

Long-term survival of octogenarian patients submitted to isolated coronary artery bypass graft surgery

Sobrevida em longo prazo de octogenários submetidos à cirurgia de revascularização miocárdica isolada

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Abstract

Introduction: An increasing number of octogenarian patients are undergoing coronary artery bypass graft surgery (CABG). The short-term results of this procedure have been broadly studied, but there are few national reports on long-term outcomes.

Objectives: To describe hospital mortality and long-term survival of patients aged \geq 80 years-old undergoing isolated CABG.

Methods: Retrospective cohort study with 142 consecutive patients aged \geq 80 years-old undergoing isolated CABG in the period between Jan/1996 and Dec/2007 in a Brazilian reference center. Mean age (\pm SD) was 82.3 ± 2.1 years, and 56.3% were male. The prevalence of hypertension was 73.2%, of previous myocardial infarction 30.3%, of diabetes 26.8%,

and of renal dysfunction (creatinine \geq 2.0 mg/ml) was 4.9%. The median follow-up was 4.0 years, with a loss of 11.6% of patients. Survival analysis was performed by the Kaplan-Meier method.

Results: Overall hospital mortality was 14.8% (95% CI: 8.8 to 20.8), with a reduction of this rate during the study period (1996-99: 25.9%, 2000-03: 15.8%, and 2004-07: 8.6%). Mean survival was 6.5 years (95% CI: 5.5 to 7.5), and the survival rate at 1, 3 and 5 years was 79.4, 73.4 and 65.2%, respectively.

Conclusion: Results are in agreement with international reports. Mean survival was 6.5 years and the survival rate at 5 years was 65.2%.

Descriptors: Myocardial Revascularization. Aged, 80 and over. Survival Analysis.

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Resumo

Introdução: Um crescente número de pacientes octogenários tem sido submetido à cirurgia de revascularização miocárdica (CRM). Os resultados em curto prazo desse procedimento têm sido amplamente estudados, mas há poucos relatos nacionais até o presente momento sobre os seus desfechos em longo prazo.

Objetivos: Descrever a mortalidade hospitalar e a sobrevida em longo prazo de pacientes com idade 80 anos submetidos à CRM isolada.

Métodos: Estudo de coorte retrospectivo com 142 pacientes consecutivos de idade 80 anos submetidos à CRM isolada no período de janeiro/1996 a dezembro/2007. A idade média (\pm dp) foi de 82,3 \pm 2,1 anos e 56,3% eram masculinos. A prevalência de hipertensão arterial sistêmica foi de 73,2%, infarto agudo

do miocárdio prévio 30,3%, diabetes melito 26,8% e disfunção renal (creatinina \geq 2,0mg/ml) 4,9%. A mediana do seguimento foi de 4,0 anos, havendo perda de 11,6% dos pacientes. A análise da sobrevida foi feita pela curva de Kaplan-Meier.

Resultados: A mortalidade hospitalar geral foi de 14,8% (IC95%: 8,8-20,8), observando-se uma redução desse percentual ao longo do período estudado (1996-1999: 25,9%, 2000-2003: 15,8% e 2004-2007: 8,6%). A média de sobrevida foi de 6,5 anos (IC95%: 5,5-7,5), sendo a taxa de sobrevida em 1, 3 e 5 anos de 83,3, 79,5 e 77,3%, respectivamente.

Conclusões: A média de sobrevida foi de 6,5 anos, sendo a taxa em 5 anos de 77,3%, dados condizentes com a literatura internacional.

Descritores: Revascularização Miocárdica. Idoso de 80 Anos ou mais. Análise de Sobrevida.

INTRODUCTION

Brazil had 21 million people aged 60 years or more in 2008, exceeding the elderly population in several European countries and 9.4 million aged 70 or older, 4.9% of the total population. The age range of individuals over 80 years was the fastest growing in the last 10 years: from 1998 to 2008 there was an increase of 70%, and the country now has almost 3 million people in this age group [1].

