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Outcomes

Mortality and complications in elderly patients undergoing cardiac surgery

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Abstract

Purpose: The purpose of the study was to analyze postoperative complications, mortality, and related factors of elderly patients undergoing cardiac surgery.

Methods: An observational, retrospective, and multicenter study of cardiac surgery patients, obtained from the ARIAM registry, was performed between 2008 and 2011. Clinical-surgical data, postoperative complications, and mortality were analyzed in a group of patients older than 75 years and in a younger group.

Results: A total of 4548 patients were analyzed, with 882 (19.4%) patients at least 75 years old. Elderly patients had worse functional status (New York heart Association class) and comorbidities. The complication rate was higher in the elderly group (40.4% and 33.5%, respectively; $P = .0001$). Mortality in the elderly was 1.1%, 12%, and 15.1% (during surgery, intensive care unit [ICU], and 30-day mortality, respectively). Thirty-day mortality in elderly patients was higher when adjusted for EuroSCORE (European System for Cardiac Operative Risk Evaluation) and cardiopulmonary bypass time.

The interaction between multiorgan dysfunction syndrome (MODS) and age more than 75 years was assessed by logistic regression, obtaining an odds ratio of 9.27 (5.88-14.60) for younger patients and 29.44 (12.22-70.94) for elderly patients who died during the ICU stay.

Conclusions: Age more than 75 years is an independent risk factor for ICU mortality when adjusted for EuroSCORE and cardiopulmonary bypass time. Elderly patients also have a higher rate of complications during ICU stay. Elderly patients develop MODS more frequently and present a higher mortality rate than younger patients with MODS.

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1. Introduction

The progressive increase in life expectancy, together with improvements in medicine, makes us witnesses to the change in some indications, especially in surgery. The aging of the Spanish society is evident, as shown by a life expectancy exceeding 75 years. According to data from the 2011 census [1], the population older than 75 years now represents 8.82% of the population registered in Spain.

Age more than 75 years, for many physicians, is a psychological barrier that identifies a population with many comorbidities that is at high risk for invasive procedures. This attitude, which is not always justified, can prevent certain patients from benefitting from all available resources. In addition, as shown in numerous studies, increased morbidity and mortality are seen when comparing the elderly population undergoing heart surgery with the younger groups [2-7]. Therefore, the development of transaortic valve implantation since 2002 has made these techniques benefit elderly patients with high surgical risk [8].

At the same time, age has been considered a predictor of mortality and is therefore represented in risk scales used in cardiac surgery, like the EuroSCORE (European System for Cardiac Operative Risk Evaluation), which awards 1 point for each period of 5 years from 60 years; the Parsonnet score, which awards 20 points to being or older than 80 years; and Simplified Acute Physiology Score (SAPS) 3, which gives 15 points to being older than 75 years [9-12].

The aim of this study was to analyze postoperative complications, mortality, and related factors of elderly patients undergoing cardiac surgery and increase knowledge about cardiac surgery in this age group.

2. Materials and methods

The registry of adult cardiac surgery platform ARIAM-Andalusia is an observational, prospective, multicenter study of all patients undergoing cardiac surgery that has progressively incorporated 11 hospitals in the autonomous community of Andalusia.

All of the patients included in the registry between March 2008 and March 2011 were analyzed. The data were collected by the physicians in charge of registration. Each hospital introduced their patients through a Web interface, developed by Coresoft, which was accessed through the Internet (www.ccardiaca.org). The data were subsequently reviewed and saved in a central unit. For this study, we did a retrospective analysis with available data from the registry.

The ARIAM Andalusia project has become a global project, implemented in the Andalusian Public Health Service, partially financed by Health Counselling since 2005, which also includes other registries, such as acute coronary syndrome, cardiac arrests, severe sepsis, or pediatric cardiac surgery. The basis of these records was published in an official gazette [13].

Table 1 Definition of the complications analyzed

Reoperation	Patient returned to the operating room for any reason
Reoperation for bleeding or cardiac tamponade	Patient returned to the operating room for mediastinal bleeding/tamponade.
Perioperative MI	Development of new Q waves on surface ECG in at least 2 contiguous leads in the first 24 h with elevation greater than 5 times the upper limit of CK-MB.
Mediastinitis	Deep wound infection that affects sternal bone, muscle, and/or mediastinum and requires antibiotic treatment and/or surgical debridement.
Severe sepsis/septic shock	Systemic inflammatory response syndrome criteria, with positive cultures and/or need for vasoactive drugs.
Prolonged mechanical ventilation	Need for invasive mechanical ventilation longer than 24 h after surgery
Pneumonia	Respiratory sample positive culture obtained by sterile technique (BAL, tracheal aspirate) and/or appearance of new radiographic infiltrates
Atrial fibrillation	Development of new atrial fibrillation requiring treatment for control. Excludes previous AF recurrence.
Renal failure	Worsening of preoperative renal function requiring the use of renal replacement therapy (hemodialysis or hemofiltration)
Stroke	New abrupt-onset neurological deficit that is not resolved within 24 h
Heart block	Development of new atrioventricular conduction block requiring ventricular permanent pacemaker implantation
Cardiac arrest	Ventricular arrhythmias (VF or pulseless VT) or asystole.
Cardiac taponade	Pericardial effusion with clinical and/or echocardiographic compromised right heart filling does not require surgery.
Multiorgan failure	Two or more major organ systems suffer compromised functions (neurological, renal, pulmonary, cardiac or vascular).

ECG, Electrocardiogram; MI, Myocardial infaction; CK-MB, Isozime MB of creatin kinase; BAL, Bronchoalveolar lavage; VF, Ventricular fibrillation; VT, Ventricular tachycardia.