

CHARACTERIZATION OF YOUNG PEOPLE WITH ACUTE MYOCARDIUM INFARCTION

CARACTERIZAÇÃO DE PESSOAS JOVENS COM INFARTO AGUDO DO MIOCÁRDIO

CARACTERIZACIÓN DE PERSONAS JÓVENES CON INFARTO AGUDO DE MIOCARDIO

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Objective: to characterize the clinical presentation of young adults diagnosed with acute myocardial infarction. **Method:** a documentary research with a quantitative approach. A form on sociodemographic and clinical aspects was used. The sample consisted of 12 medical records, from patients aged between 25 and 45 years old. The collected data were tabulated in an Excel spreadsheet and, after analysis, were presented in absolute frequencies. **Results:** predominantly males, with Supra ST, aged between 35 and 45 years old, overweight and without family history. Chest pain was found in 91.66% of the young people, 58.33% did not use continuous medication and 100% had troponin elevation and cardiac catheterization. **Conclusion:** the clinical presentation in the studied young population was within the general parameters for acute myocardial infarction diagnosis.

Descriptors: Myocardial Infarction. Risk Factors. Cardiovascular Diseases. Diagnosis. Epidemiology.

Objetivo: caracterizar a apresentação clínica de adultos jovens diagnosticados com infarto agudo do miocárdio. *Método:* pesquisa documental com abordagem quantitativa. Utilizou-se um formulário sobre aspectos sociodemográficos e clínicos. A amostra foi composta por 12 prontuários, de pacientes com idade entre 25 e 45 anos. Os dados coletados foram tabulados em uma planilha do Excel e, após análise, foram apresentados em frequências absolutas. *Resultados:* predominou o sexo masculino, com Supra de ST, faixa etária entre 35 e 45 anos de idade, com sobrepeso e sem antecedentes familiares. Dor torácica foi encontrada em 91,66% dos jovens, 58,33% não faziam uso de medicação contínua e 100% tiveram elevação da troponina e realizaram cateterismo cardíaco. *Conclusão:* o quadro de apresentação clínica na população jovem estudada ficou dentro dos parâmetros gerais para o diagnóstico do infarto agudo do miocárdio.

Descritores: Infarto do Miocárdio. Fatores de Risco. Doenças Cardiovasculares. Diagnóstico. Epidemiologia.

Objetivo: caracterizar el cuadro clínico de adultos jóvenes con diagnóstico de infarto agudo de miocardio. *Método:* investigación documental con enfoque cuantitativo. Se utilizó un formulario sobre aspectos sociodemográficos y clínicos. La muestra estuvo compuesta por 12 registros médicos de pacientes entre 25 y 45 años de edad. Los datos

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se recolectaron en una planilla de Excel y, después del análisis, se presentaron en frecuencias absolutas. Resultados: se registró un predominio del sexo masculino, con Supra de ST, grupo etario de 35 a 45 años, con sobrepeso y sin antecedentes familiares. Se encontró dolor de tórax en el 91,66% de los jóvenes, el 58,33% no tomaban ningún medicamento en forma continua y el 100% tuvo una suba de la troponina y se sometían a cateterismo cardíaco. Conclusión: el cuadro de presentación clínica en la población joven estudiada estuvo dentro de los parámetros generales correspondientes al diagnóstico de infarto agudo de miocardio.

Descriptores: Infarto de Miocardio. Factores de Riesgo. Enfermedades Cardiovasculares. Diagnóstico. Epidemiología.

Introduction

At the beginning of this century, Cardiovascular Diseases (CVDs) assume the behavior of severity and high prevalence previously performed by major communicable diseases⁽¹⁾. According to the World Health Organization (WHO), approximately 18 million people die each year from CVDs, accounting for 31% of all deaths worldwide⁽²⁾. In Brazil, these data are also approaching. In 2015 out of 1,264,174 deaths, just over 27% (349,642 deaths) were due to CVDs⁽³⁾.

CVDs are diseases that affect the heart and blood vessels, including rheumatic heart disease, cerebrovascular disease, ischemic disease, and other conditions⁽²⁾. Among them, the ischemic disease is especially highlighted due to its severity and frequency of involvement. Also called Acute Coronary Syndrome (ACS), it is characterized as a set of signs and symptoms caused by coronary artery obstruction due to the interaction between thrombotic phenomena and vasospasm⁽⁴⁾.

