ejpmr, 2017,4(7), 777-781

SJIF Impact Factor 4.161

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

PREDICTORS OF IN HOSPITAL MORTALITY OF ACUTE MYOCARDIAL INFARCTION

Eliverta Zera[1*], Ira Xhemollari [2], Sonila Xinxo[3]

[1]Regional Hospital Durres
[2]Medicine University, Tirane
[3]Institute of Public Health, Tirane Albania

***Corresponding Author: Eliverta Zera**

Regional Hospital Durres.

Article Received on 16/05/2017 **Article Revised on 07/06/2017** **Article Accepted on 28/06/2017**

ABSTRACT

Background: Acute Myocardial infarction (AMI) is the main cause of death in the world. Survival is markedly influenced by age of the patient, sex, presence of different risk factors and complications that patients develop after myocardial infarction. **Aim.**To investigate the predictors of in hospital fatal outcome among patient with AMI. **Methods:** Four hundreds and ninety-nine patients with AMI, hospitalized in Cardiology Department of Durres Hospital, Albania during October 2011 to October 2014, were divided in two groups: survived and deceased (patients deceased during hospitalization due to AMI). The impact of the risk factors (age, gender, smoking, hypertension, diabetes mellitus, multi vessels disease, Killip class, level of creatinemia) in hospital mortality was evaluated by using logistic regression analysis and correlation technique. A p value <0.05 was considered statistically significant. **Results:** Out of 499 patients, 346 (69.3%) were males and 64 (30.7%) were females. The mean age was 65.5 ±11.4 years. Fifty one (10.3%) patients died during hospitalization due to AMI. The age group > 70 years old increased the likelihood of dying in hospital with 2-3 times (OD=2.2, OD=3.1 p <0.05) compared to other groups of age (respectively 60-70 years old and less than 60 years old). Being female and use of smoking is associated with a higher risk of 2.5 (OD=2.5 p<0.05) of in hospital mortality. Killip Class >II increased 11 times the likelihood of in hospital mortality (OD=1, p<0.05). In addition, a multi-vessel disease is associated with an increased about 8 times the likelihood of in hospital mortality (OD=7.8, p<0.05). Meanwhile, the presence of diabetes or high blood pressure did not impact on hospital mortality rate among in patients with an AMI. The coefficient of correlation for relationship between level of creatinemia and occurrence of fatal income is 0.293 (p<0.05). **Conclusions:** Age, gender, Killip class >II, multi-vessel disease and smoking should be considered as predictors of in-hospital mortality after an episode of AMI. In addition, a high level of creatinemia is predictor of in-hospital mortality.

KEY WORDS: *acute myocardial infarction, in-hospital mortality, predictor.*

INTRODUCTION

Acute Myocardial infarction (AMI) is one of the main cause of death in the world. A great number of studies have estimated the factors related with survival after AMI.[1] The pathophysiology of AMI is very complex and the frequent coexistence of multi vessel and cardiogenic shock have a great impact in in-hospital mortality and morbidity.[2,3] Most of the complications occur during the first few hours while the patients are likely to be in the hospital. A significant number of patients suffer from complications of AMI. Some of deaths are due to pathophysiologic changes which occur as a consequence of the AMI. More often, death can occur due to cardiogenic shock, sudden cardiac death, heart failure, mechanical cardiac complications, or another MI event. These patients need to recognition of their status and begin aggressive management in order to prevent unnecessary complications. Survival is markedly influenced by gender of the patient, age, presence of different risk factors, presence of altered renal function and complications that patients develop after myocardial infarction. Data from some epidemiologic[4] and clinical studies[5-7] have shown that short prognosis is worse for women than man. The reason for the poor prognosis after acute MI in women remains obscure. It was suggested that women are older age, have more history of diabetes, hypertension, hypercholesterolemia and congestive heart failure, implicating as contributive factors for higher mortality in women compared to men.[8-12] During the last two decades, the mortality rate after admission for myocardial infarction has declined significantly by about 30%. However, it still remains high. Survival is mainly reduced in patients over 70 years, in-hospital mortality rate of whom are 21% compared with 2.8% of patients 60 years old or younger.[13] The reasons for the continued reduction in CHD-related mortality are completely

