CorSalud 2020 Jul-Sep;12(3):254-266

CorSalud

Cuban Society of Cardiology

Original Article

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Characterization of mortality due to ST-segment elevation acute myocardial infarction at the *Hospital Arnaldo Milián Castro* (Cuba): A 6-year study

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Este artículo también está disponible en español

ARTICLE INFORMATION

Received: April 13, 2020
Accepted: May 21, 2020

Competing interests
The authors declare no competing interests.

Abbreviations
AMI: acute myocardial infarction
CRF: coronary risk factors
CVD: cardiovascular diseases
HBP: high blood pressure

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ABSTRACT

Introduction: Cardiovascular diseases account for the largest number of deaths worldwide each year; reason why they are considered a real scourge for humanity. Ischemic cardiomyopathy ranks high among them as it exhibits the highest global mortality rates.

Objective: To characterize deceased patients diagnosed with acute myocardial infarction.

Method: A cross-sectional descriptive study was carried out with 158 patients who died from acute myocardial infarction in the *Hospital Provincial Universitario Arnaldo Milián Castro* of Santa Clara, Villa Clara (Cuba), from 2013 to 2018.

Results: Males (83; 52.5%) between 70 and 79 years of age (66; 41.8%) predominated. A total of 104 deceased (65.8%) presented at least four risk factors with individual predominance of high blood pressure (122; 77.2%), diabetes mellitus (108; 68.4%) and dyslipidemia (99; 62.7%). The clinical presentation was typical in both sexes (male 39 and female 55), large anterior wall myocardial infarction prevailed, and thrombolysis was performed in 51 cases (32.3%) before the first 12 hours of onset of symptoms. Left ventricular dysfunction was the most frequent complication (42.4%). No necropsy was performed on 40 cases, which did not allow for the assessment of diagnostic coincidence; however, there was a total coincidence in 86 deaths (54,4%) and a partial coincidence in 25 (15,8%). About 2774 years were not lived and a descending time line was attained.

Conclusions: Mortality from acute myocardial infarction showed a slight downward trend in the number of deaths reported by death certificate, with an average of 25.2 years of life potentially lost.

Keywords: Myocardial infarction, Risk factors, Complications, Mortality

Caracterización de la mortalidad por infarto agudo de miocardio con elevación del segmento ST en el Hospital Arnaldo Milián Castro (Cuba): Estudio de 6 años

RESUMEN

Introducción: Las enfermedades cardiovasculares aportan el mayor número de defunciones anuales en todo el planeta, por lo que son consideradas un verdadero azote para la humanidad; dentro de estas, cobra relevancia especial la cardiopatía isquémica por exhibir las mayores tasas de mortalidad universal.

Authors' contribution
JMPU and AAH: Conception and design of the research; data collection, analysis and interpretation and writing of the manuscript.
DPS: Analysis and interpretation of data and help in writing the manuscript.
All authors critically reviewed the manuscript and approved the final report.

Objetivo: Caracterizar a los pacientes fallecidos con diagnóstico de infarto agudo de miocardio.
Método: Se realizó un estudio descriptivo transversal con 158 pacientes fallecidos por infarto agudo de miocardio en el Hospital Provincial Universitario Arnaldo Milián Castro de Santa Clara, Villa Clara (Cuba), de 2013 a 2018.
Resultados: Predominaron los fallecidos del sexo masculino (83; 52,5%) con edades entre 70 y 79 años (66; 41,8%); 104 fallecidos (65,8%) presentaron al menos cuatro factores de riesgo, con predominio individual de la hipertensión arterial (122; 77,2%), la diabetes mellitus (108; 68,4%) y la dislipidemia (99; 62,7%). La presentación fue típica en ambos sexos (masculino 39 y femenino 55) con localización mayormente anterior extenso y se realizó trombólisis en 51 casos (32,3%), antes de las primeras 12 horas de iniciados los síntomas. La complicación más frecuente fue la disfunción ventricular izquierda (42,4%). No se pudo evaluar la coincidencia diagnóstica en 40 casos, porque no se les practicó necropsia; pero se coincidió totalmente en 86 fallecidos (54,4%) y de forma parcial en 25 (15,8%). Se dejaron de vivir 2774 años y se obtuvo una línea del tiempo descendente.
Conclusiones: La mortalidad por infarto agudo de miocardio mostró una ligera tendencia a la disminución de los fallecidos informados por certificado de defunción, con un promedio de 25,2 años de vida potencialmente perdidos.
Palabras clave: Infarto de miocardio, Factores de riesgo, Complicaciones, Mortalidad

