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#### **ORIGINAL ARTICLE**

## Changes in referral protocols for cardiac surgery: Do financial considerations come at a cost?



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#### **KEYWORDS**

Cardiac surgical procedures; Waiting lists; Follow-up; Mortality

#### Abstract

Introduction and objectives: The aim of this study was to determine whether changes to referral protocols for cardiac surgery have had an impact on waiting times, hospitalizations and mortality during the waiting period and during the first year of follow-up after surgery. *Methods*: In this retrospective study of patients referred for cardiac surgery between January 1, 2008 and September 30, 2014, the study population was divided into two groups: those referred before (group A, January 1, 2008 to August 31, 2011) and after (group B, September 1, 2011 to September 30, 2014) the change in referral protocols. A telephone follow-up was conducted. *Results*: There were 864 patients referred for cardiac surgery, 557 in group A and 307 in group B. Patient characteristics were similar between groups. The mean waiting time for surgery was  $10.6\pm18.5$  days and  $55.7\pm79.9$  days in groups A and B, respectively (p=0.00).

During the waiting period two patients (0.4%) were hospitalized in group A and 28 (9.1%) in group B (p=0:00); mortality was, respectively, 0% and 2.3% (p=0.00). During one-year follow-up 12.8% of group A patients and 16% of group B patients were hospitalized. Cardiovascular mortality in this period was around 5% in both groups (p>0.05).

*Conclusion:* Changes to referral protocols for cardiac surgery had an impact on waiting times, on the number of hospitalizations and on mortality in this period.

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#### PALAVRAS-CHAVE

Procedimentos cirúrgicos cardíacos; Listas de espera; Seguimento; Mortalidade Alteração nas redes de referenciação de doentes para cirurgia cardiotorácica: as razões económicas serão destituídas de custos?

#### Resumo

Introdução e objetivos: O objetivo deste estudo foi determinar se as alterações aos protocolos de referenciação para cirurgia cardíaca tiveram impacto nos tempos de espera, taxa de internamentos e na mortalidade durante o período de espera e durante o primeiro ano de seguimento após cirurgia.

Materiais e métodos: Estudo retrospetivo, com doentes referenciados para cirurgia cardíaca de 1/01/2008 a 30/09/2014. Avaliaram-se dois grupos de doentes antes e depois da mudança de referenciação: grupo A entre 1/01/2008 e 01/08/2011 e grupo B entre 01/08/2011 e 30/09/2014. Foi realizado o follow-up telefónico.

Resultados: Foram referenciados 864 doentes para cirurgia cardíaca, 557 no grupo A e 307 no grupo B. As características dos grupos foram semelhantes. O número médio de dias de espera para cirurgia foi de 10,6  $\pm$  18,5 dias e de 55,7  $\pm$  79,9 dias, respetivamente no grupo A e B (p = 0,00).

Durante o período de espera foram internados dois doentes (0,4%) no grupo A e 28 (9,1%) no grupo B (p = 0,00); a taxa de mortalidade foi, respetivamente, de 0-2,3% (p = 0,00). Durante o período de *follow-up* de um ano foram admitidos em internamento 12,8% dos doentes do grupo A e 16% dos doentes do grupo B. A mortalidade neste período foi de cerca de 5% em ambos os grupos (p > 0,05).

Conclusão: As alterações aos protocolos de referenciação para cirurgia cardíaca tiveram impacto nos tempos de espera, no número de internamentos e na mortalidade nesse período. © 2014 Sociedade Portuguesa de Cardiologia. Publicado por Elsevier España, S.L.U. Todos os direitos reservados.

#### Introduction

Cardiothoracic surgery departments are concentrated in a few hospitals in Portugal. In order to meet the needs of the various cardiology centers, there are referral protocols for patients requiring cardiac surgery. Following the recommendations of the Regional Health Authorities, these protocols were altered in August 2011.

These changes were mainly made for economic reasons, in an attempt to reduce national health system costs. They may have affected waiting times for surgery, but there is as yet no evidence to support this. Several authors have shown that increased waiting times for coronary artery bypass grafting (CABG) are associated with a rise in mortality during the waiting period. 1-13

The aim of this study was to determine whether these changes have had an impact on waiting times of patients referred for cardiac surgery and on hospitalizations and mortality during the waiting period and during the first year of follow-up after surgery.

#### **Methods**

We performed a retrospective, descriptive and correlational study of all patients referred for cardiac surgery by our cardiology department between January 1, 2008 and September 30, 2014. Data on baseline characteristics, waiting times for surgery (defined as the interval between the date of admission to the cardiology department and

the day that information on the patient was sent to the surgical center), and events (death or hospitalization) during the waiting period were taken from patients' medical records. For the purposes of the study, cases were only considered urgent if they had been indicated as such in patients' records, using the following criteria: for coronary patients, those admitted for myocardial infarction and severe coronary disease (left main disease, disease of the proximal anterior descending artery or three-vessel disease), and for valve patients, those admitted for heart failure requiring ventilation and refractory to medical therapy.

The patients were divided into two groups: group A, those referred for surgery between January 1, 2008 and August 31, 2011); and group B, those referred between September 1, 2011 and September 30, 2014). The month of August 2011 was chosen to divide the two groups because it was then that the referral protocols were changed.

Baseline characteristics, waiting times and events were compared between the groups.

A telephone follow-up was conducted by a cardiologist of patients referred for cardiac surgery during the period under analysis, and events at one year were recorded.

SPSS 20.00 was used for the statistical analysis. Categorical variables were compared by the chi-square test, continuous variables were compared using one-way ANOVA, and survival curves during the waiting period and during the first year of follow-up were constructed using the Kaplan-Meier method.

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