

Original Article

Clinical and angiographic profile of young patients undergoing primary percutaneous coronary intervention

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ABSTRACT

Background: The current decline observed in mortality rate among patients with ST-segment elevation acute myocardial infarction can be attributed not only to the increased use of reperfusion strategies, but also to a change in the demographic profile of this population, notably the reduction in mean age.

Methods: We retrospectively reviewed all patients undergoing primary percutaneous coronary intervention in the period from April 2010 to December 2014. The primary objective was the characterization of the most prevalent risk factors, the angiographic nature of the lesions, the technical aspects of the procedure, and in-hospital clinical outcomes in patients aged ≤ 45 years, comparing them to those aged > 45 years.

Results: Among 489 patients with acute myocardial infarction, 54 were ≤ 45 years, and 435 were > 45 years. Young patients exhibited a higher prevalence of smoking and obesity, while patients > 45 years were more likely to have hypertension, diabetes mellitus, dyslipidemia, and previous myocardial infarction. Primary percutaneous coronary intervention in young patients was associated with the use of fewer guide catheters, shorter fluoroscopy time, and higher percentage of direct stent implantation. Young patients exhibited good in-hospital outcomes, with lower rate of adverse cardiac events (3.7% vs. 9.2%; $p = 0.30$).

Conclusions: Patients aged ≤ 45 years accounted for approximately 10% of cases of ST-segment elevation acute myocardial infarction and exhibited high prevalence of modifiable risk factors.

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Perfil clínico e angiográfico de pacientes jovens submetidos à intervenção coronária percutânea primária

RESUMO

Introdução: O atual declínio observado na taxa de mortalidade entre pacientes com infarto do miocárdio com supradesnívelamento do segmento ST pode ser atribuído não apenas a maior utilização de estratégias de reperfusão, mas também a uma mudança no perfil demográfico dessa população, notadamente à redução em sua média de idade.

Métodos: Foram analisados retrospectivamente todos os pacientes submetidos à intervenção coronária percutânea primária no período de abril de 2010 a dezembro de 2014. O objetivo primário foi a caracterização dos fatores de risco mais prevalentes, a natureza angiográfica das lesões, os aspectos técnicos do procedimento e a evolução clínica hospitalar de pacientes jovens, com idade ≤ 45 anos, comparando-os àqueles com idade > 45 anos.

Resultados: Dentre 489 pacientes com diagnóstico de infarto agudo do miocárdio, 54 tinham idade ≤ 45 anos e 435, idade > 45 anos. Pacientes jovens exibiram maior prevalência de tabagismo e obesidade, enquanto pacientes > 45 anos eram mais propensos a apresentar hipertensão arterial sistêmica, diabetes melito, dislipidemia e infarto do miocárdio antigo. Intervenção coronária percutânea primária em jovens associou-se ao uso de menor quantidade de cateteres-guia, menor tempo de fluoroscopia e maior porcentual de implante direto de stent. Pacientes jovens exibiram boa evolução hospitalar, com reduzida taxa de eventos cardíacos adversos (3,7% vs. 9,2%; $p = 0,30$).

Palavras-chave:

Infarto do miocárdio

Adulto jovem

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Conclusões: Pacientes com idade \leq 45 anos representaram aproximadamente 10% dos casos de infarto agudo do miocárdio com supradesnivelamento do segmento ST e exibiram elevada prevalência de fatores de risco modificáveis.

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Introduction

Data from the National Institutes of Health and from USA government agencies indicate that coronary artery disease was responsible for one in seven deaths in that country in 2011.¹ It is estimated that, each year, 635,000 Americans are hospitalized for acute coronary syndrome. Although the mortality rate for ST-segment elevation acute myocardial infarction (STEMI) has decreased significantly - from 11.5%, in 1990, to 8.0%, in 2006-, this decrease can be attributed not only to advances in clinical pharmacotherapy and in reperfusion strategies, notably primary percutaneous coronary intervention (PCI), but also to changes in the demographic profile of patients.

Among these changes, the decline in the mean age of patients affected by STEMI stands out. A review of four French registries involving 6,707 people indicated a mean decrease from 66.2 to 63.3 years over the course of 15 years.² In Brazil, the National Registry of Cardiovascular Interventions (Central Nacional de Intervenções Cardiovasculares - CENIC), encompassing 20,004 procedures in a 5-year period (2006-2010), recorded a mean age of 60.8 years among patients with STEMI.³

The in-hospital and late outcomes of young patients with stable coronary artery disease in our country were recently characterized, attesting to a good long-term prognosis.^{4,5} However, clinical and angiographic information about this population in the acute phase of STEMI are scarce. Thus, the aim of this study was to obtain more information on this subject.

