Turk Gogus Kalp Dama 2015;23(4):735-738
doi: 10.5606/tgkdc.dergisi.2015.11645

Exceptionally large vegetation on pacemaker lead developed years after implantation

Kalp pili elektrodu üzerinde implantasyondan yıllar sonra ortaya çıkan olağanüstü büyük vejetasyon

Demet Menekşe Gerede,[1] Ali Timuçin Altın,[1] Veysel Kutay Vurgun,[1] Aynur Acıbuca,[1] Serkan Durdu[2]

Departments of [1]Cardiology, [2]Cardiovascular Surgery, Medical Faculty of Ankara University, Ankara, Turkey

ABSTRACT

With the increasing use of cardiac implantable electronic devices in recent years, infective endocarditis associated with these devices has become more common. Early diagnosis and treatment are important to manage this infection successfully. However, the diagnosis of cardiac implantable electronic device endocarditis is not always easy, as there may be no local inflammation signs or the clinical presentation can mimic other systemic infections. Herein, we report a case of pacemaker-related infective endocarditis clinically mimicking pneumonia. Echocardiographic examination was performed due to the patient's seven years history of pacemaker implantation. A giant vegetation was seen on the pacemaker lead. Interestingly, her vegetation grew to a giant size asymptomatically during this long period of time. After the diagnosis of infective endocarditis, the patient was managed successfully with pacemaker lead system removal and appropriate antibiotic therapy.

Keywords: Infective endocarditis; pacemaker; vegetation.

ÖZ

İmplante edilebilen kardiyak elektronik cihazların son yıllarda kullanımının artması ile birlikte, bu cihazlar ile ilişkili infektif endokardit daha sık olarak görülmektedir. Bu enfeksiyonun başarılı şekilde tedavi edilebilmesi için erken tanı ve tedavi önemlidir. Ancak lokal enflamasyon bulgularının olmaması veya klinik tablonun diğer sistemik enfeksiyonları taklit edebilmesi nedeniyle, implante edilebilen kardiyak elektronik cihaz endokarditinin tanısı her zaman kolay olmamaktadır. Bu yazıda klinik olarak pnömoniyi taklit eden kalp pili ile ilişkili infektif endokardit olgusu sunuldu. Hastanın yedi yıllık kalp pili implantasyonu öyküsü nedeniyle, ekokardiyografik değerlendirme yapıldı. Kalp pili elektrodu üzerinde dev vejetasyon izlendi. İlginç olarak, vejetasyon bu uzun süre zarfında asemptomatik olarak dev boyuta ulaşmıştı. İnfektif endokardit tanısı sonrası, kalp pili elektrod sisteminin çıkarılması ve uygun antibiyotik tedavisi ile hasta başarılı bir şekilde tedavi edildi.

Anahtar sözcükler: İnfektif endokardit; kalp pili; vejetasyon.

Recently, the rate of cardiac implantable electronic device (CIED) infections has increased due to increased CIED implantations worldwide. This type of infection can present as either a local pocket infection or systemic infection, leading to associated endocarditis (LAE). Cardiac implantable electronic device-related infective endocarditis (IE) is present in up to 23% of all cardiac device infections and the mortality rate of CIED-related IE ranges from 10.0 to 23.2%.[1] Prompt recognition and management may improve outcomes, while the treatment of CIED infections with LAE includes the prompt removal of all CIED hardware and a prolonged course of intravenous antibiotherapy.[2,3] Herein, we describe a case with an extremely large vegetation attached to the pacemaker lead in the right atrium, which was protruding into the right ventricle during diastole.

CASE REPORT

An 83-year-old woman presented with a history of fever and cough for two days. Upon admission to

Available online at
www.tgkdc.dergisi.org
doi: 10.5606/tgkdc.dergisi.2015.11645
QR (Quick Response) Code

Received: February 20, 2015 *Accepted*: March 25, 2015

Correspondence: Demet Menekşe Gerede, M.D. Ankara Üniversitesi Tıp Fakültesi, Kardiyoloji Anabilim Dalı, 06100 Sıhhiye, Ankara, Turkey.
Tel: +90 532 - 599 10 91 e-mail: drmeneksegerede@yahoo.com

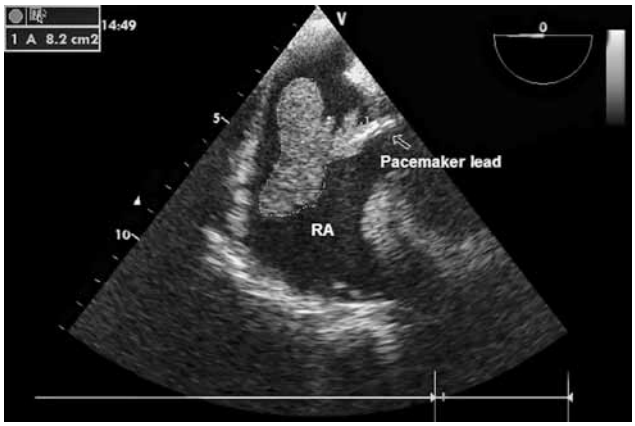

Figure 1. Transesophageal echocardiogram view showing an irregular image compatible with vegetation on the pacemaker lead in the right atrium.