INTRODUCTION

For several decades, cardiovascular diseases (CVD) have been among the leading causes of death in many countries around the world, reason why they are considered a scourge for mankind. Among them, coronary artery disease −exhibiting the highest global mortality rates− is the main cause of morbidity and mortality in developing countries[1]. Hence, a number of authors have considered proposing the term epidemic[2,3].

Ischemic heart diseases are often a group of diseases of atherosclerotic origin that involve the coronary artery blood vessels and cause ischemia and myocardial infarction. Most of their clinical manifestations are medical emergencies per se[2,4].

Cardiovascular disease accounts for more than 25% of overall mortality in the U.S. Their records show an increasing trend in the incidence of acute myocardial infarction (AMI), as well as in-hospital mortality; CVD is considered to be responsible for 14.2 years of life potentially lost with a considerable direct or indirect monetary cost to the American society[5-8]. In Mexico, ischemic heart disease accounts for 41.9% of all annual deaths due to coronary syndromes and, in turn, reports 69.4% of the total number of deaths in that country. Similarly, on the European continent, a country like Spain has 40% mortality and 60% deaths from cardiac causes in general. Studies such as REGICOR show mortality rates of up to 183 per 100.000 inhabitants in this region[8-10].

Certainly, AMI mortality has varied as treatment has improved, since in the first half of the 20th century it was limited to clinical observation. Coronary care units emerged in the mid-1970s and focused on early detection and treatment of cardiac arrhythmias[11-16]. Percutaneous coronary intervention arose shortly thereafter, with the aim of reperfusing the infarction-related artery as early as possible[6].

In Cuba, heart disease accounts for almost a quarter of all deaths in the country, being the leading cause of death −more than 20. 000 people die annually from CVD− and the third cause of years of life potentially lost. Lethality remains high, almost half of the individuals suffering from AMI die, at the expense of out-of-hospital lethality, although there is a downward trend[17]. In 2013, AMI mortality reached 24.5% of all deaths from CVD and 43.4% of mortality from ischemic heart diseases, with a higher incidence in the population aged 60-79 years[18]. It hit a gross mortality rate of 149.1 per 100.000 inhabitants, while statistics show an upward trend, reaching 241.6 in 2017[19].

That same year, the Villa Clara rate was 247.3 per 100.000 inhabitants (1939 deaths) and ranked fifth in incidence (210.0 deaths from CVD per 100.000 inhabitants), as it did in 2013[18]. However, this rate puts it in third place overall in the country, followed by Havana and Matanzas[19].

Acute coronary syndromes exhibit high lethality. In most cases, death occurs quickly after the onset of symptoms, so the time to seek qualified medical attention should be reduced to the minimum possible[10,20,21].

Prolonging the quantity and quality of human life is the key objective of any health system; therefore, death is its greatest failure. Analyzing and learning from death should be a compulsory and systematic activity. Therefore, the autopsy is critical since it evaluates care processes[21].

In the last 10 years the Cardiology Department of the *Hospital Provincial Universitario Arnaldo Milián Castro* has assisted 3546 patients with AMI; of which 815 (23.01%) died. Since no studies have been carried out on this disease for more than five years, we have proposed several objectives in our paper, namely, to characterize, from the clinical epidemiological point of view, deceased patients diagnosed with AMI, identify their complications, determine the diagnostic coincidence between the clinical causes of death and the results of the pathological anatomy, and estimate the years of life potentially lost.

METHOD

A developmental research was carried out through a descriptive cross-sectional study in 158 patients who died from ST-segment elevation myocardial infarction at the *Hospital Provincial Universitario Arnaldo Milián Castro* in Santa Clara (Cuba), during 6 years, from 2013 to 2018. The cases, with a complete medical history, were selected by non-probability sampling.

Data collection and processing

The information was obtained from individual medical records, autopsy protocols from the Department of Pathological Anatomy and the death registry from the Hospital Statistics Department.