Among the coronary heart diseases, Acute Myocardial Infarction (AMI) is a major public health problem that concerns the authorities when considering irreversible damage, limitations and dependencies, as well as the psychosocial and economic damage resulting from this condition⁽⁴⁻⁵⁾. Circulatory diseases have been for some time leading the ranking of mortality cases in Brazil, replacing infectious diseases. Among them, the ischemic heart diseases are growing steadily year-by-year, accounting for 32% of all deaths from heart disease. In this sense, AMI deserves even more prominence, as it accounts for 81.2% in this same period⁽³⁾.

In this context of epidemiological transition, there is a concomitant demographic transition marked by increased life expectancy and population aging, which makes the Acute Coronary Syndrome (ACS) onset more frequent. However, recently, when the epidemiological profile is associated with the incidence of AMI, there is a counterpoint in which there is an increase in cases in the young adult population⁽⁶⁾. It is known that 10% of the cases of this disease occur among individuals younger than 45 years old⁽⁷⁾ and that the share of cases in the young adult population is uncommon, as evidenced by international studies, which reveal an incidence ranging from 2 to 10%⁽⁸⁾.

The Brazilian scientific production on acute myocardial infarction in young adults is scarce. There are only three studies proposed to study AMI in this subgroup in Brazil^(3,6-7). Therefore, the results are still rare and controversial. Most prevalent factors in young adults with AMI are smoking, family history, obesity and dyslipidemia. It is noteworthy that the clinical presentation as well as the prognosis present peculiarities due to the etiopathogenic and anatomical characteristics of this young population⁽⁹⁾.

Thus, considering the importance of the theme in the field of public health and the gap that still exists in the scientific environment, it is realized the need to strengthen the existing outcomes and to reveal the peculiar characteristics, if any, of the young population diagnosed with AMI.

The relevance of this research is to produce information about acute myocardial infarction in young people, helping to close the gap in this area of knowledge and stimulate further studies

in this area. Therefore, the question is: What is the profile of young adults diagnosed with acute myocardial infarction?

To answer this question, the objective of this research is to characterize the clinical presentation of young adults diagnosed with acute myocardial infarction.

Method

This is a documentary, exploratory-descriptive research with a quantitative approach based on secondary data from medical records. Data was obtained from electronic medical records (*Smart software*) and selected by non-probability sampling. The research was carried out in the audit department of a medium-sized philanthropic organization, a reference in high complexity and in cardiology, from Salvador, Bahia, Brazil.

The population of this study consisted of 1,505 medical records from young people, aged 25 to 45 years old, diagnosed with AMI, who were admitted via an emergency unit and had already been discharged during the data collection period. Medical records dated from November 2016 to August 2018 were used, considering the screening service implementation beginning in the hospital. Medical records of patients who were still hospitalized, to avoid ethical bias in the research, and those who did not have the necessary complete information were excluded.

For data collection, a form prepared by the researchers was used, which contained information related to sociodemographic and clinical aspects, such as gender, age, Body Mass Index (BMI), family history, risk factors, medications in use, Pathological history, Main complaint, symptoms, altered tests, interventions and indicated medical treatment. After collection, data was tabulated in a spreadsheet of the Microsoft Excel *program* and presented in absolute frequencies after analysis.

The project was approved by the Research Ethics Committee of the Bahian Cardiology Foundation, under Opinion No. 2,873,436 and CAAE 96978918.0.0000.5027.

Results

Between November 2016 and August 2018, 10,436 patients were screened in the emergency room of the organization under study. Of this total, 1,505 (14.42%) corresponded to patients aged between 25 and 45 years old. However, the study *corpus* consisted of 12 medical records of people between 25 and 45 years old, diagnosed with acute myocardial infarction by laboratory tests and altered electrocardiogram, who met the criteria of being young adults with acute myocardial infarction and were discharged from the hospital organization.

Table 1 shows the participants' sociodemographic and clinical characteristics.

