



ORIGINAL ARTICLE

Cardiac device infection: Review based on the experience of a single center[☆]



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KEYWORDS

Cardiac device;
Pacemaker;
Cardiac defibrillator;
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device;
Endocarditis

Abstract

Introduction: The incidence of cardiac implantable electronic device infections has increased significantly over the years and they are associated with significant morbidity and mortality. The epidemiology in the Central region of Portugal is not known.

Objective: To characterize cardiac implantable electronic device infections through a retrospective study of 3158 patients admitted to our center between January 2008 and September 2014 and to review the subject in the light of the current state of the art.

Results: The infection rate was 1.48% (pacemakers 1.21%, cardiac defibrillator/resynchronization devices 5.40%). The study population consisted of 47 patients with a mean age of 65 ± 19 years, predominantly male (72.3%). Infections were mainly of pacemakers, the main device implanted in our population ($n=2954$), and most occurred late after first implantation. Clinically, most patients presented with fever and local inflammation. Blood cultures identified mainly Gram-positive microorganisms. Empiric antibiotic therapy with vancomycin was instituted in all patients, associated with gentamicin in 57%. The device was extracted in the majority of cases (72%). During follow-up (32 ± 22 months) eight patients died (17%), seven of cardiovascular cause (15%), and seven were readmitted with device infection (15%).

Conclusions: Our rate of infection was low, similar to other published series, with a higher rate in cardiac defibrillator/resynchronization devices. After standard treatment with antibiotic therapy and device extraction, the prognosis was good.

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PALAVRAS-CHAVE

Dispositivos cardíacos;
Pacemakers;
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Dispositivos de ressincronização;
Endocardite infecciosa

Endocardite de dispositivos, revisão com base na experiência de um centro**Resumo**

Introdução: O número de infeções associadas com dispositivos cardíacos tem aumentado exponencialmente ao longo dos anos. Estas infeções associam-se a elevada morbimortalidade. A sua epidemiologia na região centro do país não é conhecida.

Objetivo e métodos: Pretende-se caracterizar a nossa população de doentes com infeções de dispositivo através dum estudo retrospectivo, incluindo 3158 doentes consecutivos que implantaram dispositivos no nosso centro, entre janeiro de 2008 e setembro de 2014, e realizar uma revisão do tema à luz do estado da arte.

Resultados: A taxa de infeção na nossa população foi de 1,48% (*pacemakers* 1,21%, desfibrilhadores e dispositivos de ressincronização 5,40%). A população inicial era constituída por 47 doentes. Tinham idade média de 65 ± 19 anos e predomínio do género masculino (72,3%). Foram predominantemente infeções em *pacemakers*, após primeira implantação e com surgimento tardio. A apresentação clínica foi variada, apresentando-se a maioria com febre e alterações inflamatórias locais. Identificaram-se nas hemoculturas, predominantemente, microrganismos gram positivos. A antibioterapia empírica inicial realizada foi vancomicina associada a gentamicina em 57% dos casos; extração do dispositivo foi realizada em 72%. Durante o seguimento (32 ± 22 meses) morreram oito doentes (17%), sete dos quais de causa cardiovascular (15%) e verificaram-se sete reinternamentos por reinfeção (15%).

Conclusão: A taxa de infeção é baixa e semelhante a outras séries, sendo superior em desfibrilhadores e dispositivos de ressincronização. Após a admissão inicial para tratamento antibiótico ± extração, o prognóstico foi bastante favorável.

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Introduction

Infections of non-valvular cardiac implantable electronic devices (CIED) – pacemakers and implantable cardioverter-defibrillator (ICD) or cardiac resynchronization therapy (CRT) devices – has increased in recent years,^{1–3} and now account for around 10% of cases of endocarditis.⁴ They are associated with significant morbidity and an 8.4–11.6% higher risk of mortality than with non-infectious cardiac device-related complications.^{5,6}

Prevention or early diagnosis and treatment of CIED infection is crucial to survival and to reducing the risk of reinfection.⁷

There have been few studies on the subject and only recently has there been discussion of the best therapeutic approach. Current knowledge is based mainly on observational studies and there are as yet no international guidelines.

Epidemiological data on CIED infection in Portugal are almost non-existent, particularly for the Central region of the country. The aim of this study was to review the current state of the art, based on the experience of our center.

Methods**Study population**

We performed a retrospective analysis of 3158 patients who underwent device implantation in our center between

January 2008 and September 2014. Of these, 47 (1.48%) were hospitalized for CIED infection. The diagnosis was established according to the modified Duke criteria, based on the presence of localized pocket infection and/or endocarditis.

Baseline characteristics

The following characteristics of the study population were recorded: age, gender, type of CIED, type of infection, type of implantation (replacement or first implantation), clinical presentation, known predictors of infection (hypertension, diabetes, oral anticoagulation, immunosuppression, smoking, long-term corticosteroid therapy, chronic renal disease, severe cardiac dysfunction, previous implantation of temporary pacemaker, antibiotic therapy prior to implantation and presence of hematoma following implantation).

Laboratory and imaging parameters

Laboratory parameters at admission and during hospital stay were analyzed, together with the microorganisms isolated and the results of antibiotic susceptibility testing, and the findings of transthoracic (TTE) and transesophageal echocardiography (TEE) if performed.

Therapeutic approach

The initial empiric antibiotic therapy and any change following the results of susceptibility testing were recorded.

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