



ORIGINAL

Invasive device-related infections after heart surgery[☆]

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KEYWORDS

Heart surgery;
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Risk factors;
ENVIN-HELICS registry

Abstract

Objective: To analyze postoperative infections in critically ill patients undergoing heart surgery.
Setting: Intensive care units (ICUs).

Design: An observational, prospective, multicenter study was carried out.

Patients: Patients in the postoperative period of heart surgery admitted to the ICU and included in the ENVIN-HELICS registry between 2005 and 2011.

Main outcome variables: Mechanical ventilation associated pneumonia (MVP), urinary catheter-related infection (UCI), primary bacteremia (PB), PB related to vascular catheters (PB-VC) and secondary bacteremia.

Results: Of a total of 97,692 patients included in the study, 9089 (9.3%) had undergone heart surgery. In 440 patients (4.8%), one or more infections were recorded. Infection rates were 9.94 episodes of MVP per 1000 days of mechanical ventilation, 3.4 episodes of UCI per 1000 days of urinary catheterization, 3.10 episodes of PB-VC per 1000 days of central venous catheter, and 1.84 episodes of secondary bacteremia per 1000 days of ICU stay. Statistically significant risk factors for infection were ICU stay (odds ratio [OR] 1.18, 95%CI 1.16–1.20), APACHE II upon admission to the ICU (OR 1.05, 95%CI 1.03–1.07), emergency surgery (OR 1.67,

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◇ The members of ENVIN-HELICS Study Group who supplied the data of patients' "postoperative of heart surgery" are listed in [Appendix A](#).

PALABRAS CLAVE

Cirugía cardíaca;
Infecciones
relacionadas con
dispositivos invasivos;
Factores de riesgo;
Registro
ENVIN-HELICS

95%CI 1.13–2.47), previous antibiotic treatment (OR 1.38, 95%CI 1.04–1.83), and previous colonization by *Pseudomonas aeruginosa* (OR 18.25, 95%CI 3.74–89.06) or extended spectrum beta-lactamase producing enterobacteria (OR 16.97, 95%CI 5.4–53.2). The overall ICU mortality rate was 4.1% (32.2% in patients who developed one or more infections and 2.9% in uninfected patients) ($p < .001$).

Conclusions: Of the patients included in the ENVIN-HELICS registry, 9.3% were postoperative heart surgery patients. The overall mortality was low but increased significantly in patients who developed one or more infection episodes.

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Infecciones relacionadas con dispositivos invasivos después de cirugía cardíaca**Resumen**

Objetivo: Analizar las infecciones en Pacientes críticos postOperados de Cirugía Cardíaca (POCC).

Ámbito: Unidades de cuidados intensivos (UCI).

Diseño: Estudio observacional, prospectivo y multicéntrico.

Pacientes: Se incluyeron los pacientes POCC incluidos en el registro ENVIN-HELICS entre los años 2005-2011.

Variables de interés principal: Neumonías relacionadas con ventilación mecánica (N-VM), infecciones urinarias relacionadas con sonda uretral (IU-SU), bacteriemias primarias y/o relacionadas con catéteres vasculares (BP-BCV) y bacteriemias secundarias (BS).

Resultados: De los 97.692 pacientes registrados 9.089 (9,3%) fueron POCC. En 440 (4,8%) POCC se identificaron una o más de las infecciones controladas. La densidad de infección fue de 9,94 episodios de N-VM por 1.000 días de VM; 3,4 episodios de IU-SU por 1.000 días de SU, 3,10 episodios de BP-BCV por 1.000 días de CVC; y 1,84 episodios de BS por 1.000 días de estancia en UCI. Los factores de riesgo estadísticamente significativos fueron estancia en UCI (OR 1,18; IC95% 1,16-1,20), APACHE II al ingreso en UCI (OR 1,05; IC95% 1,03-1,07), cirugía urgente (OR 1,67; IC95% 1,13-2,47), tratamiento antibiótico previo (OR 1,38; IC95% 1,04-1,83), colonización previa de *Pseudomonas aeruginosa* (OR 18,25; IC95% 3,74-89,06) o enterobacterias productoras de betalactamasas de espectro extendido (OR 16,97; IC95% 5,4-53,2). La mortalidad intra-UCI fue del 4,1%; del 32,2% en aquellos que desarrollaron una o más infecciones y del 2,9% en los pacientes sin infección ($p < 0,001$).

Conclusiones: El 9,3% de los pacientes incluidos en el registro fueron POCC. La mortalidad global de los POCC es baja pero aumenta significativamente en aquellos que desarrollaron una o más infecciones.

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Introduction

The number of patients needing heart surgery has increased in recent years. The postoperative period of this kind of surgery initially requires the adoption of a series of therapeutic and/or monitorization measures for which the patient must stay in specialized units such as the Department of Intensive Care Medicine or the Intensive Care Unit (ICU) for a number of days after the operation. In the great majority of cases the patient course is favorable, though a small group of individuals can suffer a range of complications. One of the possible complications in the immediate postoperative period is the development of infections associated to invasive devices (tracheal tube, ventilator, urethral catheter, vascular catheters) used during surgery and in the subsequent days. The presence of these infections has been related to an increase in morbidity and mortality.¹

In Spain, the monitoring of infections acquired in the ICU is fundamentally carried out by means of the ENVIN-HELICS registry, developed by the Infectious Diseases Working Group

of the Spanish Society of Intensive and Critical Care Medicine and Coronary Units (SEMICYUC).² For years, this registry has established a longitudinal control of patients admitted to the ICU for more than 24h, with the purpose of identifying infections related to invasive devices, and to know the consumption of antimicrobials during admission to the ICU. One of its options is patient classification according to background disease, with a specific code for postoperative heart surgery patients (POHS). In this study we describe the device-related infection rates, characteristics and etiologies in POHS, along with the risk factors for these infections in this particular subgroup of patients.

Materials and methods**Patients studied**

We selected the patients included in the ENVIN-HELICS registry between the years 2005 and 2011 (both included),

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