Table 1 – Sociodemographic and clinical characteristics of young adults with acute myocardial infarction. Salvador, Bahia, Brazil – Nov. 2016 - Aug. 2018 (N=12) (continued)

Variables	n	%
Age Group (years old)		
25-29	-	-
30-34	1	8.33
35-39	4	33.33
40-45	7	58.33
Gender		
Female	2	16.66
Male	10	83.33

Table 1 – Sociodemographic and clinical characteristics of young adults with acute myocardial infarction. Salvador, Bahia, Brazil – Nov. 2016 - Aug. 2018 (N=12) (continued)

Variables	n	%
Body Mass Index		
Underweight	0	0.00
Ideal weight	2	16.66
Overweight	5	41.66
Obesity Grade I	3	25.00
Obesity Grade II	2	16.66
Obesity Grade III	-	-
Family Background for Acute Myocardial Infarction		
Yes	2	16.66
No	10	83.33
Risk Factors for Acute Myocardial Infarction		
Hypertension	4	33.33
Diabetes	3	25.00
Hypercholesterolaemia	4	33.33
Smoking	3	25.00
Other cardiovascular diseases	-	-
Pre-Admission Medications		
Yes	5	41.66
No	7	58.33
Main Complaint		
Chest pain	11	91.66
Outro(a)	1	8.33
Altered Laboratory Tests		
CK	10	83.33
CK-MB	9	75.00
Troponin	12	100.00
Myoglobin	5	41.66
ECG Change		
Supra Tracking ST	9	75.00
Trackless Supra ST	3	25.00
Pathological Q wave	1	8.33
LV Ejection Fraction		
> or = 55%	4	33.33
< 50%	6	50.00
No information	2	16.66
Indicated Medical Treatment		
Thrombolysis	2	16.66
Cardiac catheterization	12	100.00
Angioplasty	7	58.33
Revascularization of the myocardium	1	8.33

Table 1 – Sociodemographic and clinical characteristics of young adults with acute myocardial infarction. Salvador, Bahia, Brazil – Nov. 2016 - Aug. 2018 (N=12) (conclusion)

Variables	n	%
Hospital Clinical Evolution		
Discharge	12	100.00
Death	-	-

Source: Created by the authors.

Note: Conventional signal used:

- Numeric data equals zero not resulting from rounding.

Discussion

When considering gender, the prevalence of young adults with AMI is 88.33% male, aged 35-45 years old (91.66%), overweight (41.66%) and (25%) with obesity grade I. Thus, the male gender continues to stand out as a relevant risk factor for cardiovascular disease. In the state of São Paulo, Brazil, approximately 50% of men corresponding to the incidence of AMI were identified⁽⁶⁾.

The *Framingham Heart Study*, of 1948, the largest observational study on the subject, shows that infarction is more prevalent in men, with a morbidity 6 times higher than in women, in the age group of 35 to 44 years old. However, after 45 years old, the frequency in females accelerates rapidly and the difference is reduced to a factor of 1 after 75 years old, with a tendency to overtake males after old age⁽¹⁰⁾. In this research, the prevalence of AMI in females occurred in the age group of 40-45 years old, possibly due to its proximity to the menopause period.

There is a possibility that other biological, psychosocial and behavioral factors may also contribute to gender differences in mortality. These variables may include Body Mass Index (BMI), socioeconomic status, frequency of detection and treatment of associated diseases, psychological stress and the therapeutic itinerary of patients seeking medical care⁽¹¹⁾.

AMI is related to several risk factors, as well as its association with older people; however, it is noticed that it is increasing among younger ages. There are references that international

studies and also in Brazil already portray this reality, but it is difficult to define an age that can be used as a parameter to identify in fact which cases of AMI can be considered as early or not⁽⁶⁾.

Another study, aiming to evaluate the differences between young men and women after acute myocardial infarction, the sample field selected was from patients aged 25 to 45 years old⁽⁴⁾. In this research, people in the age group between 25 and 29 years old were not identified, and only one in the age group between 30 and 34 years old. In contrast, there was a research using the maximum age of 55 years old as a cutoff point to characterize the young adult population diagnosed with AMI⁽⁶⁾.