unclear, however, improvements in diagnostic procedures, developments in reperfusion techniques for acute myocardial infarction (AMI), and the increasing use of highly effective treatments for CHD and its risk factors, have been implicated as main factors. The goal of reperfusion interventions is to limit the amount of permanent myocardial damage, necrosis, and scar tissue formation.[14-16] The aim of our study is to investigate the predictors of in hospital fatal outcome among patient with AMI.

METHODS

In the study were included 499 patients consecutive with acute myocardial infarction (AMI) who presented in the Cardiology Department, Regional Hospital of Durres, Albania between October2011to October 2014. Demographic, diagnostic, therapeutic, and clinical data were collected from hospital medical records. Coronary risk factors and previous conditions were assessed by a specific questionnaire administered to patients. Four hundreds and ninety-nine patients with AMI were divided in two groups: survived and deceased (patients deceased during hospitalization due to AMI). Continuous variables are presented as means (± standard deviation) and categorical variables as percentages. The impact of the risk factors (age, gender, smoking, hypertension, diabetes mellitus, multi vessels disease, Killip class, level of creatinemia) in hospital mortality was evaluated by using logistic regression analysis and correlation technique. A p value <0.05 was considered statistically significant.

RESULTS

Out of 499 patients, 346 (69.3%) were males and 64 (30.7%) were females. The mean age was 65.5 ±11.4 years. Fifty one (10.3%) patients died during hospitalization due to AMI out of which 24 (47.1%) were male and 27 (52.9%) were female. Mean stay in the hospital was 7.57 ±3.7 days. There were 149 patients of ≤60 years of age and out of them, 10 deaths (19.6%) occurred, while 15 patients died out of 144 patients (29.5%) of 61–70 years of age and 26 deaths were recorded out of 135 cases (51%) in patients more than 70 years of age. Table 1.

Table 1. Patient demographics by status of life

Variable	Survived	Dead	P value*
	N (%)	N (%)	
			0.001
Female	126(28.1)	27(52.9)	
Male	322(71.9)	24(47.1)	
Age			0.009
≤60 yrs	149(33.3)	10(19.6)	
61–70yrs	144(36.6)	15(29.5)	
>70 yrs	135(31.1)	26(51)	

**chi square* $p<0.05$ considered significant.

A significantly higher percentage of dead patients compared to survived patients had a history of diabetes (37.3 % vs.31.9 %), but a lower percentage had a history of hypertension (64.7% vs. 72.4 %). The dead patients had an AMI of anterior localization (52.9% vs 40.8 %), while survived patients presented more with inferior localization (59.2 % vs 47.1%). The dead patients had a significantly higher Killip class at admission (Killip IV; 66.7% vs. 8.7 %), compared with the patients who survived. The dead patients, also, had more frequently three vessels CAD (72.7% vs20.3%) and only a small part of them underwent coronary angiography (21.5% vs 41.5%). Level of creatinemia was higher in the dead patients (1.51± 1.3 vs 1.037±0.58). Table 2.

Table2. Patient cardiovascular risk profile, infarction (AMI) characteristics by status of life

Variable	Survived	Dead	P value*
	N (%)	N (%)	
Diabetes Mellitus	143(31.9)	33(37.3)	0.441
HTA	324(72.4)	33(64.7)	0.253
Killip Class			0.001
I	301(67.2)	8(15.7)	
II	57(12.7)	3(5.9)	
III	51(11.4)	6(11.8)	
IV	39(8.7)	34(66.7)	
Infarct location			0.097
Anterior	183(40.8)	27(52.9)	
Inferior	265(59.2)	24(47.1)	
Coronary angiography	186 (41.5)	11(21.5)	0.001
One vessel	81(44)	1(9.1)	
Two vessels	67(35.8)	2(18.2)	