Frequency distribution tables with absolute values (number of cases) and relative values (percentages) were completed. Mean and mode were determined in the variables requiring it for better presentation, as well as the standard deviation as a measure of variability. From the inferential point of view, the proportion difference test was applied in order to test whether the percentage differences had a high statistical value (p 0.05). In addition, the correlation coefficient and the corresponding trend line for the time series were used for lethality analysis.

Ethical considerations

As the study was conducted on patients who died from AMI, the results were indicators of the medical service provided by the hospital in the period analyzed and can be used for improvement; reason enough to assume responsibility for using study data solely for research purposes and publish/apply results only with the consent of the institution.

RESULTS

Males predominated 83 (52.5%) and there were 66 cases (41.8%) in the 70-79 age group (**Table 1**), reaching a statistically significant association; distributed equally among men and women.

Table 2 summarizes the comorbidities according to sex; 122 cases with high blood pressure (HBP) were found, for 77.2% of the total of deaths and 108 cases with diabetes mellitus (68.4%). High percentages of dyslipidemia (62.7%) and smoking (58.9%) were also found. According to sex, the proportions in HBP, diabetes mellitus, and smoking were lower in women, but this association was statistically significant for both sexes ($p<0.0001$).

Among female patients, 55 (34.8%) had a typical AMI presentation (**Figure 1**)., as did 59 male patients (37.3%); which adds up to 114 cases with this form of presentation, also with statistical significance in both sexes ($p<0.0001$).

A predominance of large anterior infarction (57 cases; 36.1%) was found when assessing the association between topography of the infarction and sex (**Table 3**) with a similar distribution in both sexes (men 36.1% vs. 36.0 women), followed by inferior wall myocardial infarction with or without right ventricular involvement (24.7%) and a similar sex distribution; results that yielded statistical significance.

Ventricular dysfunction was the main complication of myocardial infarction (**Table 4**), found in 67 deceased (42.4%); 50 (43.9%) with typical AMI presentation and 17 (38.6%) with atypical AMI presentation ($\chi 2=0.03$; $p<0.0001$). Followed in frequency by cardiorespiratory arrest (29.7%), with more similarity between both forms of presentation (30.7 vs. 27.3%).

Figure 2 shows the correspondence between the clinical diagnosis of death and the results of anatomophysiological studies. It should be noted that necropsy was not performed on 40 of the deceased (25.3%). In the remaining 118, correspondence was obtained in 111, of which the diagnostic

Table 1. Distribution of deceased patients with ST-segment myocardial infarction according to age and sex. *Hospital Arnaldo Milián Castro* (Villa Clara, Cuba) 2013 – 2018.

Age groups (years)	Sex				Total	
	Male		Female			
	Nº	%	Nº	%	Nº	%
Under 50	2	2.4	3	4.0	5	3.2
50 - 59	2	2.4	6	8.0	8	5.1
60 - 69	21	25.3	10	13.3	31	19.6
70 - 79	**33**	**39.8**	**33**	**44.0**	**66**	**41.8**
80 years up	25	30.1	23	30.7	48	30.4
Total	**83**	**52.5**	75	47.5	158	100.0

χ^2_{male}=0.24; p<0.0001 – χ^2_{female}=0.11; p<0.0001
Source: Research database

Table 2. Distribution of deceased patients according to comorbidities and sex.

Comorbidities	Sex				Total	
	Male		Female			
	Nº	%	Nº	%	Nº	%
High blood pressure	**65**	**78.3**	**57**	**76.0**	122	77.2
Diabetes mellitus	**60**	**72.3**	48	64.0	108	68.4
Dyslipidemia	50	60.2	**49**	**65.3**	99	62.7
Smoking	**49**	**59.0**	44	58.7	93	58.9
Previous ischemic heart disease	16	19.3	**19**	**25.3**	35	22.2
Previous stroke	4	4.8	2	2.7	6	3.8
Chronic obstructive pulmonary disease	2	2.4	2	2.7	4	2.5
Peripheral artery disease	3	3.6	1	1.3	4	2.5

χ^2_{male}=0.89; p<0.0001 – χ^2_{female}=0.54; p<0.0001

Table 3. Distribution of deceased patients according to topography of the infarction and sex.