An increasing number of octogenarians has undergone coronary artery bypass grafting (CABG). The short-term results of this procedure have been widely studied, however, there are few national reports to date in their long-term outcomes.

In one of the largest studies conducted with this population up to now, Peterson et al. [2] reported a hospital mortality of 11.5%. When the number of patients was smaller, Likosky et al. [3] and Alexander et al. [4] observed a mortality of 7.7 and 8.1%, respectively. Two national studies [5,6] with octogenarian patients observed mortality of 10.0% and 11.5%. Regarding survival of octogenarians undergoing CABG, previous studies have shown that these patients have similar survival [2] or even higher probabilities [7] to live longer than the general population.

This study aims to describe the hospital mortality and long-term survival of patients aged 80 years or older undergoing CABG.

METHODS

A retrospective cohort study including all patients aged 80 years or older underwent isolated CABG from January 1996 to December 2007 at the Institute of Cardiology of Rio Grande do Sul (IC/FUC).

The classification of heart failure was performed according to the criteria established by the New York Heart Association (NYHA). The presence of renal dysfunction was defined by a serum creatinine level greater than 2 mg/ml. The criterion adopted for left ventricular dysfunction was an ejection fraction below 50% assessed by cardiac catheterization (closer examination), or in the absence of this method, echocardiogram was used. Severe coronary lesion was considered when it was greater than 70% in the coronary arteries and 50% in the left coronary trunk (LCT). Counting the number of vessels with severe injury includes the three main coronary arteries and its branches. Hospital mortality was defined as the occurrence of death during the patient hospitalization, regardless of its duration. Patients with no information after hospital discharge were considered loss to follow up. Patients, whose follow-up was lost, were censored, and their data were recovered until the date of the last appointment that appeared in their records.

Data were directly collected from patients' records and then entered and analyzed with the software SPSS 15.0. Follow-up was performed via telephone or by consulting the medical records, with data being last verified in the first quarter of 2009. When they were not possible, a \dagger consultation was made on the Death Registers of the Department of Health of Rio Grande do Sul, which revealed the existence of patients' death, as well as its cause.

Descriptive analysis for categorical variables was carried out by the distribution of absolute and relative frequency, and for the average quantitative analysis, standard deviation and median, when indicated. The survival description was issued by Kaplan-Meier curve. The 95% confidence interval was calculated when it was necessary, being shown in parentheses.

This study was approved by the Research Ethics Committee of IC/FUC (Cardiology Institute / University Foundation of Cardiology).

RESULTS

The obtained sample was 142 patients aged e" 80 years-old undergoing isolated CABG, all of them using extracorporeal circulation, in a total of 6.711 isolated coronary artery bypass surgeries (2.1%). The mean age (\pm SD) was 82.3 ± 2.1 years and 56.3% were male. Population characteristics are shown in Table 1.

The hospital mortality was 14.8% (95% CI: 8.8 to 20.8), observing a reduction of this percentage over the study period (Figure 1). The median follow-up time was 4.0 years (mean 4.4 ± 2.6 years), with 14 patients losing follow-up (11.6%) and 34 late deaths.

The mean age observed was 6.5 years (95% CI: 5.5 to 7.5) and median of 7.4 years, survival at 1, 3 and 5 years of 79.4, 73.4 and 65.2%, Figure 2 shows Kaplan-Meier actuarial

survival curve. In the subgroup of discharged patients from hospital, this average increased to 7.7 years (95% CI: 6.7 to 8.7), with survival at 1, 3 and 5 years of 94.3, 87.1 and 77.5% respectively.

Among the 21 in-hospital deaths, the primary cause was cardiogenic shock (9, 42.8%), followed by septic shock (6, 28.6%). Among the 34 late deaths, cardiac causes accounted for 11 cases (32.4%), with acute myocardial infarction causing the death of four patients (11.8%).

Table 1. Preoperative description of the studied sample.