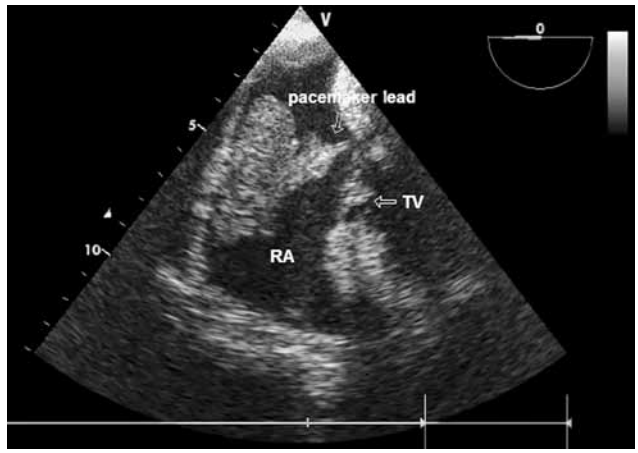

Figure 2. Transesophageal echocardiogram view showing the relationship between vegetation and tricuspid valve.

our hospital, chest X-ray showed bilateral pulmonary infiltrates. Due to the presence of pulmonary infiltrates and high concentration of C reactive protein (157 mg/L), the patient was diagnosed with pneumonia. Thereafter, parenteral antibiotic treatment including ciprofloxacin, meropenem, and teicoplanin was initiated. However, the patient maintained a low-grade fever and her procalcitonin level was high (32 ng/mL). Therefore, the antibiotic spectrum was extended and other possible foci of infection were investigated.

The patient's urine culture was negative and prosthetic infections related to the right knee replacement were excluded. The Brucella agglutination test produced negative results. Thoraco-abdominopelvic computed tomography showed no infectious focus. However, she underwent dual chamber (DDD) mode pacemaker implantation seven years ago due to a total atrioventricular block. Infective endocarditis was suspected and transthoracic echocardiography (TTE) was performed to search for vegetation, although there was no sign of a pocket infection. The TTE revealed a mobile mass suggestive of a vegetation 1.7x3.8 cm in size, adhering to the atrial side of the pacemaker lead, and protruding into the right ventricle during diastole.

Three sets of blood cultures were, then, drawn and antibiotics were switched to vancomycin and rifampicin. Transesophageal echocardiography (TEE) was performed to evaluate the vegetation size and any other endocardial involvement. The TEE confirmed a vegetative mobile mass of 4.7x2.4 cm in size and 8.2 cm^2 area on the lead (Figures 1 and 2). There were 2-3 degrees of tricuspid regurgitation and trivial mitral regurgitation; however, no vegetation on the other cardiac chambers or valves was observed.

The detailed patient history revealed that she occasionally suffered from chills, trembling, and fever for the previous five months; however, there was no specific clue for a possible cause of bacteremia. With an appropriate antibiotic therapy, the patient remained afebrile and no blood cultures produced microorganisms. The concentration of C-reactive protein decreased to 32 mg/L and the level of procalcitonin decreased to 0.297 ng/mL. During the fourth week of antibiotic therapy, the pacemaker generator and transvenous pacemaker leads were surgically removed (Figures 3a, b). Meanwhile, a new DDD pacemaker with three epicardial leads was implanted through the contralateral side. Pathological

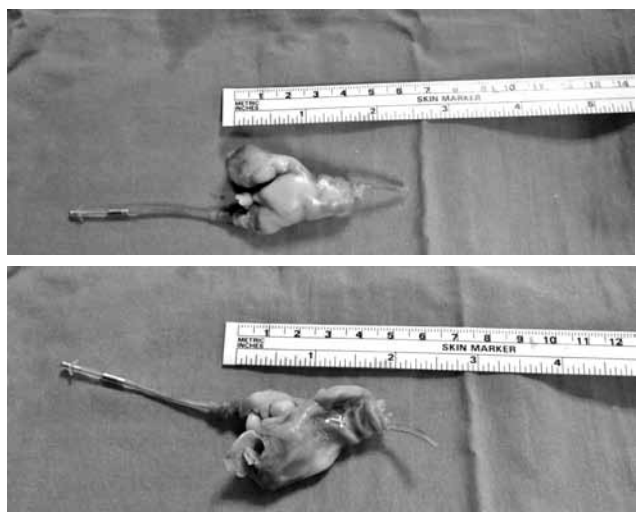

Figure 3. Extracted pacemaker lead with giant vegetation.

examination of the removed material was reported as fibrin colonized with bacteria. Antibiotic therapy was continued for an additional four weeks after surgery.