Topography of the infarction	Sex				Total	
	Male		Female			
	Nº	%	Nº	%	Nº	%
Large anterior MI	30	36.1	27	36.0	57	36.1
Inferior wall MI	10	12.0	11	14.7	21	13.3
Inferior wall MI with RV involvement	10	12.0	8	10.7	18	11.4
Anteroseptal MI	12	14.5	5	6.7	17	10.8
Septal MI	8	9.6	8	10.7	16	10.1
Anterior MI	8	9.6	7	9.3	15	9.5
anterolateral MI	5	6.0	9	12.0	14	8.9
Total	83	52.5	75	47.5	158	100.0

χ^2_{male}=0.39; p<0.0001 – χ^2_{female}=0.19; p<0.0001
MI, myocardial infarction; RV, right ventricle

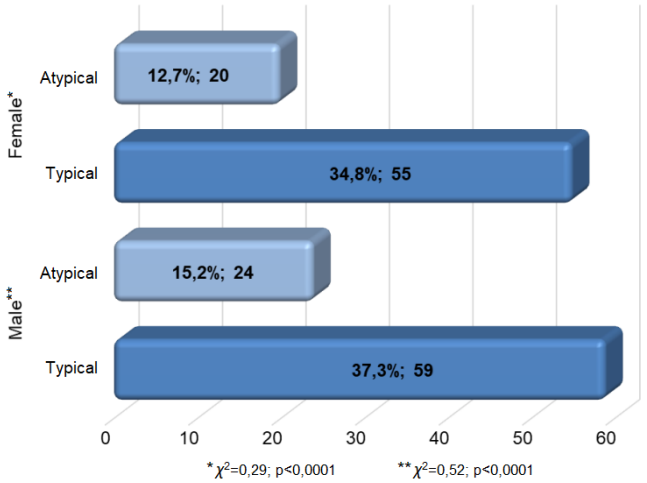

Figure 1. Distribution of deceased patients according presentation form of infarction and sex.
Source: Research database.

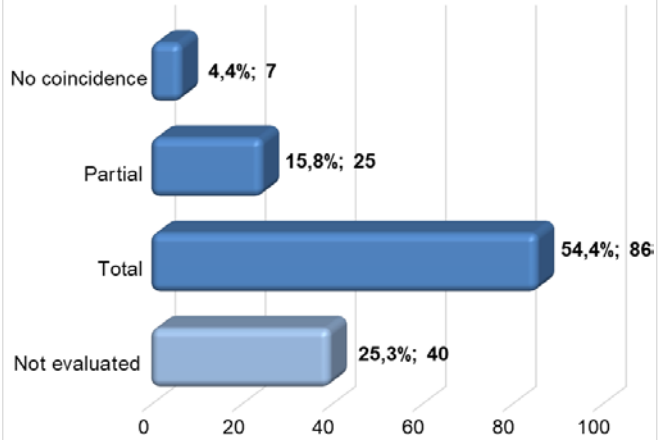

Figure 2. Distribution of deceased patients according to the clinical and pathological coincidence of the diagnosis.

coincidence was total in all causes of death in 86 cases: a 54.4% of the total sample and 72.9% of those who had necropsy. The clinical diagnosis did not coincide with the cause of death in only 7 cases (4.4%).

Table 5 shows that 110 patients died from AMI before reaching the years corresponding to their life expectancy at birth; that is to say, 69.6% of the total number of deceased died prematurely. The number of years not lived (2.774) by age group reflected a loss of 1.385 years in the cases between 70 and 79 years old, and 1.037 in the group between 60 and 69 years old; therefore, the global average of years of life potentially lost was 25.2 years; most striking between 60 and 69 years (33.5 years) and in those under 50 (31.4 years).

The mortality trend shows a negative slope line (**Figure 3**), despite the fact that from 2016 onwards there is an increase of 5 deaths in 2017 and 2018. In addition to the negative-slope trend line, the small modular value predicts a slight decrease in the number of deaths, even though the value of R2 (0.296) provides a correlation coefficient of 0.54 that only ensures that the relationship is weak; but there was a downward trend in deaths from AMI.

DISCUSSION

To reduce mortality from AMI, it is necessary not only to have the quantity and quality of personnel required in conjunction with material resources, but also to have updated and reliable information on patients who die from this cause in order to make sound treatment decisions, according to the resources available; especially in low or middle income countries.