≥ 3 vessels	38(20.3)	8(72.7)	
Revascularization	186	11	0.427
PCI	33 (17.7)	3(27.3)	
CABG	153 (82.3)	8(72.7)	

**chi square* $p<0.05$ considered significant.

Creatinina (mean ± SD) mg/dl	1.037±0.58	1.51± 1.3	0.001

**t test* $p<0.05$ considered significant.

The age group > 70 years old increased the likelihood of dying in hospital with 2-3 times (OD=2.2, OD=3.1 p <0.05) compared to other groups of age (respectively 60-70 years old and less than 60 years old). Being female and use of smoking is associated with a higher risk of 2.5 (OD=2.5 p<0.05) of in hospital mortality. Killip Class >II increased 11 times the likelihood of in hospital mortality (OD=1, p<0.05). In addition, a multi-vessel disease is associated with an increased about 8 times the likelihood of in hospital mortality (OD=7.8, p<0.05). Meanwhile, the presence of diabetes or high blood pressure did not impact on hospital mortality rate among inpatients with an AMI. Table 3. The coefficient of correlation for relationship between level of creatinemia, age and occurrence of fatal income is 0.293 and 0.156 (p<0.05). Table 4.

Table 3. The results of logistic regression on predictors of in-hospital outcome in patients with AMI (OR crudo)

Predictors	Odds Ratio crudo	Cl95%	P value
Group age			
≤60 yrs	0.35	0.162-0.748	0.070
61–70yrs			0.037
>70yrs*	1	1	
Female	2.50	1.5-5.2	0.001
HTA	1.40	0.78-2.5	0.252
Diabetes Mellitus	1.26	0.7-2.3	0.441
Smoking	2.50	1.1-3.7	0.017
Killip class >2	11.0	5-24	0.001
≥ 2 vessels CAD	7.80	1.1-52	0.049

Table 4. The result of correlation technique on predictors of in-hospital outcome in patients with AMI (OR crudo)

Predictors	Correlation coefficient *	P value
Creatinine	0.293	**0.001**
Age	0.156	**0.001**

** Spearmen technique* $p<0.05$ considered significant.

DISCUSSION

Acute myocardial infarction is leading cause of morbidity and mortality in worldwide. Although during the last decades mortality has dropped significantly but still it is high. This study is the first to investigate the predictors of in hospital fatal outcome among patient with AMI in Durres, Albania. Of the 499 patients with acute myocardial infarction those who were discharged from the hospital had a slightly different profile from the patients who died. The greater mortality was founded in the female sex (52.9% vs 47.1% in males), likely to what was reported in the Framingham Heart Study[17] but contrary to what was observed in the study by Becker et al[18] where it was reported that there was no significant gender difference in in-hospital mortality. Our results showed that female sex was a predictor related to in-hospital mortality after adjusting for all risk variables (OR 2.5, 95% CI 1.5 to 5.2, P 0.001). Similar result was founded by Pimenta[19] et al and Greenland[20] et al. This may be due to the fact that females tend to be older, have a higher burden of comorbidities, are more likely to be diabetic and usually receive less aggressive in-hospital therapy for acute myocardial infarction than do men. Age is a powerful predictor of short term outcome in acute myocardial infarction.[13,21] We founded increase in mortality after myocardial infarction with increase in age of the patients. The age group > 70 years old increased the likelihood of dying in hospital with 2-3 times (OD=2.2, OD=3.1 p <0.05) compared to other groups of age (respectively 60-70 years old and less than 60 years old). This may explained with the fact that as the age of the patients increased, there was an increase in the frequency of Killip classes III and IV, and the older patients had more severe haemodynamic compromise than younger patients. Our data were similar with Devlin et al 24, comparing the outcome of patients with AMI older than 75 years with that of younger patients, reported a greater percentage of mortality and heart failure among the elderly. On the other hand, McMechan[22] et al reported that one third to half of the patients admitted to a hospital with acute myocardial infarction are older than 70 years and 74.4% of the

