Med Clin (Barc). 2017;xxx(xx):xxx–xxx

MEDICINA CLINICA

www.elsevier.es/medicinaclinica

Original article

Right-sided infective endocarditis in cardiac device carriers: Clinical profile and prognosis☆

Carlos Ortiz-Bautista[a,*], Javier López[a], Pablo Elpidio García-Granja[a], Isidre Vilacosta[b], Teresa Sevilla[a], Cristina Sarriá[c], Carmen Olmos[b], Carlos Ferrera[b], Carmen Sáez[c], Ana Puerto[a], José Alberto San Román[a]

[a] *Instituto de Ciencias del Corazón (ICICOR), Hospital Clínico Universitario de Valladolid, Valladolid, Spain*
[b] *Hospital Clínico Universitario San Carlos, Madrid, Spain*
[c] *Servicio de Medicina Interna-Infecciosas, Instituto de Investigación del Hospital La Princesa, Madrid, Spain*

ARTICLE INFO

Article history:
Received 4 February 2017
Accepted 30 March 2017
Available online xxx

Keywords:
Infective endocarditis
Device infective endocarditis
Right-sided infective endocarditis

ABSTRACT

Background and objectives: Due to the widespread indications for device implants and the population aging, right-sided infective endocarditis (RSIE) epidemiology has dramatically changed, being nowadays, cardiac device carriers the main affected group. The aim of this work is to describe the epidemiology, clinical profile and outcomes of RSIE in cardiac device carriers.
Patients and methods: We included definitive infective endocarditis episodes consecutively diagnosed in 3 tertiary centers from March 1995 to September 2014. A retrospective analysis of 85 variables, one-year follow up and univariate analysis of in-hospital mortality was conducted.
Results: Among 1182 episodes, 100 cardiac device carriers presented with RSIE (8.5%). Mean age ± SD was 67 ± 14 years. *Staphylococcus* spp. were the main causative microorganisms (coagulase-negative 44%, *aureus* 31%) and 37% were methicillin-resistant. Cardiac devices were removed in 95% of patients. In-hospital mortality was 8% and one-year mortality was 4%. Univariate analysis demonstrated that renal failure at admission (OR 6.2; 95% CI 1.3–30.3), septic shock (OR 8.9; 95% CI 1.7–47.9) and persistent infection during clinical course (OR 19.4; 95% CI 3–125.7) increase in-hospital mortality while device removal is a protective factor (OR 0.08; 95% CI 0.02–0.39).
Conclusions: RSIE have low in-hospital and one-year mortality. Coagulase-negative *Staphylococci* is responsible of almost half of the episodes and methicillin-resistant incidence is high. Device removal is mandatory since it decreases in-hospital mortality.

Endocarditis infecciosa derecha en portadores de dispositivos cardiacos: perfil clínico y pronóstico

Palabras clave:
Endocarditis infecciosa
Endocarditis infecciosa sobre dispositivos
Endocarditis infecciosa derecha

RESUMEN

Antecedentes y objetivos: Debido al aumento en las indicaciones de implante de dispositivos cardiacos y el envejecimiento de la población, la epidemiología de la endocarditis infecciosa derecha (EID) ha cambiado drásticamente, siendo hoy en día los portadores de dispositivos cardiacos el principal grupo afectado. El objetivo de este trabajo es describir la epidemiología, el perfil clínico y los resultados de la EID en portadores de dispositivos cardiacos.
Pacientes y métodos: Se incluyeron episodios de endocarditis infecciosa definitiva diagnosticados consecutivamente en 3 centros terciarios entre marzo de 1995 y septiembre de 2014. Se realizó un análisis retrospectivo de 85 variables, seguimiento de un año y análisis univariante de la mortalidad hospitalaria.

Resultados: Entre 1.182 episodios, 100 portadores de dispositivos cardiacos presentaron EID (8,5%). La edad media ± DE fue de 67 ± 14 años. Los estafilococos fueron los principales microorganismos responsables (coagulasa negativos 44%, *aureus* 31%), y de ellos, el 37% eran resistentes a meticilina. Los dispositivos cardiacos fueron retirados en el 95% de los pacientes. La mortalidad hospitalaria y al año fue del 8 y el 4%, respectivamente. El análisis univariante demostró que la insuficiencia renal al ingreso (OR 6,2; IC 95% 1,3-30,3), el *shock* séptico (OR 8,9; IC 95% 1,7-47,9) y la infección persistente durante la evolución (OR 19,4; IC 95% 3-125,7) aumentan la mortalidad hospitalaria, mientras que la retirada del dispositivo es un factor protector (OR 0,08; IC 95% 0,02-0,39).
Conclusiones: La EID sobre dispositivos cardiacos tiene una baja mortalidad intrahospitalaria y al año. Los estafilococos coagulasa negativos son responsables de casi la mitad de los episodios y la incidencia de resistencia a meticilina es elevada. La retirada de los dispositivos disminuye la mortalidad hospitalaria.

