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Epidemiological Profile for Acute Coronary Syndrome: The Difference between Genders in an Intensive Care Unit

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Abstract

Background: Acute Myocardial Infarction (ACS), a complication of acute coronary syndrome is a major cause of death in industrialized countries. The incidence of these diseases has increased, but the rate of mortality among patients decreased over the years.The mortality of acute myocardial infarction is higher in men than women, but for female coronary disease is most fatal in relation to the other sex.

Methods: The data was collected between October 2003 and December 2010 from patients who were admitted in the Intensive Care Unit of Hospital Santa Lucia, a private institution in Brasilia-DF, Brazil with the diagnosis of ACS. For the study of in-hospital mortality, we calculated the mortality rate of the years studied and Spearman bivariate correlation was used to determine the level of significance of the values found. By means of the nonparametric Kruskal-Wallis sought to find a statistically significant relationship between deaths per year.Factors with possible influence were analyzed by logistic regression models and were associated as covariates.Statistical analysis was performed using SPSS 20.0 software.

Results: Altogether, 1005 were analyzed from a large database.There was a reduction in the rate of mortality from acute coronary syndromes over the years evaluated, the Spearman bivariate correlation found a significant relationship ($p = - 0.059$). The highest percentage of deaths was found in 2008 (17.6%), the lowest in 2009 (3.8%). Of the total sample 32.32% were women. The mortality rate of ACS among women (11.8%) was almost double compared with the male sex (7.1%), the bivariate correlation has shown statistically significant ($p = 0.078$). In logistic regression models the relationship between gender and death has changed in the female gender with age ($p = 0.013$) and presence of family history ($p = 0.018$), in the male gender with age ($p = 0.017$). The others co-variables showed no statistically significant relationship with mortality between genders.

Conclusion: This study showed a statistically significant reduction in hospital mortality from acute coronary syndrome between 2003 and 2010. Our findings indicate that the mortality is higher in women than in men after an episode of acute coronary syndrome. The risk factors such as age and family history are important because their presence influences the mortality of each case.

Keywords: Temporal trend; Genders; Risk factors; Acute coronary syndrome; Intensive care unit; Mortality

Introduction

Acute Coronary Syndrome (ACS) is a consequence of acute myocardial ischemia that occurs when there is an imbalance between oxygen supply and its consumption by the heart muscle. It encompasses a group of entities including acute myocardial infarction with ST-segment elevation, myocardial infarction without ST-segment elevation and unstable angina [1].

These manifestations are common causes of attendances and admissions to emergency services, as well as causes of morbidity and mortality worldwide. American epidemiological data report that over twelve million people are diagnostic of coronary artery disease and more than one million have myocardial infarction each year, resulting in about 466,000 deaths annually attributed to coronary artery disease [2]. In Brazil, according to Datasets, in 2008, 195,450 individuals were hospitalized with a diagnosis of Acute Myocardial Infarction (AMI) and other ischemic heart disease and 94,912 deaths occurred [3].

A constant and progressive decline in mortality from acute myocardial infarction has been observed over the past four decades, from 30% toapproximately15% [3,4]. In the early 80s, significant efforts have been developed in an attempt to limit the size of AMI, with the introduction of beta-blockers and fibrinolytic [5]. The widespread use of acetylsalicylic acid and the development of Percutaneous Transluminal Coronary Angioplasty (PTCA) in its entirety, contributed to the reduction of the mortality rate in the short term, to 6.5% [6].

The cardiovascular disease is the most prevalent condition among women, the leading cause of death in most areas of the world, and still increasing nowadays. Several studies present significant differences between genders in cardiovascular disease. Men and women can have different pathology and pathophysiology of the disease, which leads to difficulties concerning diagnosis, treatment and outcome of the female population [7].

Several explanations exist for the changes in the mortality of AMI, recorded over the years: improved monitoring, change in the rate of hospitalization for AMI, change the risk profile of patients and improvement of pharmacological and interventional treatment [8,9].

