ejpmr, 2019,6(3), 79-84

SJIF Impact Factor 4.897

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

DIFFERENCES IN THE RISK FACTORS AND INPATIENTS OUTCOMES OF PATIENTS WITH ACUTE MYOCARDIAL INFARCTION BY AGE IN DURRES POPULATION

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Article Received on 01/01/2019 **Article Revised on 22/01/2019** **Article Accepted on 12/02/2019**

ABSTRACT

Background: Despite the greater risk of AMI among older patients and the increasing size of this population the relationship between age, clinical presentation and outcome of AMI in elderly patients is incompletely understood. The few studies have explored age-associated differences in AMI presentation and outcomes in elderly patients. ***Purpose:*** The objective of our study was to determine the frequency of risk factors and in hospital outcome in elderly patients me AMI. ***Methods:*** We enrolled in the study 499 patients consecutive with AMI admitted in cardiology department from October 2011 to October 2014.The baseline characteristics, traditional risk factors for CHD and in-hospital outcome were analyzed across some age-based strata (in years): 25-44, 45-54.55-64, 65 to 74, 75 to 84, and ≥85 years of age. Statistical analyses were performed with SPSS 16.0. P value of <0.05 was considered statistically significant. ***Results:*** Of 499 patients with AMI,19(3.8%) belonged age group 25-44 years old,62(12.4%) belonge age group 45-54 years old,153(30.7%) belonged age group 55-64 years old, 161(32.3%) belonged age group 65-74years old, 75(15%) belonged age group 75-84years old and 29(5.8%) belonged age group ≥85years old. Of them the percentage of female were higher in age group ≥85years old (37.9%) and the percentage of male were higher in age group 75-84 yrs (73.4%). The age group patients 65-74 yrs represented with ≥ 3 risk factors (31% vs 14.5% and 17.2%) and ≥4 risk factors (37.5% vs 19.2% and 24.1%). The age group patients 65-74 years more frequently had an anterior infarction (58.3% vs 50.6% and 27.7%) and the higher percentage of pulmonary edema (18% vs 1.3% and 13.7%) p 0.001.The age group ≥85 vj more frequently had an inferior infarction (68.9%) and congestive heart failure (33.3%) p 0.001 A small proportion of elderly patients underwent coronary angiography (16% vs 30.4%) and revascularization (58.3% vs 69.3%). In hospital mortality were higher in the age group ≥85 vj (17.2% vs 8%). p 0.002. ***Conclusions:*** The elderly patients with AMI were female, had a higher incidence of hypertension, smoking, obesity and hypercholesterolemia. Most of them had ≥ 2 risk factors. The elderly received less frequently a coronary angiography after episode of AMI. The prevalence of cardiac failure was higher in the elderly AMI patients. In hospital mortality were higher in this subset population. The risk of in hospital mortality were higher in this age group. Older age was associated with a greater proportion of patients with functional limitations, heart failure, prior coronary disease and renal insufficiency and a lower proportion of male and diabetic patients.

KEYFACTORS: Risk factors, elderly patients, outcomes, acute myocardial infarction.

1. INTRODUCTION

Coronary heart disease is the leading cause of death among elderly patients, in both men and women older than 65 years[1,2,3.4] Globally, the world's population is growing and also longevity is increasing. Consequently, a big number of older people living and are at risk of acute myocardial infarction (AMI). As people age, the pattern of morbidity and mortality is changed. Compared with the general population, the elderly have a high percentage of coronary artery diseases and this because the prevalence and the severity of atherosclerotic coronary artery disease (CAD) increase with age in both men and women.[5] As compared with the younger patient population in the elderly dominate atypical symptoms and consequently in this subset remains very high the occurrence of missed diagnosis. The presence of comorbidities like diabetes, hypertension, prior MI, poor function of left ventricular, CHF and chronic kidney disease, increases the mortality in this group of population. According to some studies mortality from MI is 6-fold greater for ages 75-84 and 8-fold greater over the ages of 85 years when compared to patients ages 55-64 years.[6] The percentage of women among elderly MI patients is greater than young MI patients.[7,8] This could

be explained by the reduction of estrogen levels and its cardiovascular effects in the elderly women.[9] In the elderly patients were more present cardiovascular complications including cardiogenic shock, atrial fibrillation, and heart failure.[10] When compared to young MI patients ventricular premature contractions and AV blocks were more common in elderly MI patients when compared to young MI patients. The possible reason could be the fact that in aging persons, the atrio-ventricular conduction system is more vulnerable to ischemia and necrosis.[11] The objective of our study was to determine the frequency of risk factors and in hospital outcome in elderly patients me AMI.

