Original Article

Impact of prior coronary bypass graft surgery on the outcomes of patients undergoing primary percutaneous coronary intervention

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ABSTRACT

Background: Historically, patients with prior coronary artery bypass graft (CABG) surgery undergoing primary percutaneous coronary intervention (PCI) have a worse prognosis than patients without prior CABG. However, more contemporary analyses have contested these findings. This study's aim was to evaluate the 30-day clinical outcomes in patients with and without prior CABG submitted to primary PCI.
Methods: Prospective cohort study, extracted from the database of Instituto de Cardiologia do Rio Grande do Sul, containing 1,854 patients undergoing primary PCI.
Results: Patients with prior CABG (3.8%) showed, in general, a more severe clinical profile. The time of symptom onset until arrival at the hospital was shorter in this group (2.50 hours [1.46 to 3.66] vs. 3.99 hours [1.99 to 6.50]; $p < 0.001$), while the door-to-balloon time was similar (1.33 hour [0.85 to 2.07] vs. 1.16 hour [0.88 to 1.58]; $p = 0.12$). Femoral access was more often used in the group with prior CABG (91.5% vs. 62.5%; $p < 0.001$). Manual thrombus aspiration was less often performed in this group (16.9% vs. 31.1%; $p = 0.007$), but there was no difference regarding the use of glycoprotein IIb/IIIa inhibitors (28.2% vs. 32.4%, $p = 0.28$). Angiographic success was lower in the group with prior CABG (80.3% vs. 93.3%; $p = 0.009$). At 30 days, patients with prior CABG had similar rates of major adverse cardiac events (14.1% vs. 11.2%; $p = 0.28$), and mortality, although numerically higher, was not statistically significant (13.2% vs. 7.0%, $p = 0.07$).
Conclusions: In this contemporary analysis, patients with prior CABG undergoing primary PCI had a more severe clinical profile and lower angiographic success, but showed no differences regarding 30-day clinical outcomes.

Impacto da cirurgia de revascularização miocárdica prévia em desfechos clínicos de pacientes submetidos à intervenção coronária percutânea primária

Palavras-chave:
Angioplastia
Intervenção coronária percutânea
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Infarto do miocárdio

RESUMO

Introdução: Historicamente, pacientes com cirurgia de revascularização do miocárdio (CRM) prévia submetidos à intervenção coronária percutânea (ICP) primária têm pior prognóstico que pacientes sem CRM prévia. No entanto, análises mais contemporâneas contestam esses achados. Nosso objetivo foi avaliar os desfechos clínicos de 30 dias em pacientes com e sem CRM prévia submetidos à ICP primária.
Métodos: Estudo de coorte prospectivo extraído do banco de dados do Instituto de Cardiologia do Rio Grande do Sul, contendo 1.854 pacientes submetidos à ICP primária.
Resultados: Pacientes com CRM prévia (3,8%) mostraram perfil clínico, em geral, mais grave. O tempo de início dos sintomas até a chegada ao hospital foi menor nesse grupo (2,50 horas [1,46 – 3,66] vs. 3,99 horas [1,99-6,50]; $p < 0,001$) e o tempo porta-balão foi semelhante (1,33 hora [0,85-2,07] vs. 1,16 hora [0,88-1,58]; $p = 0,12$). O acesso femoral foi mais usado no grupo com CRM prévia (91,5% vs. 62,5%; $p < 0,001$). O uso de tromboaspiração manual foi menor nesse grupo (16,9% vs. 31,1%; $p = 0,007$), mas não houve diferença no uso de inibidor da glicoproteína IIb/IIIa (28,2% vs. 32,4%; $p = 0,28$). O sucesso angiográfico foi menor no

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grupo com CRM prévia (80,3% vs. 93,3%; *p* = 0,009). Aos 30 dias, pacientes com CRM prévia apresentaram taxas similares de eventos cardíacos adversos maiores (14,1% vs. 11,2%; *p* = 0,28), e a mortalidade, embora numericamente mais alta, não foi estatisticamente significativa (13,2% vs. 7,0%; *p* = 0,07).
Conclusões: Nessa análise contemporânea, pacientes com CRM prévia submetidos à ICP primária apresentaram perfil clínico mais grave e menor sucesso angiográfico, porém não mostraram diferenças nos desfechos clínicos em 30 dias.

