywords:
Lead endocarditis
Staphilococcus hominis
Transesophageal echocardiography

ABSTRACT

Use of intracardiac devices for heart diseases is increasing worldwide. One of the important complications of pacemakers is infective endocarditis from the leads as the source. In this case, we report a lead endocarditis caused by *Staphylococcus hominis* four years after the pacemaker implantation. A 50-year-old diabetic woman, who was implanted a permanent pacemaker four years ago, had complaints of fever and fatigue three months ago. On transesophageal echocardiography (TEE), a mobile mass resembling vegetation on the lead, which was 15×10 mm in diameter, was revealed. At the end of the second week of treatment, fever persisted and markers of inflammation remained elevated. Thus, the patient was referred for surgery, lead was extracted and a new epicardial lead was placed. The culture of the extracted material was positive for *Staphylococcus hominis*. Antibiotherapy was continued till the end of the postoperative sixth week accordingly. In conclusion, in patients with pacemakers and risk factors for endocarditis, fever must suggest lead endocarditis and TEE must be performed for accurate diagnosis. In addition to appropriate antibiotic therapy, extraction of infected material is needed for the cure.

Introduction

Use of intracardiac devices for heart diseases is increasing worldwide. The most frequently used implantable devices are cardiac pacemakers. One of the important complications of pacemakers is infective endocarditis from the leads as the source. Clinical findings of lead endocarditis are more subtle than that of native valve infective endocarditis and thus the diagnosis is frequently delayed. *Staphylococcus aureus* and *Staphylococcus epidermidis* are the most frequent causative agents responsible for lead endocarditis within the first six months after the implantation [1–3]. *S. hominis* is a natural habitant of the human skin flora and rarely reported as a cause of device related or prosthetic valve endocarditis [4]. In this case, we report a lead endocarditis caused by *S. hominis* four years after the pacemaker implantation and we will discuss the management of patients with lead endocarditis.

Case report

A 50-year-old diabetic woman, who was diagnosed with sick sinus syndrome and implanted a permanent pacemaker four years ago, had complaints of fever and fatigue three months ago. She was diagnosed with pneumonia and started empiric antibiotic treatment. Her complaints persisted despite treatment and she was admitted to infectious disease clinic and consulted with cardiology. Physical examination was normal except body temperature (38,5 °C) and tachycardia (110 bpm). Laboratory val-

Address: Suleyman Ercan, MD, Gaziantep University, School of Medicine, Department of Cardiology, 27310 Gaziantep, Turkey, e-mail: sleymanercan@yahoo.com
DOI: 10.1016/j.crvasa.2012.07.001

Please cite this article as: S. Ercan, et al., Permanent pacemaker lead endocarditis due to *Staphylococcus hominis* and review of the literature, Cor et Vasa 54 (2012) e336–e338 as published in the online version of *Cor et Vasa* available at http://www.sciencedirect.com/science/article/pii/S0010865012000847

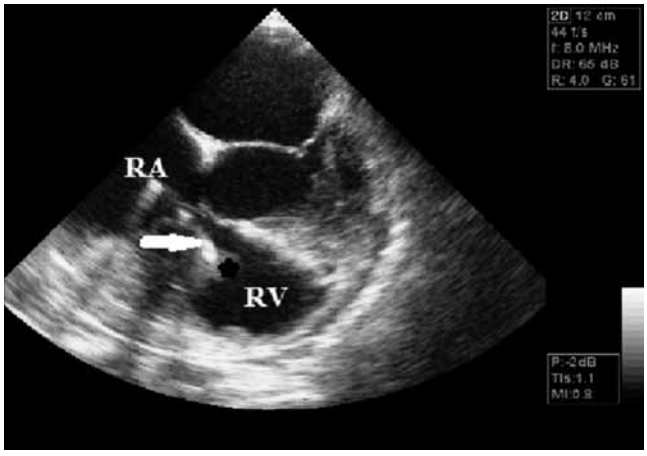

Fig. 1 – Transesophageal echocardiography shows a mass (vegetation) on the lead.
RA – right atria; RV – right ventriculi; arrow – lead of the pace; star – mass (vegetation).

ues showed normal leukocyte count (WBC: 7800 10^3/μL) and increased levels of C-reactive protein (CRP; 116 mg/L) and erythrocyte sedimentation rate (ESR; 70 mm/h). Other routine laboratory values were within normal limits.

Transthoracic echocardiography (TTE) showed a mass image on the pacemaker lead. On transesophageal echocardiography (TEE), a mobile mass resembling vegetation on the lead, around the tricuspid valve with sparing the leaflets, which was 15×10 mm in diameter was revealed (Fig. 1). The patient was hospitalized, three sets of blood cultures were drawn and vancomycin (2 g daily) and gentamycin (160 mg daily) were started. Blood cultures were positive for *S. aureus* for two times. Antibiogram showed that the microorganism was sensitive to the treatment protocol and so the antibiotherapy was not changed. However, at the end of the second week of treatment, fever persisted and markers of inflammation (ESR and CRP) remained elevated. Thus, the patient was referred for surgery, lead was extracted and a new epicardial lead was placed. There was no vegetation on tricuspid valve. The culture of the extracted material was positive for *S. hominis*. Antibiotherapy was appropriate according to the antibiogram and continued till the end of the postoperative sixth week. On follow up, fever did not recur, ESR was 14 mm/h and CRP was 4 mg/L. Control TTE was negative for vegetation.