Studies that analyze the incidence, evolution and AMI mortality

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are still scarce in Brazil. Risk factors responsible for the progression of atherosclerosis or by precipitation events are of particular importance in this group of patients [5]. Within this perspective, the present study aimed to evaluate the main factors of risk in acute coronary syndromes and more common complications and evaluate its direct interference in such mortality.

Methods

Setting and design

The study was conducted in Brasília capital of Brazil, in the Intensive Care Unit of Hospital Santa Lucia, a private institution in Brasilia-DF, Brazil. This is a prospective study, whose data were extracted from medical records of patients admit of acute coronary syndrome in the intensive care unit of the Hospital Santa Lucia (Brasilia-DF, Brazil), from October 2003 to December 2010. We compared the data between genders, the distribution of risk factors and the mortality trend.

Data collection

The study included all patients with ACS, not selected, regardless of age, consecutively admitted to the Intensive Care Unit from 10/19/2003 to 12/31/2010, prospectively followed during hospitalization and the data on the characteristics of infarction and evolution were stored in a database. The diagnostic criteria for ACS were those established by the World Health Organization.

Data analysis

The statistical analysis was performed using SPSS 20.0 software. The Spearman's bivariate correlation was used to compare death and gender. Factors with possible influences such as age, hypertension, diabetes mellitus, dyslipidemia, sedentary lifestyle, tabagism, peripheral artery disease, family history of coronary disease (FH), known coronary disease, obesity, chronic renal failure, chronic obstructive pulmonary diseases, were analyzed by logistic regression models and were associated as covariates. With the intention of confronting the annual death per sex, a chart was made and a trend line was estimated.

Results

Altogether, 1,005 patients were analyzed from a large database. The admission during the study period is represented in Figure 1 and also gender comparison. From the sample, 680 (67.66%) were men. The average age was 62.20 ± 12.23 years old, being 62.82 ± 12.431 for men and 67.77 ± 12.657 for women. Previous infarction occurred in 24.6% of the cases. The most frequent risk factors were systemic hypertension (73.43%), dyslipidemia (50.74%), familial history (46.46%), former smoker (34.32%), and diabetes mellitus (31.44%). The prevalence of symptoms in admission per gender can be observed in Table 1. The prevalence of risk factors in admission per gender can be observed in Table 2.

There was a reduction in the rate of mortality from acute coronary syndromes over the years evaluated, the Spearman bivariate correlation found a significant relationship (p = - 0.059). The highest percentage of deaths was found in 2008 (17.6%), the lowest in 2009 (3.8%). Of the total sample, 67.67% were men and 32.32% women. The average mortality between 2003 and 2010 was 11.8% for women and 7.12% for men. In 2010, there was a reversal in the average number of deaths, which is the only year in which the male death rate (7.37%) was higher than female (2.04%). When comparing each individual year we cannot observe any significant variation in mortality between genders (Figure 2). The prevalence of risk factors in mortality per gender can be observed in Table 3.

The mortality rate of AMI among women (12.0%) was almost double compared with the male sex (7.1%), the bivariate correlation has shown statistically significant (p = 0.078). The prevalence of symptoms in mortality per gender can be observed in Table 4. In logistic regression models the relationship between gender and death has changed in the female gender with age (p = 0.013) and presence of family history (p = 0.018), in the male gender with age (p = 0.017). The others co-variables showed no statistically significant relationship with mortality between genders. It was also observed on the lines of linear forecasting trends is expected that male death rate exceeds the female in the following years.

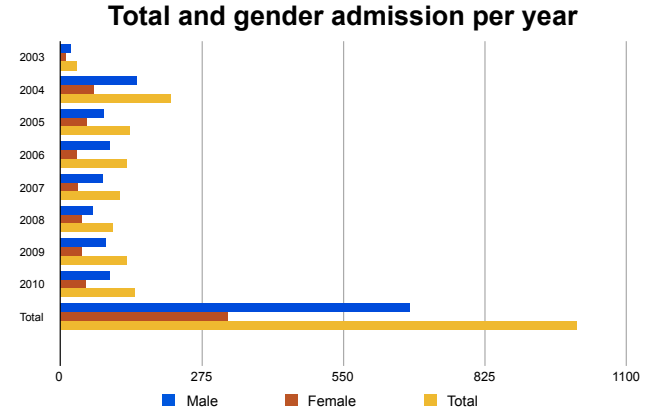

Figure 1: Total and gender admission per year.