deaths due to that disease occur in patients older than 70 years.[23] Our data showed that systemic arterial hypertension and diabetes mellitus had no influence on in-hospital mortality in this group of patients with infarction even on logistic regression analysis. In our study, we founded a clear association between the presence of Killip classes III and IV, the presence of multi vessels CAD and the occurrence of death (OR 11, 95% CI 5 to 24, P 0.001 and OR 7.8, 95% CI 1.1 to 52, P 0.049 respectively). Some studies have shown that smoking increases the risk of AMI and death from CAD and the unadjusted short term clinical outcomes of smokers are better than nonsmokers, a phenomenon called the smoking paradox.[24, 25] In our study, smoking was an independent predictor of in-hospital mortality in logistic regression analysis. Most studies showed that higher of mortality was observed in patients with higher level of creatinine. It has been demonstrated that altered renal function is accompanied with poorer clinical outcome. Pitsavos et al[27] found that creatinine clearance rate was an independent predictor of in-hospital mortality in patients with acute coronary syndrome. In our study, the logistic regression analysis also showed that high level of creatinine had more influence on mortality. Our data were similar with Cakar[26] et al. observed that the mortality rate in acute myocardial infarction patients with elevated creatinine (defined as creatinine levels >1.3 mg/ dL) was higher than in the normal creatinine group.

Limitations.

Our data should be interpreted with caution due to the study's limitations. There is a small number of patients included in this study. We cannot rule out that a disproportionate number of patients with AMI died before presentation to the hospital, as well as a number of cases that have gone directly for PCI without coming to our hospital. On the other hand, database included all forms of acute myocardial infarction regardless of delay to presentation, presence of ST-segment elevation, and eligibility for reperfusion therapy. We could not account for some factors as noncardiac comorbidity, preferences of the patients, functional status, and quality of life.

6. CONCLUSIONS

Age, Gender, Killip class >II, Multi-vessel disease and Smoking should be considered as predictors of in-hospital mortality after an episode of AMI. In addition, a high level of creatinemia is predictor of in-hospital mortality. Our results suggest that appropriate measures are needed to increase the awareness on risk factors for patients with cardiovascular disease and to reduce the high mortality rates in patients with AMI.

REFERENCES

1. Moss AJ, Bigger JT and Odoroff CL: Postinfarct risk stratification. Prog Cardiovasc Dis 1997; 29: 389-412.
2. Ruiz-Meana M, García-Dorado D. Translational cardiovascular medicine (II). Pathophysiology of ischemia-reperfusion injury: new therapeutic options for acute myocardial infarction. Rev Esp Cardiol 2009; 62: 199-209.
3. Goldberg RJ, Samad NA, Yarzebski J, et al. Temporal trends in cardiogenic shock complicating acute myocardial infarction. N Engl J Med 1999; 340: 1162-8.
4. Kannel WB, Sorlie P and McNamara PM: Prognosis after initial myocardial infarction: the Fram7.80ingham Study. Am J Cardiol 1979; 44: 53-59.
5. Toffer GH, Stone PH, Muller JE, Willich SN, Davis VG and Poole WK: Effects of gender and race on prognosis after myocardial infarction: adverse prognosis for women, particularly black women. J Am Coll Cardiol 1987; 9: 473-482.
6. Dittrich H, Gilpin E, Nicod P, Cali G, Henning H and Ross J Jr: Acute myocardial infarction in women:influence of gender on mortality and prognostic variables.Am J Cardiol 1988; 62: 1-7.
7. Robinson K, Conroy RM, Mulcahy R and Hickey N: Risk factors and in-hospital course of first episode of myocardial infarction or acute coronary insufficiency in women. J Am Coll Cardiol 1988; 11: 932-936
8. Coronado BE, Griffith JL, Beshansky JR, et al. Hospital mortality in women and men with acute cardiac ischemia: aprospective multicenter study. J Am Coll Cardiol 1997; 29: 1490–1496
9. Ghali WA, Faris PD, Galbraith PD, Norris CM, Curtis MJ, Saunders LD, et al. Sex differences in access to coronary revascularization after cardiac catheterization: importance of detailed clinical data. Ann Intern Med 2002; 136: 723-32.
10. Chun BY, Dobson AJ, Heller RF. The impact of diabetes on survivalamong patients with first myocardial infarction. Diabetes Care 1997(May); 20(5): 704–8.
11. Bugiardini R, Estrada JL, Nikus K, Hall AS, Manfrini O. Gender bias in acute coronary syndromes. Curr Vasc Pharmacol, 2010; 8: 276–284.
12. El-Menyar A.A., Al Suwaidi J. Impact of gender in patients with acute coronary syndrome. Expert Rev. Cardiovasc. Ther. 2009; 7(4): 411–421.
13. Maggioni AP, Maseri A, Fresco C, Franzosi MG, Mauri F,Santoro E et al. Age-related increase in mortality among patients with fi rst myocardial infarctions treated with thrombolysis. N Engl J Med 1993; 329: 1442–8.
14. Furman MI, Dauerman HL, Goldberg RJ, et al. Twenty-two year (1975 to 1997) trends in the incidence, in-hospital and long term case fatality rates from initial Q-wave and non-Q-wave myocardial infarction: a multi-hospital, community-wide perspective. J Am Coll Cardiol 2001; 37: 1571.
15. Rogers WJ, Canto JG, Lambrew CT, et al. Temporal trends in the treatment of over 1.5 million patients with myocardial infarction in the US from 1990 3through 1999: the National Registry of Myocardial

