

Epidemiological and clinical characterization of hypertensive patients with a diagnosis of acute myocardial infarction

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Introduction: arterial hypertension is a chronic disease present in around 30% of the world population; Due to its mechanisms of action, it is a risk factor for the appearance of acute myocardial infarction. **Objective:** to describe the clinical and epidemiological characteristics of hypertensive patients diagnosed with acute myocardial infarction who were treated at the General Teaching Hospital "Dr. Enrique Cabrera" in the period from September 2018 to September 2020. **Method:** observational, descriptive and cross-sectional study in hypertensive patients who suffered from acute myocardial infarction with ST segment elevation. The universe consisted of 166 patients and the entirety of it was worked on. The variables age, sex, cardiovascular risk factors, topography of the infarction, reperfusion treatment, blood pressure control and complications were studied. **Results:** 71,69 % of the patients belonged to the male sex. Smoking was present in 42.41% of the patients. 48,80 % of the infarcts were inferior and 56,02 % of the cases received fibrinolysis in the first six hours after the onset of symptoms. At the time of admission, 86,14 % of the infarcted patients did not keep their blood pressure under control. The most common complication was heart failure, present in 6,02 % of all patients. **Conclusions:** the majority was male. During the hospital phase, the main complication was heart failure, which could be related to the effects of hypertension on the heart.

Keywords: Hypertension; Myocardial Infarction; ST Elevation Myocardial Infarction; Heart Failure; Tobacco Use Disorder.

Blood pressure was first recorded by Carl Ludwin in 1847. Later, after several attempts, Samuel Von Basch created a cuff that was inflated with water and compressed the arteries until obliterating them; then this water was replaced by air in 18891.

Arterial hypertension (AHT) is considered a disease of multifactorial origin and hereditary, environmental, hemodynamic, and humoral factors stand out in its pathophysiology. An important role of atrial natriuretic peptide and others such as neuropeptide G2 has also been reported.

Currently, HT affects 30 % of the world's adult population. It is estimated that it causes the death of 7,5

million people each year, which represents 13 % of all deaths worldwide³.

In Cuba, AHT is the chronic non-communicable disease with the highest prevalence; in the year 2020, it was 2302 per 1 000 inhabitants, with a majority of women, with a rate of 249,3 per 1 000 inhabitants. Havana is the fourth province in the country with the highest prevalence of this disease with 251,9 per 1 000 inhabitants, only behind Sancti Spíritus, Matanzas, and Villa Clara⁴.

Due to its action on the blood vessels, arterial hypertension, causes mechanical lesions in their intimal tissues and increases the aggregation of monocytes with the formation of fatty stretch marks; After a series of metabolic processes, fibrous plaques are formed; these plaques can ulcerate and rupture, leading to thrombotic obstruction; if this process occurs in the heart, it can cause acute myocardial infarction (AMI); it also causes hypertrophy of the cardiac musculature, which increases oxygen demand⁵.

For this reason, HT is a risk factor for cardiovascular diseases and is considered the main one among them. In Cuba, as in the rest of the world, heart disease is the leading cause of death at all ages, with 29,939 deaths in 2020^{3,4}.

Taking into account the clinical characteristics of hypertensive patients who suffered myocardial infarction makes it possible to draw up preventive strategies to reduce risk factors and associated complications, which

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Conflict of interest

The authors declare no conflict of interest.

facilitates the actions of health personnel and makes it possible to allocate resources according to needs and achieve a better control of these entities.

For this reason, it was decided to conduct this research to describe the clinical and epidemiological characteristics of hypertensive patients diagnosed with acute myocardial infarction who were treated at the “Dr. Enrique Cabrera” General Teaching Hospital in Havana in the period from September 2018 to September 2020.

METHOD

Type of study: an observational, descriptive, and cross-sectional study was conducted in patients treated at the Coronary Care Unit of the “Dr. Enrique Cabrera” General Teaching Hospital in Havana, Cuba in the period from September 2018 to September 2020.

Universe and sample: a universe of 166 hypertensive patients older than 18 years old, who suffered an acute myocardial infarction (AMI) with ST-elevation (STEMI), diagnosed through their clinical characteristics, the electrocardiographic study, and the increase of specific enzymes of myocardial damage; who had complete data to carry out the study were studied. The entire universe was studied.

Variables and data collection: the variables used were age, sex, cardiovascular risk factors⁶, topography of AMI according to electrocardiographic leads with modification of their normal patterns, reperfusion treatment (fibrinolysis before and after 6 hours from the onset of symptoms, percutaneous transluminal coronary angioplasty, and no treatment), blood pressure monitoring and complications during admission.

The data collection forms of the Cuban Registry of Acute Myocardial Infarction (RECUIMA) of the hospital, the databases, and the individual medical records of the patients were reviewed.

Statistical processing: the data obtained from the selected patients were entered into a Microsoft Excel spreadsheet to be processed by descriptive statistical methods (distribution of absolute and relative percentage frequencies).