Variable	n	%
Severe lesion ≥ 3 vessels	109	76.8
Arterial hypertension	104	73.2
Severe TBI lesion	55	38.7
Prior AMI	43	30.3
Diabetes	38	26.8
Non-elective surgery	27	19.0
Ventricular dysfunction	16	11.3
Atrial fibrillation	7	4.9
Renal dysfunction	7	4.9
Prior CABG	3	2.1

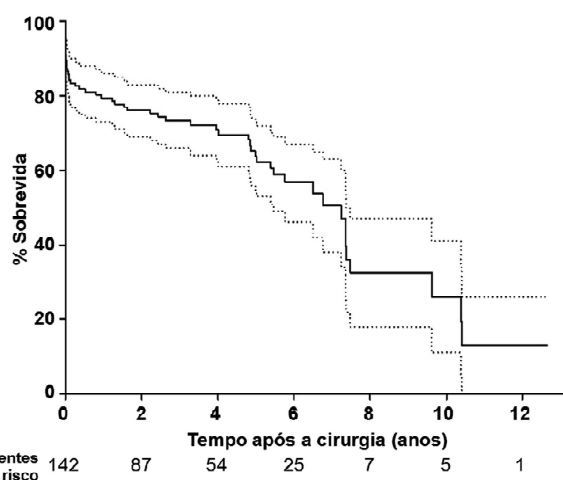


Figure 2 - Kaplan-Meier survival curve of octogenarians undergoing isolated CABG at the IC-FUC between 1996 and 2007 (dotted curves represent a 95% confidence interval)

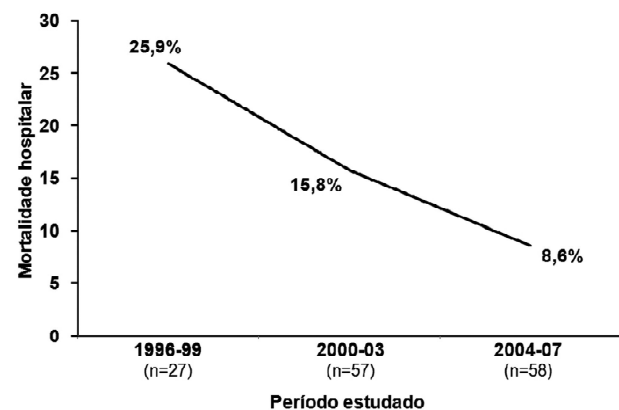


Figure 1 - Hospital mortality according to the study time period

DISCUSSION

This study describes the hospital mortality and survival in a consecutive series of 142 octogenarians who underwent isolated CABG between 1996 and 2007 at the IC/FUC, observing a mortality rate of 14.8%, which proved to be decreasing over the period, standing at 8.6% in the period 2004 to 2007, and the 5-year survival was 65.2%.

The indication for CABG in septuagenarian is usual nowadays, a fact that becomes increasingly common in octogenarians and nonagenarians [8]. It is known that older patients have higher mortality risk when undergoing this procedure. Hannan et al. [9] by analyzing this outcome in different age groups, observed that mortality rates were relatively low for patients aged 40-49, 50-59, 60-64, 65-69 and 70-74 years (1, 10%, 1.65%, 2.17%, 2.76% and 3.36% respectively), however, this percentage exponentially increased for patients between 75 and 79 years old (5.28%) and for those aged greater than or equal to 80 years (8.31%).

In this study, it was also described that the mortality chance during hospitalization of an 80-year-old patient, in multivariate analysis, was 3.25 times the chance of a 50-year-old patient.

Hospital mortality described in this series was 14.8% higher than what had been observed in the three major previous studies already reported [2-4]. Nevertheless, when the number of patients was divided by time intervals, it was observed that there was a large reduction in mortality, and this percentage over the last three years of study was 8.6%, which can be attributed to greater experience, associated with an increased number of cases in recent years, the management of patients in this age group regarding preoperative, transoperative and postoperative care, which differ this group from those of younger age.