In our study we found that the number of deaths is higher in men than in women, proportionally increasing with age, but being more frequent between 70 and 79 years. The Third Na-

Table 4. Distribution of deceased patients according to complications and presentation form of infarction.

Complications	Forms of presentation				Total	
	Typical		Atypical			
	Nº	%	Nº	%	Nº	%
Ventricular dysfunction	**50**	**43.9**	**17**	**38.6**	67	42.4
CRA in asystole	35	30.7	12	27.3	47	29.7
Malignant arrhythmias	10	8.8	8	18.2	18	11.4
Cardiogenic shock	8	7.0	6	13.6	14	8.9
Cardiac rupture	9	7.9	1	2.3	10	6.3
III degree AVB	2	1.8	0	0.0	2	1.3
Total	114	72.2	44	27.8	158	100.0

$\chi^2_{typical}$ =2.99; p<0.0183 – $\chi^2_{atypical}$ =0.03; p<0.0001
AVB, atrioventricular block; CRA, cardiorespiratory arrest

Table 5. Years of life potentially lost by age group.

Age groups (Years)	Nº of patients	Number of years			
		Lived	Should live **	Not lived	Average
Under 50	5	233	390	157	31.4
50 - 59	8	429	624	195	24.4
60 - 69	31	1381	2418	1037	33.4
70 - 79*	66	3763	5148	1385	21.0
Total	110*	5806	8580	2774	25.2

* Patients over 79 years of age are excluded.
** According to life expectancy in Cuba for both sexes, from the Health Report 2017[19].

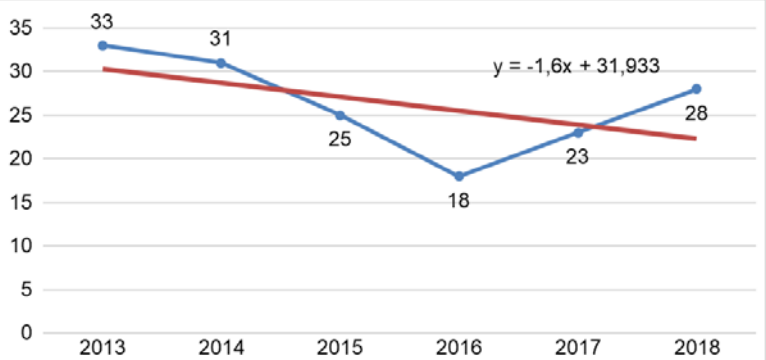

Figure 3. Linear mortality trend due to acute myocardial infarction. R2=0.296; correlation coefficient = 0.54.

tional Registry of Acute Coronary Syndrome (RENASICA III) (by its acronym in Spanish), a multicenter study conducted in Mexico with a hospital cohort, reports similar results; where age over 65 years was an important predictor of in-hospital mortality[22]. Although for years AMI has been considered as a disease that mainly affects males, it has aroused interest as a cause of death among women[23,24]; since they have higher in-hospital mortality, attributable to the older age of presentation of AMI, with an average of 7 to 10 years later than in men[6,25,26]. However, younger women have also shown higher in-hospital mortality rates compared to men, although when variables are adjusted −for example, the severity of coronary artery disease by angiography− 30-day mortality is not found to be significantly different between both sexes[27,28]. However, the female risk profile is considered different from the male one because it is associated with AMI with worse hemodynamic impact and greater in-hospital complications. In addition, other research indicates that women wait longer to seek medical attention, which is why they take longer to receive reperfusion treatment, present with more atypical symptoms (up to 30% of cases), receive fewer interventions[6], are less likely to be admitted to intensive care units[29] and are treated more conservatively, all of which has a recognized impact on prognosis[30].

The knowledge of coronary risk factors (CRF) −included within the comorbidities in this research−, has allowed to act on their control and modification, which positively affects both primary and secondary prevention of CVD, since their impact has been well studied. In general, our results are similar to those of many published studies.

Abreu Reyes *et al*[31], in their study carried out in Villa Clara, found that 94 deaths with autopsy (84.5%) had three or more CRFs, and most of them were 65 years old and older. Although the highest average of risk factors was evidenced in the age group between 45 and 54 years, with an average of 5.8 per patient. For their part, Baena *et al*[32], in 2248 live patients, found 39.1% without CRF, 32.8% with one, 17.5% with two, 6.9% with three, and only 3.7% had four to six CRFs. They explained that the number of these factors showed a statistically significant linear trend, proportional to the presence of coronary artery disease and that the risk of suffering from heart disease in people without risk factors is small, increases progressively with these additional CRFs and is especially high in those with more than three risk factors.