Ethical standards: the research complied with the Declaration of Helsinki approved at the 18th World Medical Assembly in 1964 and ratified at the 64th General Assembly in October 2013. Confidentiality was maintained at all times regarding the identity of the patients and the results obtained were not used for other purposes outside the framework of the research. The study was approved by the Ethics Committee and the Scientific Council of the institution.

RESULTS

Male sex was the most distinctive in all age groups, representing 71,69 %. The 30,72 % belonged to the age group between 50 and 59 years old (Table 1).

Table 1. Distribution of patients with arterial hypertension who suffered ST-segment elevation myocardial infarction according to age group and sex. “Dr. Enrique Cabrera” General Teaching Hospital. September 2018 to September 2020

Age group (years)	Sex				Total	
	Male		Female		No.	%
	No.	%	No.	%		
40-49	15	9,04	3	1,81	18	10,84
50-59	34	20,48	17	10,24	51	30,72
60-69	35	21,08	13	7,83	48	28,92
70-79	22	13,25	11	6,63	33	19,88
≥ 80	13	7,83	3	1,81	16	9,64
Total	119	71,69	47	28,31	166	100

Source: Cuban registry of acute myocardial infarction, databases, and individual medical records..

Smoking was the most frequent risk factor, independently of arterial hypertension, with 95 patients (42,41 %) (Table 2).

Table 2. Distribution of patients according to other coronary risk factors.

Risk factors	No.	% (n=224)
Smoking habit	95	42,41
Diabetes mellitus	53	23,66
Obesity	22	9,82
Dyslipidemia	20	8,93
PPH* of ischemic heart disease	18	8,04
Others	14	6,25
Chronic kidney disease	2	0,89

*PPP: personal pathological history.

Taking into account the location of STEMI according to the affected electrocardiographic leads, 48,8 % of the patients had an inferior myocardial infarction (Table 3).

Table 3 Distribution of patients according to the topography of ST-segment elevation acute myocardial infarction.

Topography of acute myocardial infarction	No.	% (n=166)
Inferior	81	48,8
Anterior	70	42,17
Combined	9	5,42
Lateral	6	3,61

Of the total number of patients, 98 received fibrinolysis, 93 of them within the first six hours from the onset of symptoms (Table 4).

Reperfusion therapy	No.	% (n=166)
Fibrinolysis < 6h	93	56,02
No treatment	67	40,36
Fibrinolysis > 6h	5	3,01
PTCA*	1	0,60

*PTCA: percutaneous transluminal coronary angioplasty.

Eighty six point fourteen percent of the total, did not maintain adequate blood pressure.

Among the complications, heart failure was present in 6,02 % of patients (Table 5).

Complications	No.	% (n=166)
Heart failure	10	6,02
Cardiogenic shock	8	4,82
Arrhythmia	6	3,61
Cardiorespiratory arrest	6	3,61
Encephalic vascular accident	1	0,60
Death	1	0,60

DISCUSSION

Around 85 % of the patients who suffer acute myocardial infarction, are considered to have a history of hypertension so this condition constitutes the main risk factor for ischemic heart disease^{7,8}.

This study showed that among hypertensive patients who developed STEMI, the majority were men in all age groups, with the highest number of men between 50 and 59 years old.

This corresponds to the higher incidence of STEMI in men compared to women, which has been corroborated in numerous studies^{9,10,11,12,13}. This risk becomes equal in both sexes as the years go by and the protective effects of estrogens are lost in women, which means that in the postmenopausal stage they even surpass the risk in men¹³.

Among the risk factors, without taking into account HT, smoking was the most frequent, followed by diabetes mellitus, a result that corresponds to other studies^{14,15}.

Smoking is considered to be the main cause of cardiovascular disease and die in consequence, and is preventable. Among its effects is that caused by the relationship between nicotine consumption, the increase in adrenaline, and the hemodynamic effect that brings with it a remodeling of the structures of the heart and blood vessels¹⁶.

On the other hand, there is a close relationship between diabetes, heart disease, and cardiovascular events. The accumulation of glucose in the blood progressively damages the blood vessels and accelerates the process of arteriosclerosis¹⁷.

The relationship of these risk factors with the sustained increase in blood pressure makes patients very vulnerable to ischemic heart disease.

As in other studies^{9,12,15} there was found that the greatest number of infarctions were located in the inferior aspect of the heart, followed by those in the anterior aspect.

As it has been demonstrated, anterior infarctions are more extensive and have a worse prognosis, since the anterior descending artery generally irrigates a larger myocardial mass compared to the other coronary arteries, which increases mortality and many of these patients with anterior infarctions arrive at emergency centers already dead, and therefore, the registry is lower compared to inferior infarctions¹⁸.

In this study it was documented that most patients underwent reperfusion therapy using fibrinolysis, the greatest number of these given in the first six hours after the onset of symptoms.

Reperfusion therapies are considered to be the most effective measures to restore the balance between oxygen needs and oxygen supply to the cardiac muscle at risk in the initial phase of ST-elevation acute myocardial infarction¹⁹.