DISCUSSION

Cardiac device-related IE is a serious disease with significant morbidity and mortality rates, which has become more frequent with the increased use of pacemakers and implantable cardioverter defibrillators (ICDs) in recent years.[1,2]

Patients with LAE may present with signs of local pocket inflammation and bacteremia or with systemic illness including fever, chills, sweats, and signs of sepsis. In our case, the presence of pacemaker implantation and signs of systemic infection led to a high clinical suspicion of IE. Thereafter, we performed TTE which produced the definite diagnosis of IE.

The diagnosis of LAE is based on the modified Duke criteria.[3] Our case had one major (vegetation on echocardiography) and three minor criteria, which included a fever of >38 °C, predisposing heart condition (pacemaker), and peripheral (pulmonary) embolic event, which are compatible with a definite clinical diagnosis of IE. Greenspon et al.[4] reported that the clinical presentation of LAE varied based on the size of vegetation and patients with LAE with local pocket infection usually had a smaller vegetation, whereas those presenting with systemic manifestations of infection tended to have a larger vegetation. According to the authors of aforementioned study, patients who developed LAE soon after a CIED procedure were more likely to present with local infections. In contrast, those with LAE which occurred more than six months following a CIED procedure were more likely to present with signs of a systemic infection. This patient had a large vegetation, where a pacemaker was implanted seven years previously; therefore, the absence of any signs of pocket inflammation is not surprising.

Furthermore, the Heart Rhythm Society consensus statement on lead extraction emphasizes that device infections can be insidious and the only clinical manifestation may be chronic pain or local signs of infection at the pulse generator site. However, it does not indicate that the intravascular components of the system are left non-infected.[5] With rare exceptions, IE necessitates removal of the entire CIED system. Extraction of the CIED is a technically complex procedure with a risk profile including tears of the tricuspid valve, hemothorax, tamponade, pulmonary embolism, or lead migration. The presence and size of the vegetation in patients with IE are critical determinants in selecting the procedure. Vegetations <3 cm in patients with CIEDs typically do not preclude transvenous lead extraction. Conversely, vegetations ≥3 cm often require open surgical debridement.[3]

Timing from pacemaker implantation to the diagnosis of endocarditis is another variable which may favor surgical removal of the electrode system using cardiopulmonary bypass. This is because, 12 months after the implantation, the electrodes are attached to the right endocardium and are embedded in a dense fibrotic plaque, making electrode removal by direct traction dangerous.[6] Our case had a vegetation of 4.7x2.4 cm in size and the time from implantation to IE diagnosis was seven years. Therefore, our first choice was a surgical procedure. There was no growth in the blood cultures; however, this was an expected result, as the patient was on antibiotherapy, when the blood cultures were obtained.

In conclusion, IE should always be kept in mind in the differential diagnosis of CIED. The diagnosis can be challenging in the absence of local signs of infection. It should also be emphasized that one can develop CIED-related infections even after several years of implantation. Our case is also unique, since there is no another case in the literature such a long time after implantation with the largest vegetation reported to date.

Declaration of conflicting interests

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

Funding

The authors received no financial support for the research and/or authorship of this article.

REFERENCES

1. Baman TS, Gupta SK, Valle JA, Yamada E. Risk factors for mortality in patients with cardiac device-related infection. Circ Arrhythm Electrophysiol 2009;2:129-34.
2. Sohail MR, Uslan DZ, Khan AH, Friedman PA, Hayes DL, Wilson WR, et al. Management and outcome of permanent pacemaker and implantable cardioverter-defibrillator infections. J Am Coll Cardiol 2007;49:1851-9.
3. Baddour LM, Epstein AE, Erickson CC, Knight BP, Levison ME, Lockhart PB, et al. Update on cardiovascular implantable electronic device infections and their management: a scientific statement from the American Heart Association. Circulation 2010;121:458-77.

4. Greenspon AJ, Le KY, Prutkin JM, Sohail MR, Vikram HR, Baddour LM, et al. Influence of vegetation size on the clinical presentation and outcome of lead-associated endocarditis: results from the MEDIC registry. JACC Cardiovasc Imaging 2014;7:541-9.
5. Wilkoff BL, Love CJ, Byrd CL, Bongiorni MG, Carrillo RG, Crossley GH, et al. Transvenous lead extraction: Heart Rhythm Society expert consensus on facilities, training, indications, and patient management: this document was endorsed by the American Heart Association (AHA). Heart Rhythm 2009;6:1085-104.
6. Horstkotte D, Follath F, Gutschik E, Lengyel M, Oto A, Pavie A, et al. Guidelines on prevention, diagnosis and treatment of infective endocarditis executive summary; the task force on infective endocarditis of the European society of cardiology. Eur Heart J 2004;25:267-76.