High blood pressure was individually the most frequent CRF followed by diabetes mellitus, dyslipidemia and smoking, all found in more than half of the deceased. This result coincides with other studies,[12,33-36] although some suggest that age, diabe-

tes mellitus and the presence of previous ischemic heart disease are the CRFs most associated with lethality from AMI[35].

Currently, the increasing survival of patients with acute coronary syndromes has led to an increase in the number of cases with chronic coronary disease prone to new cardiovascular events[37]. National investigations agree on the prevalence of HBP in patients who died from AMI: Santos Medina *et al*[38] (87.3%), Santos Rodríguez *et al*[39] (92%) and Escobar García[40] (85.5%).

Abreu Reyes *et al*[31] report higher frequency of dead patients with typical chest pain, as well as cases with acute pulmonary edema and cardiorespiratory arrest; and, less frequently, syncope and atypical chest pain. Data from observational studies have demonstrated the limitations of anamnesis to identify patients with AMI. Indeed, Kannel and Abbott[41], and Caballero Oliva *et al*[42] found that about 25% of infarctions were not recognized in the first consultation, due to the absence of pain or presence of atypical symptoms. In contrast, Prieto Dominguez *et al*[36] reported that most patients had typical presentations of the cardiovascular event.

An estimated 2-4% of patients who arrive at the UK emergency services do so due to chest pain[43] and Gutiérrez *et al*[44] find pain as the predominant symptom in a third of geriatric patients. Other symptoms and signs are: dyspnea, confusion, acute pulmonary edema, hemiplegia and shock[43-47]. The onset of symptoms and their identification is paramount, since from their early detection an appropriate treatment can be implemented with greater chances of survival.

Our results concerning the topography of the infarction coincide with a number of national and international investigations. Novo Choy *et al*[45] and Abreu Reyes *et al*[31] in Santa Clara, Escobar García[40] in Camagüey and Cabrera Rego[48] in Havana, found higher mortality in patients with anterior AMI. This last author points out that it was 2.7 times higher than inferior AMI. In contrast, other authors have found predominance of inferior[46] or anterolateral[47] infarctions.

Anterior wall AMIs have higher incidences of hospital complications and mortality than inferior wall AMIs, as they tend to be more extensive and have a worse prognosis, since the left anterior descending artery irrigates a large part of the left ventricle. Furthermore, for physical or geometric reasons, prior infarctions cause more scar enlargement, aneurysms and left ventricular dysfunction, all of which increase the possibility of free wall rupture[4, 5,49]. For its part, lower AMI, a consequence of the occlusion of right or circumflex coronary arteries, is associated with a better prognosis compared to anterior AMI[50]. They are usually less extensive infarctions, with better ventricular function and a lower incidence of complications, except for the presence of complete atrioventricular block, which responds to extensive infarctions and is associated with higher mortality due to multivessel disease, that also compromises the left anterior descending artery[51].

Thrombolytic treatment is one of the first to be applied in the acute phase and, in many cases, mortality is related to its absence. Since large clinical trials with intravenous thrombolytic agents in the 1980s yielded impressive results, flow restoration in the artery responsible for AMI has been shown to be associated with increased survival52. The success of any reperfusion strategy (thrombolysis or primary angioplasty) depends on time, hence the phrase "time is muscle". It has even been suggested that delaying reperfusion means denying it[52], along with all the benefits it may bring[53-58].

Hospital mortality due to AMI largely depends on the severity of left ventricular dysfunction[59]. The clinical practice guidelines of the European Society of Cardiology[6] recognize that mortality in patients with Killip Kimball I functional class is around 6%, while in Killip Kimball IV functional class is close to 80%. Post-mortem studies have shown the presence of new or old infarction in patients with cardiogenic shock, compromising more than 40% of the myocardial mass[60].