In Cuba, the most widely used of these methods is thrombolysis, since it is implemented to be administered, even in Primary Health Care. Numerous investigations have shown a decrease in mortality when applied in a timely manner^{19,20,21}.

The benefit obtained in the first hour is much greater since mortality is reduced by 50 %. Between the first and twelfth hours, the differences are not very relevant and a reduction in mortality of around 30 % can be achieved. In this period the amount of myocardium that recovers is not very important and the benefit seems to be related to a decrease in mortality due to arrhythmias^{20,22}.

This study showed that a large proportion of patients did not receive any reperfusion therapy. Unfortunately, excessive delays in arrival at the hospital, contraindications, and uncertain diagnosis, among other factors, mean that fibrinolytic treatment is not applied, which means that the prognosis of patients without this type of treatment will not be the best²³.

On admission it was found that, only a minority of patients had controlled blood pressure levels. It has been shown that of the entire population of hypertensive patients worldwide, only 11,8 % are monitored. Antihypertensive therapy reduces the risk of coronary heart disease by 10 to 20 %. An increase in blood pressure of 20 mmHg above normal, increases mortality from cardiovascular disease twofold²⁴.

Heart failure is a frequent complication in the

acute and subacute phase of infarction, although it can also occur as a consequence of other complications. Clinically, it can range from almost asymptomatic ventricular dysfunction to more severe clinical manifestations secondary to a state of cardiogenic shock. These were the two main complications that occurred most frequently in the patients in this study, which is consistent with other investigations^{10,25}.

These consequences may be directly related to HT because this disease is a risk factor for developing heart failure with or without reduced ejection fraction. Hypertensive patients have worse clinical outcomes and increased mortality due to heart failure².

The work with hypertensive patients is of vital importance to try to maintain control of hypertension and reduce other factors such as smoking and thus achieve a reduction in AMI. Knowing and preventing the main complications in these cases can reduce mortality in these patients.

A limitation of the study is that it was not possible to know the evolution of these patients after medical discharge, and therefore late complications and mortality were not studied.

CONCLUSIONS

The patients were mostly male and the group age 50 to 59 years old had the highest number of cases. Smoking was the first risk factor after hypertension; most of the infarcted patients did not maintain adequate blood pressure control, which may be related to the fact that the main complication was heart failure.

AUTHORSHIP

Lázaro Puig-Benítez: conceptualization, methodology, original draft-writing, drafting-reviewing and editing.

Francys Franquiz-Lopez: conceptualization, drafting-reviewing and editing.

Julio César Besada-Morales: validation, drafting-reviewing and editing, validation-verification.

Eliam Joel Erranti-Valdes, Yoan José Aguilar-Cuscó and Guillermo Masó-Planche: formal analysis, research, data curation, methodology.

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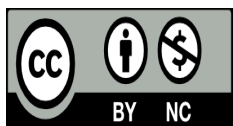
Caracterización clínica y epidemiológica de pacientes hipertensos con diagnóstico de infarto agudo de miocardio

RESUMEN

Introducción: la hipertensión arterial es una enfermedad crónica que está presente en alrededor del 30 % de la población mundial; por sus mecanismos de acción es un factor de riesgo para la aparición de infarto agudo de miocardio. **Objetivo:** describir las características clínicas y epidemiológicas de pacientes hipertensos diagnosticados con infarto agudo de miocardio que fueron

atendidos en el Hospital General Docente "Dr. Enrique Cabrera" en el periodo de septiembre de 2018 a septiembre de 2020. **Método:** estudio observacional, descriptivo y transversal en pacientes hipertensos que padecieron infarto agudo de miocardio con elevación del segmento ST. El universo fue de 166 pacientes y se trabajó con la totalidad del mismo. Se estudiaron las variables edad, sexo, factores de riesgo cardiovascular, topografía del infarto, tratamiento de reperfusión, control de la presión arterial y complicaciones. **Resultados:** el 71,69 % de los pacientes perteneció al sexo masculino. El hábito de fumar estuvo presente en el 42,41 % de los pacientes. El 48,80 % de los infartos fue de cara inferior y el 56,02 % de los casos recibió fibrinólisis en las primeras seis horas del comienzo de los síntomas. Al momento del ingreso el 86,14 % de los infartados no mantenía controlada su presión arterial. La complicación más común fue la insuficiencia cardiaca presente en 10 pacientes. **Conclusiones:** los pacientes fueron mayormente del sexo masculino y el grupo de 50 a 59 años fue el de mayor número de casos. El mal hábito de fumar fue el primer factor de riesgo después de la hipertensión arterial; la mayoría de los infartados no mantenían un control adecuado de la presión arterial, lo que puede estar relacionado con que la principal complicación fue la insuficiencia cardiaca.

Palabras clave: Hipertensión; Infarto de Miocardio; Infarto de Miocardio con Elevación del ST; Insuficiencia Cardíaca; Tabaquismo.



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