Prevalence of symptoms in admission per gender			
Symptoms	**Male n=680 (%)**	**Female n= 325 (%)**	**P-value**
Precordial pain	570 (83.8%)	263 (80.9%)	0.146
Sweating	286 (42.1%)	141 (43.4%)	0.370
Epigastric pain	126 (18.5%)	60 (18.5%)	0.527
Pallor	191 (28.1%)	114 (35.1%)	0.015
Nausea/Vomiting	186 (27.4%)	127 (39.1%)	<0.001
Syncope	35 (5.1%)	23 (7.1%)	0.14
Irradiation	267 (39.3%)	142 (43.7%)	0.103

Table 1: Prevalence of symptoms in admission per gender.

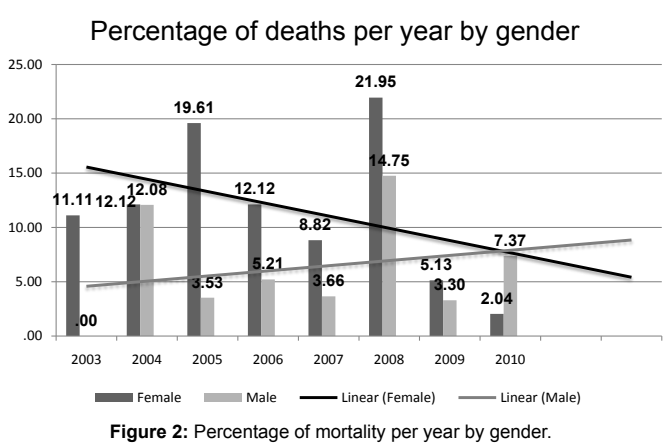

Figure 2: Percentage of mortality per year by gender.

Prevalence of risk factors in admission per gender			
Risk factor	**Male n=680 (%)**	**Female n= 325 (%)**	**P-value**
Hipertension	471 (69.3%)	267 (82.2%)	<0.001
Diabetes	198 (29.1%)	118 (36.3%)	0.013
Dyslipidemia	327 (48.1%)	183 (56.3%)	0.009
Tabagism	149 (21.9%)	48 (14.8%)	0.004
Obesity	140 (20.6%)	63 (19.4%)	0.361
Sedentary	360 (52.9%)	184 (56.6%)	0.152
Family history	310 (45.6%)	157 (48.3%)	0.229
DPOC	53 (7.8%)	17 (5.2%)	0.085
Perifericarteriopathy	39 (5.7%)	35 (10.8%)	0.004
Chronic kidney disease (CKD)	61 (9%)	17 (5.2%)	0.023
Chagas Disease	7 (1%)	6 (1.8%)	0.216
Stroke	27 (4%)	19 (5.8%)	0.122
Valvulopathy	3 (0.4%)	6 (1.8%)	0.036

Table 2: Prevalence of risk factors in admission per gender.

Prevalence of risk factors in mortality per gender			
Risk factor	**Male n=48 (%)**	**Female n= 39 (%)**	**P-value**
Hypertension	31 (64.6%)	35 (89.7%)	0.006
Diabetes	18 (37.5%)	15 (38.5%)	0.551
Dyslipidemia	14 (29.2%)	22 (56.4%)	0.009
Tabagism	6 (12.5%)	5 (12.5%)	0.606
Obesity	6 (12.5%)	5 (12.5%)	0.606
Sedentary	19 (39.6%)	20 (51.3%)	0.191
Family history	16 (33.3%)	10 (25.6%)	0.294
DPOC	4 (8.3%)	3 (7.7%)	0.085
Periferic arteriopathy	1 (2.1%)	3 (7.7%)	0.234
Chronic kidney disease (CKD)	7 (14.6%)	2 (5.1%)	0.138
Chagas Disease	1 (2.1%)	0 (0%)	0.552
Stroke	6 (12.5%)	4 (10.3%)	0.508
Valvulopathy	0 (0%)	0 (0%)	-

Table 3: Prevalence of risk factors in mortality per gender.