Left ventricular dysfunction due to extensive myocardial ischemia is the main mechanism of cardiogenic shock in AMI, reaching 78.5% in some investigations. Following it by far are mechanical complications, acute mitral regurgitation, rupture of the interventricular septum, predominant right ventricular infarction and cardiac tamponade[61]. However, cardiogenic shock, despite its extremely high lethality, is not the only cause of mortality in the acute phase of AMI, since ventricular arrhythmias also have a recognized role.

Abreu Reyes *et al*[31] found cardiogenic shock to be the most frequent complication, followed by conduction disorders, pump failure, and severe cardiac arrhythmias. Sánchez Ábalos *et al*[3], malignant ventricular arrhythmias and complete atrioventricular block, and Santos Medina *et al*[38], ventricular fibrillation/tachycardia (27.3%) and complete atrioventricular block (23.6%).

Other studies agree that atrioventricular conduction blocks are more frequent[62]. Plain Pazos *et al*[63], found that 25% of the deceased presented some degree of this type of blockage, and Rodríguez Díaz *et al* [64] reported 15.57% of advanced atrioventricular block. These conduction disorders are more frequent in inferior AMI but can occur in anterior wall AMIs with proximal occlusion of the left anterior descending coronary artery, which is related to high mortality[59]. Since they are generally secondary to extensive infarctions, with a higher incidence of heart failure and hemodynamic complications, they are associated with a poor prognosis. Ischemia, edema and necrosis of the conduction system have been the mechanisms involved in the genesis of these disorders, in addition to autonomic nervous system impairment due to increased parasympathetic tone, electrolyte imbalances and systemic hypoxia, among others[59].

On the other hand, Rodríguez *et al*[64], also identified cardiogenic shock as the most frequent complication (41.8%) in the deceased studied, followed by severe cardiac arrhythmias (35.24%); while recurrent angina and cardiac arrhythmias predominate in patients discharged alive[56,65-67].

A better understanding of the pathophysiology of acute coronary syndromes, the introduction of new drugs and the application of new myocardial revascularization strategies have allowed a progressive reduction in mortality from AMI in patients admitted to healthcare centers prepared for evaluation, diagnosis and treatment. Despite this, the incidence of post-infarction cardiogenic shock has remained stable and leads the list of direct causes of death in relation to AMI[68]. In contrast, in-hospital death due to severe tachyarrhythmias, although still significant, has decreased[69], partly thanks to the development of intensive coronary care units. In general, the probability of dying during hospitalization due to AMI has been estimated to be 25% higher in hospitals lacking these units[66].

It is worrying that in our research 69.6% of patients died from AMI before reaching the age corresponding to their life expectancy at birth. Although in Cuba road accidents, followed by CVD and perinatal accidents are the ones that provide the highest rate of years of life potentially lost (premature mortality)[19]. Research in Matanzas shows that out of a total of 217 patients who died from AMI, the total number of years lost was 3317, with an individual average of 15.3 years of life lost[70]. These data are much lower than those found in our study (25.2 years), probably related to the increase in the number of deaths from this disease at ages below life expectancy at birth.

Mortality trend over time in our research shows a line with a negative slope that increases in the last two years, which could be explained because CVDs in the Villa Clara population are among those with the highest incidence and prevalence in the country. Statistics from 2017 show that in the province of Villa Clara 8.396 people over 15 years of age died, 6.703 in the 65-and-over age group, and 1.939 due to heart disease, which places this condition as the first cause of death with a crude rate of 247.3 and an adjusted rate of 95.2 per 100 000 inhabitants. It cannot be ignored that from the total population of Villa Clara (786.051), 671.754 inhabitants are older than 15 years (85.5%), which shows the high percentage of population aging in this province.[19]

Age is an important factor in relation to mortality and, therefore, having a greater number of elderly people in Villa Clara, a high incidence of CVD with poor prognosis can be expected. There is no doubt that insisting on the control of risk factors from primary care and increasing reperfusion treatments, particularly coronary angioplasties –which are still scarce–, in secondary and tertiary care, are very important aspects to take into account to reduce the number of deaths from AMI and the number of years of life potentially lost[71].

CONCLUSIONS

Male sex, advanced age, presence of more than three cardiovascular risk factors, and extensive anterior infarctions predominated in deaths from ST-segment myocardial infarction. Left ventricular dysfunction was the most frequent. Mortality showed a slight downward trend in deaths reported by death certificate and there was an average of 25.2 years of life potentially lost.

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