Infarction 1, 2, and 3. J Am Coll Cardiol 2000; 3136: 2056.
16. He1idenreich PA, McClellan M. Trends in the treatment and outcomes for acute mtocardial infarction: 1975-1995. Am J Med 2001; 110:165.
17. Kannel WB, Sorlie P, McNamara PM. Prognosis after initial myocardial infarction: the Framingham Study. Am J Cardiol 1979; 44: 53-9.
18. Becker RC, Terrin M, Ross R, et al. Comparison of clinical outcomes for women and men after acute myocardial infarction. Ann Intern Med 1994; 120: 638-45.
19. Pimenta L, Bassan R, Potsch A, et al. É o sexo feminino um preditor independente de mortalidade hospitalar no infarto agudo do miocárdio ?Arq Bras Cardiol 200; 77: 37 43. [Links]
20. Greenland P, Reicher-Reiss H, Goldbourt U, et al. In-hospital and 1-year mortality in 1524 women after myocardial infarction. Comparison with 4315 men. Circulation 1991; 83:484-91. [Links]
21. Gurwitz JH, Goldberg RJ, Gore JM. Coronary thrombolysis for the elderly. JAMA 1991; 265:1720–3.
22. Mc Mechan SR, Adgey AAJ. Age related outome in acute myocardial infarction: 1elderly people benefit from thrombolysis and should be included in trials. BMJ 1998; 317: 1334-5.
23. 23. Marcus FI, Friday K, McCans J, et al. Age-related prognosis after acute myocardial infarction (The Multicenter Diltiazem Post-Infarction Trial). Am J Cardiol 1990; 65: 559-66.
24. Ishihara M, Sato H, Tateishi H et al. Clinical implications of cigarette smoking in acute myocardial infarction: Acute angiographic findings and long-term prognosis. Am Heart J 1997; 134: 955–60.
25. Angeja BG, Kermgard S, ChenMS, et al. The smoker's paradox: insights from the angiographic substudies of the TIMI trials. J Thromb Thrombolysis. 2002; 13(3): 133–139.
26. Cakar MA, Gunduz H, Vatan MB, Kocayigit I, Akdemir R. The effect of admission creatinine levels on one-year mortality in acute myocardial infarction. Scientific World Journal 2012. doi:10.1100/2012/186495.
27. Pitsavos C, Kurlaba G, Panagiotakos DB, et al. Association of creatinine clearance and inhospital mortality in patients with acute coronary syndromes. Circ J. 2007; 71: q99-14.