Prevalence of symptoms in mortality per gender			
Symptoms	**Male n=39 (%)**	**Female n= 48 (%)**	**P-value**
Precordial pain	36 (75%)	27 (69.2%)	0.359
Sweating	16 (33.3%)	15 (38.5%)	0.392
Epigastric pain	7 (14.6%)	6 (15.4%)	0.575
Pallor	7 (14.6%)	16 (41%)	0.005
Nausea/Vomiting	14 (29.2%)	10 (25.6%)	0.452
Syncope	2 (4.2%)	2 (5.1%)	0.610
Irradiation	11 (22.9%)	8 (20.5%)	0.498

Table 4: Prevalence of symptoms in mortality per gender.

Discussion

This study sought to evaluate the differences between genders for acute coronary syndrome. Historically, more men were integrate in the studies regarding acute myocardial infarction, so some studies do not shows differences between genders [10,11]. Our study is composed of 325 (32.33%); with this sample we were able to found some characteristics with significantly differences.

The average age was 62.20 ± 12.23 years old, being 62.82 ± 12.431 for men and 67.77 ± 12.657 for women. Which collaborates what is found in the literature that shows women having their first cardiac event usually 6 to 10 years later than men [12,13]. Several studies raise the hypothesis that estrogen plays a protective factor for cardiovascular disease [14-16].

Analyzing the data for the prevalence of symptoms in admission, we could found a significant value for pallor (p= 0.015) and nausea/vomiting (p<0.001), the other symptoms do not show any specific significance. These results corroborates that symptoms in the female gender are usually unspecific which can be a reason for women call later for professional help [17]. We cannot conclude the reasons for these differences, but they could be related to different pain perception, older age, or other comorbidities.

When we evaluate the risk factors in admission, hypertension, diabetes, dyslipidemia, peripheral arteriopaph, chronical kidney disease and valvulopathy they all showed a significantly difference.

According to studies such as GUSTO IIb (Global Use of Strategies to Open Occluded Coronary Arteries in Acute Coronary Syndromes) [18] and TIMI IIIB (Thrombolysis in Myocardial Infarction) [19], women presented more frequently with unstable angina and Non–ST-Elevation Myocardial Infarction (NSTEMI), whereas men have AMI with ST elevation (STEMI). The type of ischemic event shows gender-specific differences, we found that men usually have more STEMI than women [20].

One of the main focuses of the study is although the high incidence of ACS in men, the mortality among women is prevalent. From our sample, 87 subjects died, of these 39 were women. Analyzing only these subjects who died, we can look for the prevalence of risk factors. We found significant differences in hypertension and dyslipidemia, it cannot be conclusive but can lead us to think that this prevalence in women is more influent for death. Regarding the prevalence of symptoms in patients that dead, only pallor showed a statistics significance, what can still reinforce the hypothesis of unspecific symptoms in women [17].

Using logistic regression subgroup analysis for gender, we identified that age and presence of family history, for female, are independent risk factors of adverse events and are positively correlated with AMI mortality. However, for male, we identified that just age is independent risk factors of adverse events and are positively correlated with AMI mortality.

Limitations

This study has some limitations. We do not adjustment for age and severity of the disease, furthermore some studies shows that doing that most of the differences disappeared [21-23]. Secondly, some of the data such as comorbid and age were self-reported. We also did not evaluate other risk factors for AMI such as psychosocial stress.

Conclusion

This study brings together valuable data with considerable differences between genders. Mortality is higher in women than in men after an episode of acute coronary syndrome and risk factors such as age and familiar history are important because their presence influences the mortality of each case [7]. The reason for this disparity in female cardiovascular disease evaluation and prevention are not well elucidated. We aim to point out new directions and reinforce some others to collaborate with future investigation on this important issue.

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