International studies also differ on these data, showing ages below 45, 40 and even 35 years old^(7,9). Atherosclerotic plaque is formed throughout life, initiating, even in youth, the formation of fibroatheroma in the coronary vessel wall. However, the age group that presents responses to an evolution of the atheromatous plaque is over 55 years old⁽¹²⁾.

There are still few studies that focus on the age in which patients have AMI, a fact that can be corroborated by a study that previously reports the difficulty in identifying AMI in the age group of young adult patients, showing a variable of approximately 20% of people under 55 years old who go to the hospital for medical care⁽⁶⁾.

To estimate the severity of cardiovascular disease, the so-called risk scores were created through which it was possible to identify risk factors correlated with the CVDs⁽¹³⁾.

The pioneering and acclaimed *Framingham* study, of 1948, enabled the discovery of some risk factors for the development of heart and cerebrovascular disease. Although *Framingham* study continues to be an epicenter in the world of scientific evidence, other literature shows risk factors that are complementary to those already mentioned, such as coronary disease family history, abdominal obesity, alcoholism and physical inactivity⁽¹⁴⁾. Thus, because genetic propensity points to a risk analysis for cardiovascular diseases, family history should be analyzed, since in the family there are risk factors such as lipid disorders, hypertension, DM or even AMI, in first degree kinship⁽⁵⁾.

A study conducted in the state of Rio de Janeiro indicated 60% of family history as at least one risk factor for CAD⁽¹⁵⁾, in contrast to the findings of this study, in which 83.33% of the youths had no family history of AMI. Among the main risk factors, the following were observed: gender, age, systemic arterial hypertension (hypertension), diabetes *mellitus* (DM), dyslipidemia (LDL and HDL) and smoking. However, specifically the *Framingham* risk score (FRE) estimates the absolute risk of coronary events at 10 years in individuals without any previous CVD, events which are reassessed every 2 and 4 years. Based on these scores, the risk was characterized as low (<10%), moderate (10-20%) and high (>20%)⁽¹⁾.

As it can be seen, there are several risk factors associated with the CVDs, which can be classified as modifiable and non-modifiable factors. Modifiable risk factors include dyslipidemia, diabetes, smoking, physical inactivity, high blood pressure, obesity, and stress; non-modifiable: age, gender and family history⁽¹⁶⁾.

In this research, overweight and obesity Grade I prevailed, with 41.66% and 25.00%, respectively; 33.33% with arterial hypertension and hypercholesterolemia; and 25% with diabetes *mellitus* and smoking. It is noteworthy that one same patient had more than one risk factor, which increases the risk of AMI; and only 16.66% had the ideal weight.

A new study exposed the complexity of young adults developing a healthy lifestyle due

to the susceptibility experienced throughout the days, which includes stress, licit and illicit drug use, physical inactivity and self-consumption of inappropriate food⁽⁵⁾.

The Cardiovascular Prevention Guideline of the Brazilian Society of Cardiology⁽¹⁾ exemplifies different types of CVD risk scores other than the *Framingham*'s, such as the Reynolds Risk Score (RRS), which adds C-reactive protein and family history of coronary disease, estimating the likelihood of AMI, stroke, death, and myocardial revascularization in the period of 10 years⁽¹⁾.

Another Global Risk Score (GRS), which assesses the risk of myocardial infarction, stroke, peripheral vascular insufficiency, and heart failure over the same 10-year period, revealing Low Risk with a score <5% in men and women, intermediate if $\geq 5\%$ and $\leq 20\%$ in men or $\leq 10\%$ in women, and High Risk for GRS > 20% in men and > 10% in women⁽¹⁾. Last but not least, the Lifetime Risk (LTR), which predicts the possibility of an ischemic event in individuals over 45 years old, categorizes High Risk for scores > 39% in men and > 20.2% in women⁽¹⁾. Regarding the clinical presentation, the literature presents some classic manifestations in cases of AMI, such as dyspnea, nausea, vomiting, sweating and chest pain. However, these signs and symptoms will not always be present in all cases of AMI. Thus, 91.66% of the patients had chest pain as their main complaint; of these, 50% specified it as retrosternal type⁽¹⁾.