It should be emphasized that the long-term survival and functional improvement can be obtained in elderly patients despite the existence of a serious cardiovascular disease. The 5-year survival in patients recovering from surgery is comparable to the general population, adjusted for age, gender and race. Although the duration of hospitalization may be greater in elderly patients, patients' recovery in the first six weeks has been described as being similar to younger patients [10].

Regarding survival, despite the comparison difficulty due to methodological differences, previous studies show similar data to those observed in this research. Likoski et al. [3] described that the median survival in patients aged between 80 and 84 years old was 7.4 years, identical data to those observed in this series. Table 2 shows a list of studies that described the survival of octogenarians undergoing isolated CABG.

In Brazil, the current life expectancy is 72.4 years, however, the Brazilians who reach the age of 80 years will possibly live 9.4 years longer [14]. Therefore, the life expectancy of those who are 80 years old is more relevant than the global life expectancy of the general population. Based on this statement, the observed median survival of 6.5 years noted in this study, and especially the 7.7 years of patients who are discharged from hospital, approach the expected life expectancy of this age group, therefore, they

are considered very good, taking into account all comorbidities and risks associated with surgical procedures.

Furthermore, although short-term outcomes are more unfavorable and hospitalizations with higher costs [15,16], the CABG can effectively provide substantial improvement in quality of life among elderly. Fruitman et al. [17], in 1999, and Khan et al. [18] in 2000, studied the impact of CABG on quality of life and concluded that reducing the frequency of angina episodes and improved functional capacity would lead these patients to the same or better situation as the general population of the same age. Salomon et al. [19] demonstrated in a 6-year follow-up period a percentage of angina-free survival of 77% and Mullany et al. [20], in a 5-year follow-up period with 159 patients over 80 years old, observed a percentage of 79%. The excellent long-term survival in elderly patients after the completion of the CABG may be accompanied by a satisfactory quality of life in most patients [21].

According to the ACC / AHA guidelines [10], age itself should not be a contraindication to surgery if there is the view that the long-term benefits overcome the risk procedures. Hence, who are the ideal candidates for CABG among the elderly? Unfortunately, this is not an easy question to answer, because the risk relation and the benefits of surgery are individualized measured for each patient. There are no universal criteria accepting the selection or rejecting the patients for surgery: an elderly with few comorbidities and a good expected quality of life and life expectancy, will probably benefit from CABG. On the other hand, an octogenarian with several comorbidities and a suboptimal expected quality of life after surgery should probably be better managed conservatively [21]. Conforming to the ACC / AHA guidelines [10], the preoperative variables associated with shorter survival in elderly patients include atrial fibrillation, smoking, peripheral vascular disease and low renal function.

Limitations of this study: this report is retrospective and describes a series of cases operated at a single referral center for cardiovascular surgery, and their results may not be transferable to other centers. However, what should be highlighted is that there was no pre-selection of patients,

Table 2. Comparison of literature data on survival of octogenarians undergoing isolated CABG with those observed in the present study (in parentheses, 95% confidence interval).

Reference	Period	n	Survival				
			1 years	2 years	3 years	4 years	5 years
Peterson et al ²	1987-1990	24.461	80.8%	76.3%	71.2%	-	-
Peterson et al ¹¹	1995-1999	983	-	-	-	83.2%	-
Stoica et al ⁷	1996-2003	706	-	-	-	-	82.1%
Dacey et al ¹²	1992-2001	991	88.1%	-	-	-	68.0%
Schmidtler et al ¹³	1993-2005	432	-	-	78.0%	-	66.0%
Present study	1996 - 2007	142	79.4% (72.4-86.4)		73.4% (65.6-81.2)		65.2% (55.8-74.6)

and surgery was always indicated taking into consideration the clinical situation, in accordance with the physician assistant. In the ventricular ejection fraction evaluation, preference was given to cineventriculography, although some may prefer other methods. Outcomes comparisons are made †with literature and were also discussed, since a reliable statistical comparison could not be performed with reports by other authors. Comparative analysis with other forms of treatment was not carried out, such as drug or percutaneous treatment, because it was not the proposed objective.

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