Discussion

Prevalance of lead endocarditis in patients with cardiac pacemakers is reported to be 0.5%–7% [3]. Apart from general symptoms such as fever and malaise, peripheric clinical findings of infective endocarditis are not observed frequently in these patients; hence the diagnosis is especially hard, frequently delayed and sometimes even missed. The average time from symptom onset to diagnosis is 3–4 months. Risk factors for cardiac pacemaker related infective endocarditis are diabetes, malignancy, cachexia, use of steroids and immunosuppressive treatment [3]. Our patient was diabetic and there had been three months from symptom onset to diagnosis.

Lead endocarditis can be seen early or late after pacemaker implantation. Early endocarditis is defined as occurring within the first six months after implantation and causative microorganisms are most likely *S. aureus* and *S. epidermidis* [2,5]. Despite the fact that blood culture positivity in these patients is less common than in patients with native valve endocarditis, Victor et al. [6] reported that blood cultures were positive in 85% of patients with vegetation. In our case, polymicrobial etiology was confirmed with positive blood cultures for *S. aureus* and extracted lead material culture for *S. hominis*. Review of the literature shows that only lead endocarditis caused by *S. hominis* was reported by Sünbül et al. [4]. Furthermore, it is important to notice that endocarditis emerged very late after pacemaker implantation.

There are different suggestions for the diagnosis of lead endocarditis but modified Duke Criteria are used, although they are less specific than for native valve endocarditis [7]. In addition, septic pulmonary emboli support the diagnosis. Our patient had both major criteria; blood culture positivity and echocardiographic findings.

In these patients, fever is the predominant symptom, just like in native valve endocarditis. Older and immunosuppressive patients may come up with a more silent clinical picture. Fever may emerge as subfebrile and sustained, or it can be septic in nature due to sepsis and chills can be seen together. In addition, by way of direct contact, the pacemaker generator site may become infected and local erythema, abscess, fistula into the skin, purulent discharge and phlebitis in associated veins may become evident [8,9].

Echocardiography is very important in the diagnosis of lead endocarditis. However, reviews suggest that TTE is inadequate. Victor et al. [6] evaluated 23 patients with lead endocarditis and found that TTE was capable of diagnosis in only 30% of patients, whereas TEE was able to diagnose 91% of the patient population. Additionally TEE may give detailed information about the tricuspid valve. A recent study showed that concomitant valve infection is associated with increased mortality [10]. Therefore, in patients with permanent pacemaker, evaluation of fever should always include a TEE examination.

Extraction of contamined material should be the cornerstone of therapy in patients with lead endocarditis. Choo et al. [5] suggested that without extracting the infected material, the infection cannot be controlled even if correct antibiotics are used according to antibiogram result. Our case was also an example for this conclusion. Therefore, along with appropriate antibiotic treatment, the extraction of infected material is needed for therapy. There are two different techniques for lead extraction. The first one is direct percutaneous extraction and the other option is surgical thoracotomy. Percutaneous technique can be used if the vegetation is smaller than 10 milimeters and the tricuspid valve is not involved, the time from implantation is shorter than 1–2 years and the patient is not pacemaker dependent. In other situations, surgical extraction and placement of an epicardial lead must be considered [3,9].

In conclusion, in patients with pacemakers and risk factors for endocarditis, fever must suggest lead endocarditis and TEE must be performed for accurate diagnosis. In

addition to appropriate antibiotic therapy, extraction of infected material is needed for the cure.

References

[1] R. Banos, J. Gomez, B. Sanchez, et al., Pacemaker lead endocarditis: analysis of 11 cases, Enfermedades Infecciosas y Microbiología Clínica 18 (2000) 267–270.

[2] G. Bluhm, I. Julander, M. Lavander-Lindgren, C. Olin, Septicemia and endocarditis: uncommon but serious complications in connection with permanent cardiac pacing, Scandinavian Journal of Thoracic and Cardiovascular Surgery 16 (1982) 65–70.

[3] S. Edelstein, M. Yahalom, Cardiac device-related endocarditis: epidemiology, pathogenesis, diagnosis and treatment – a review. International Journal of Angiology 18 (2009) 167–172.

[4] M. Sunbul, M.K. Demirag, O. Yilmaz, et al., Pacemaker lead endocarditis caused by *Staphylococcus hominis*, Pacing and Clinical Electrophysiology 29 (2006) 543–545.

[5] M.H. Choo, D.R. Holmes Jr, B.J. Gersh, et al., Permanent pacemaker infections: characterization and management, American Journal of Cardiology 48 (1981) 559–564.

[6] F. Victor, C. DePlace, C. Camus, et al., Pacemaker lead infection, echocardiographic features, management, and outcome, Heart 81 (1999) 82–87.

[7] P. Cacoub, P. Leprince, P. Nataf, et al., Pacemaker infective endocarditis, American Journal of Cardiology 82 (1998) 480–484.

[8] N. Kouvousis, A.G. Lazaros, E.G. Christoforatou, et al., Acremonium species pacemaker site infection, Hellenic Journal of Cardiology 44 (2003) 83–87.

[9] G. Habib, B. Hoen, P. Tornos, et al., 2009, ESC Committee for Practice Guidelines, Guidelines on the prevention, diagnosis, and treatment of infective endocarditis (new version 2009): the task force on the prevention, diagnosis, and treatment of ınfective endocarditis of the European Society of Cardiology (ESC). Endorsed by the European Society of Clinical Microbiology and Infectious Diseases (ESCMID) and the International Society of Chemotherapy (ISC) for infection and cancer, European Heart Journal 30 (2009) 2369–2413.

[10] E. Athan, V.H. Chu, P. Tattevin, et al., 2012, ICE-PCS investigators, Clinical characteristics and outcome of infective endocarditis involving implantable cardiac devices, Journal of the American Medical Association 307 (2012) 1727–1735.