The clinical characteristic of AMI is mixed with angina, present in more than 75% of the individuals, associated with the lack of demand for emergency care and self-medication, which makes early assessment and appropriate treatment difficult⁽¹⁷⁾. Only one patient had malaise, vomiting and dizziness without association with chest pain. Pain is the most relevant sign, and its prompt recognition deserves emphasis. It is usually a typical oppressing chest pain that radiates to the left, right arm, jaw, or neck, and in some cases even as epigastric pain, and may or may not be associated with the aforementioned symptoms⁽¹⁸⁾.

Regarding the use of medications before hospitalization, the majority (58.33%) did not use it continuously. Part of the patients (25%) were continuously using only antihypertensive drugs, 8.33% only hypoglycemic agents, 8.33% only hypoglycemic drugs and 8.33% using antihypertensive drugs and associated hypoglycemic drugs.

Acute Coronary Syndrome (ACS) is formed by the unstable angina (UA) triad, non-ST elevation acute myocardial infarction (N-STEMI) and ST-elevation acute myocardial infarction (STEMI). These forms differ in pathophysiology, electrocardiographic finding, and clinical presentation, especially chest pain⁽¹⁾. Of those surveyed, 75% had STEMI on the electrocardiogram (ECG), making it possible in these cases to establish the diagnosis immediately; 8.33% had pathological Q-Wave; 8.33% had left bundle branch block and 16.66% did not show any change compatible with ischemia. The Guideline on STEMI Treatment of the Brazilian Society of Cardiology reveals that being elderly, female, having pacemakers and having Diabetes *Mellitus* and/or Heart Failure are risk characteristics for atypical manifestations of AMI, which may direct the diagnosis to other diseases.

The diagnosis of AMI is based on the clinical presentation, on the electrocardiographic alterations and on the elevation of the biochemical markers of necrosis. In all patients' laboratory tests it was found that the markers of myocardial necrosis were altered, mainly troponin, in 100% of the cases, and that 95% of the patients in the study had more than one alteration of the markers, namely: 83.3% Creatine Kinase (CK), 75% Creatine Kinase MB (CK-MB), 100% Troponin and 41.66% Myoglobin.

Left Ventricular Ejection Fractions (EFs) were also analyzed, as it can help in the diagnosis of AMI by quantifying the cardiac function. In this research, we considered $EF > \text{or} = 55\%$ as normality parameter and $EF < \text{or} = 50\%$ as reduction parameter. This is a biased data in the study, since 16.66% of the medical records did not have such a record. Thus, 50% presented

$EF < \text{or} = 50\%$ and 33.33%, $EF > 55\%$. It is noteworthy that 16.66% had $EF < 40\%$.

Regarding the interventions and treatments indicated, 16.66% underwent thrombolysis, 100% of the patients underwent cardiac catheterization (CATE), 58.33% underwent stenting angioplasty and 8.33% underwent coronary artery bypass grafting, even after thrombolysis. The ideal time between admission and fibrinolytic infusion is estimated to be a maximum of 30 minutes (needle holder time). If the option is primary angioplasty, the maximum time is 90 minutes (balloon holder time). In case of delay in angioplasty above this limit, the patient should undergo fibrinolysis⁽⁵⁾. 100% of the patients were discharged from hospital.

The limitation of the study was that it was performed in only one research site and did not include the medical records of the patients still hospitalized, because this sample was not added when the project was submitted to the research ethics committee. Thus, the data from this research are relevant but cannot be generalized.

Conclusion

The clinical presentation in the young population studied was within the general parameters for the diagnosis of acute myocardial infarction.

The profile of patients diagnosed with acute myocardial infarction was predominantly male, with Supra ST, aged 35 to 45, overweight and without a family history of AMI.

Most had chest pain and did not use continuous medication before hospitalization. All had troponin elevation and cardiac catheterization. It is believed that other studies with more than one field of research may favor the increase of the sample and the emergence of some type of specificity for this age group.

Collaborations:

1 – conception, design, analysis and interpretation of data: Maria Lucila Nobre Moraes

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2 – writing of the article and relevant critical review of the intellectual content: Maria Lucila Nobre Moraes Lima, Jamile Silva Magalhães, Taciana Ferreira dos Santos, Paula Silva Peixoto and Gilmara Ribeiro Santos Rodrigues;

3 – final approval of the version to be published: Gilmara Ribeiro Santos Rodrigues.

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