Introduction

Right-sided infective endocarditis (RSIE) is usually associated with intravenous drug use. However, in the last decade, the epidemiology of RSIE has dramatically changed, being cardiac device carriers the main affected group in industrialized countries. This is due to the widespread indications for device implants, aging population and associated comorbidities that predispose to infections.[1] Unlike immediate postprocedural complications, device-related infections (DRI) have increased in the last years.[1–3] Recent data showed overall DRI rates ranging from 0.5% to 2.2%, with higher incidence in defibrillator and cardiac resynchronization therapy.[4] The incidence of cardiac-device infective endocarditis (CDIE) has been reported as between 0.06% and 0.6% per year, or 1.14 per 1000 device-years.[5] DRI was recently classified into four different categories: (1) early post-implant inflammation, (2) uncomplicated generator pocket infection, (3) complicated generator pocket infection and (4) CDIE.[6] Clinical profile and associated risk factors for CDIE are increasingly well known and previous studies have shown that CDIE is associated with poor short and long-term outcomes.[7–11] However, some of these studies included patients with concomitant left valve involvement,[5,10,12] probably making the clinical profile somewhat different and overestimating in-hospital mortality rates.

Patients and methods

This study was conducted in three tertiary Spanish centers with cardiac surgery facilities, using standardized protocols for data collection, and identical diagnostic and therapeutic criteria throughout the study. For the analysis purpose we included definitive infective endocarditis episodes consecutively diagnosed from March 1995 to September 2014. We conducted a retrospective analysis of 85 epidemiological, clinical, microbiological, echocardiographic and prognostic variables, one-year follow up and univariate analysis of in-hospital mortality. Follow up was made in a specialized outpatient clinic. The Ethical Committee of the three centers approved the study.

Definition of terms

Definitive infective endocarditis (IE) diagnosis was carried out in accordance with the Duke's criteria from 1995 to 2000 and subsequently according to the modified Duke's criteria.[13] All patients underwent at least one transesophageal and one transthoracic echocardiogram. Blood and distal lead cultures were performed in all patients. If pulmonary thromboembolism was clinically suspected, either computerized tomography pulmonary angiography or ventilation/perfusion scan was performed. Early or late episodes were defined if they occurred within the first year (early) or beyond (late) since the implantation or device/lead replacement. Acute renal failure was defined as an increase in the serum creatinine level of 0.3 mg/dl or more within 48 h or a serum creatinine level that has increased by at least 1.5 times the baseline value within the previous seven days; and chronic renal failure as the presence of a glomerular filtration rate <60 mL/kg/min within the last three months. We considered significant chronic anemia as the presence of serum levels of hemoglobin <9 g/dl for more than one year. Persistent infection was defined as the presence of fever and positive blood cultures after 7–10 days of correct antibiotic treatment.[14] Relapse episode was defined as repeated IE episode caused by the same microorganism within the first six months after previous IE episode, while reinfection was defined as an IE episode caused by a different microorganism or by the same microorganism later than the first six months after previous IE episode.[14] Polymicrobial episodes were defined as infections caused by two or more species identified in blood or lead cultures excluding those species that could represent sample contamination. Septic shock was defined as the presence of sepsis, hypotension (<90 mmHg) and organ hypoperfusion data (oliguria, lactic acidosis, decrease in consciousness level), which required intensive fluid therapy and even vasopressor therapy.

Statistical analysis

Continuous variables are presented as mean ± standard deviation and categorical variables, as percentages of the category of interest. Normal distribution of continuous variables was tested by Kolmogorov–Smirnov test. Data were analyzed with the version 15.0 Statistical Package for Social Sciences (SPSS Inc., Chicago, IL). Differences were statistically significant if p-value was <0.05. Univariate analysis of in-hospital mortality was performed. However, given the small number of adverse events, we could not perform a multivariate analysis.

Results

Among 1182 definitive IE episodes consecutively diagnosed from March 1995 until September 2014, 113 occurred in cardiac devices carriers (9.6%). Thirteen of them were excluded from the analysis due to simultaneous left valve infection. Therefore, our final study population consisted of 100 right-sided CDIE (8.5%).

☆ Please cite this article as: Ortiz-Bautista C, López J, García-Granja PE, Vilacosta I, Sevilla T, Sarriá C, et al. Endocarditis infecciosa derecha en portadores de dispositivos cardiacos: perfil clínico y pronóstico. Med Clin (Barc). 2017. https://doi.org/10.1016/j.medcli.2017.03.055

* Corresponding author.
E-mail address: ortiz.bautista.carlos@gmail.com (C. Ortiz-Bautista).