Introduction

The number of coronary artery bypass graft (CABG) surgeries peaked in the 1990s and currently it remains a widely used alternative revascularization method in patients with coronary atherosclerosis.[1] It is also known that 50% of venous grafts become diseased, and 25% become occluded within a 5-year period postoperatively. Many of these patients seek emergency care with acute coronary syndrome.[2] Epidemiological data in Brazil are scarce, but the international literature reports that, it is a relatively frequent event. According to the National Cardiovascular Data Registry (NCDR™), the percentage of patients with prior CABG who had acute myocardial infarction with ST-segment elevation (STEMI) was around 7.0% to 7.5% between 2000 and 2010.[3]

The presence of prior CABG has been reported as an independent risk factor for adverse clinical outcomes in STEMI. In this scenario, diagnosis and treatment are always challenging. The clinical, electrocardiographic, and laboratory findings are not always entirely elucidative,[4] and when considering the existing anatomical issues and comorbidities, percutaneous coronary intervention (PCI) is sometimes more complex and has a worse prognosis.[5]

Literature data show that in patients with STEMI and prior CABG submitted to primary balloon angioplasty, in-hospital mortality rates as well as those 6 months after the event were higher when compared to patients without prior CABG, especially when the culprit vessel was a saphenous vein graft.[6] There are no recent data in the national literature evaluating this group of patients in this scenario.

This study aimed to evaluate the 30-day outcomes in a contemporary cohort of patients with and without CABG, submitted to primary PCI in a tertiary referral hospital with a high volume of patients.

Methods

Patients

This was a prospective cohort study that selected patients from an active database, which included all consecutive patients that presented with STEMI undergoing primary PCI at the Instituto de Cardiologia do Rio Grande do Sul, Fundação Universitária de Cardiologia, in Porto Alegre (RS), Brazil. The assessed data and patients were those recorded from January 2010 to December 2013. The project was approved by the local Ethics Committee. All patients were informed about the study and signed an Informed Consent.

The inclusion criteria were the presence of STEMI treated within the first 12 hours. STEMI was defined as typical chest pain at rest associated with ST-segment elevation of at least 1 mm in two contiguous leads in the frontal plane or 2 mm in the horizontal plane, or typical chest pain at rest in patients with new, or presumably new left bundle branch block in the 12-lead electrocardiogram. Exclusion criteria were time of symptom onset until arrival at the hospital longer than 12 hours, age younger than 18 years, or unwillingness to participate in the study.

Primary percutaneous coronary intervention

The decision to contact the Hemodynamics Service was made by the assistant team responsible for patient care in the emergency room, upon patient arrival. In accordance with the institutional routines, the initial adjunct antiplatelet therapy included a loading dose of 300 mg of acetylsalicylic acid and a P2Y12 inhibitor (300 to 600 mg of clopidogrel, 180 mg of ticagrelor, or 60 mg of prasugrel). The use of additional anticoagulant therapy (heparin 70 to 100 IU/kg) while still in the emergency room was performed at the discretion of the team responsible for initial care. For patients who had not received heparin in the emergency room, the drug was prescribed in the interventional laboratory by the interventional cardiology team at the time of the procedure. These professionals were also responsible for deciding whether or not use glycoprotein IIb/IIIa inhibitors, as well as other adjunctive medications.

Demonstration of the culprit vessel was performed in at least two views. The access route, PCI technique, the use of thrombus aspiration, and number of stents used were left to the operator's discretion. Coronary flow before and after the procedure was evaluated according to the Thrombolysis in Myocardial Infarction (TIMI) criteria.[7]

Data collection, outcomes and clinical follow-up

All patients were interviewed by the investigators at hospital admission. Angiographic, clinical, and laboratory data were collected using a standard questionnaire. Patients were visited daily during hospital stay by one of the researchers to evaluate the occurrence of in-hospital clinical outcomes. The occurrence of cardiovascular events 30 days after the procedure was assessed by telephone contact and/or medical record review.

Major adverse cardiac events (MACE) were defined as the combination of mortality from all causes, myocardial infarction, or need for urgent revascularization. Myocardial infarction was characterized as the presence of recurrent chest pain associated with new elevation of serum biomarkers (after the initial decline in the natural curve) associated with ST-segment elevation and/or new pathological Q waves. Urgent revascularization was considered as the need to perform a new revascularization procedure, either percutaneous or surgical, due to recurrent ischemia.

Additionally, stroke was defined as the development of sudden-onset focal neurological deficit, irreversible and/or causing death within 24 hours. Major bleeding was considered as the occurrence of clinically evident bleeding, a decrease in hemoglobin > 5 g/dL or in hematocrit > 15%, or development of hemorrhagic stroke. Stent thrombosis was classified as sudden occlusion of the treated vessel, confirmed by angiography during the in-hospital stay.