Methods

Study population

All patients diagnosed with STEMI undergoing primary PCI in a single center performing a large volume of procedures (> 70 primary PCIs/year) were analyzed retrospectively. Patients aged ≤ 45 years were classified as young patients, based on previous publications on the subject.⁶⁻⁸

The primary aim of this study was the characterization of the most prevalent risk factors in young patients with STEMI, angiographic nature of lesions, technical details of primary PCI, and in-hospital clinical evolution, with emphasis on mortality rate, reinfarction, stroke, stent thrombosis, and the occurrence of major bleeding, comparing them to patients aged > 45 years.

Procedures

A 12-lead electrocardiogram, plus V_3R , V_4R , V_7 , and V_8 leads in inferior infarction, were performed at hospital admission and 30-60 minutes after the procedure. Therapeutic interventions followed recommendations and practices established by the existing guidelines.^{9,10} Anticoagulation was obtained with unfractionated heparin (UFH) 100 U/kg IV and dual antiplatelet therapy with a loading dose of 300 mg of acetylsalicylic acid, plus clopidogrel 600 mg or ticagrelor 180 mg. The radial approach was the first choice of vascular access. Manual thrombus aspiration and use of glycoprotein IIb/IIIa inhibitors were at the discretion of the operator. Dosages of creatine

kinase MB isoenzyme (CK-MB) were performed every 6 hours, until a decrease in the level of this marker was observed.

Definitions

The following risk factors were assessed: smoking - active smoker, or abstinence from smoking occurring in less than 6 months; hypercholesterolemia (low density lipoprotein-cholesterol - LDL-C > 160 mg/dL); systemic arterial hypertension (systolic blood pressure > 140 mmHg and/or diastolic blood pressure > 90 mmHg); diabetes mellitus (two fasting plasma glucose levels > 125 mg/dL on different days); family history of heart disease (atherosclerosis diagnosed in parents or siblings < 55 years for men and < 65 for women); prior manifestation of atherosclerotic disease (previous myocardial infarction, percutaneous or surgical revascularization procedure, stroke); and chronic renal failure (glomerular filtration rate < 60 mL/min or serum creatinine > 1.5 mg/dL).

Regarding electrocardiographic location, acute myocardial infarction was classified as an anterior (anteroseptal, anterior, anterolateral, and extensive anterior) or inferior (inferior, lateral, and dorsal) event. Door-to-balloon time was defined as the interval between hospital admission and crossing of the lesion with a predilation balloon, manual thrombus aspiration catheter, or stent. Angiographic success was defined as a PCI with reduction of target stenosis to $< 20\%$ diameter, maintaining or restoring normal antegrade flow (Thrombolysis in Myocardial Infarction - TIMI grade 3). Major bleeding was defined as a Type 3 or 5 bleeding according to the definition of the Bleeding Academic Research Consortium: type 3 - (3a) bleeding with hemoglobin decrease ≥ 3 and < 5 g/dL or with red blood cell transfusion; (3b) bleeding with hemoglobin decrease ≥ 5 g/dL, or cardiac tamponade, or bleeding requiring surgical intervention, or bleeding requiring the use of intravenous vasoactive drugs; (3c) intracranial hemorrhage, or subcategories confirmed by autopsy, imaging studies, or lumbar puncture, or intraocular bleeding with vision impairment; Type 5 - (5a) likely fatal bleeding; (5b) final fatal bleeding.¹¹

Statistical analysis

Qualitative variables were summarized in absolute frequencies and percentages, and quantitative data were expressed as mean \pm standard deviation. To compare groups, the Chi-squared test or Fisher's exact test for qualitative variables and Student's *t*-test or the Mann-Whitney test for quantitative variables were used. Results with $p < 0.05$ were considered statistically significant.

Results

From April 2010 to December 2014, 2,674 PCIs were carried out; of these, 489 (18.3%) occurred in patients with STEMI in the first 12 hours of symptom onset. Of these patients, 54 (11%) were aged ≤ 45 years (mean 40.7 years, range 36-45 years), and 435 were aged > 45 years (mean 64.2 years, range 46-96 years).

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