2. MATERIALS AND METHODS

In the study were included 499 consecutive patients with acute myocardial infarction hospitalized in cardiology department in regional hospital Durres, Albania, from September 2012 to September 2015. AMI has been diagnosed according to the World Health Organization definition according to which the patients were proved to have at least two of the following three criteria: typical chest pain for myocardial ischemia lasting for at least 30 min, ST elevation of

>2 mm in two or more leads and enzymatic evidence of myocardial necrosis. The baseline characteristics, traditional risk factors for CHD and in-hospital outcomes were analyzed across some age-based strata (in years): 25-44, 45-54.55-64, 65 to 74, 75 to 84, and ≥85 years of age. Demographic, diagnostic, and clinical data were collected from hospital medical records. In-hospital outcomes were measured in terms of hemodynamic complications, disturbance of rhythm, and in hospital death. Differences in distribution of risk factors and inpatients outcomes by age groups were assessed by the chi-square test for categorical variables and by Student's t-test for continuous variables. A p value < 0.05 was considered significant. The hospital ethical committee approved the study protocol.

3. RESULTS

Of 499 patients with AMI,19(3.8%) belonged age group 25-44 years old,62(12.4%) belonged age group 45-54 years old,153(30.7%) belonged age group 55-64 years old, 161(32.3%) belonged age group 65-74years old, 75(15%) belonged age group 75-84years old and 29(5.8%) belonged age group ≥85years old. Of them the percentage of female were higher in age group ≥ 85 years old (37.9%) and the percentage of male were higher in age group 25-44 yrs (89.5%). Tab 1. Smoking and Obesity were higher in age-group 25-44 yrs, meanwhile hypertension were higher in age group 45-54yrs old. Tab 1.When the two groups are compared, risk factors were more prevalent in the elderly AMI patients (over 65 yrs) but with no significant difference. Fig 1.

Table 1: Patient demographics and cardiovascular risk profile by age-group.

Variable N (%)	**Total 499 100%**	**25-44yr 19 3.8%**	**45-54yr 62 12.4%**	**55-64yr 153 30.7%**	**65-74yrs 161 32.3%**	**75-84yrs 75 15%**	**≤ 85yrs 29 5.8%**	**Value P ***
Female	154 30.9%	2 10.5%	20 32.2%	50 32.6%	51 31.6%	20 26.6%	11 37.9%	0.001
Male	345 69.1%	17 89.5%	42 67.8%	102 67.4%	110 68.4%	56 73.4%	18 62.1%	
Diabetes	162 32.5%	4 21%	19 30.6%	52 33.9%	47 29.1%	33 44%	7 24.1%	0.113
Smoking	275 54.9%	12 63.1%	35 56.4%	89 58.1%	87 54.1%	37 49.3%	15 31.7%	0.001
Hypertension	357 71.5%	12 63.1%	50 80.6%	113 73.8%	107 66.4%	55 73.3%	20 68.9%	0.001
Prior IM	52 10.4%	3 15.7%	8 12.9%	16 10.4%	19 11.8%	3 0.4%	3 10.3%	0.105
Obesity	263 52.7%	12 63.1%	35 556.4%	81 52.9%	80 49.6%	40 53.3%	15 51.7%	0.348
Family history	214 42.9%	9 47.3%	30 48.3%	56 36.3%	76 47.2%	29 38.7%	14 48.2%	0.183
Cholesterol ≥ 200mg/dl	355 71.1%	14 73.6%	49 79%	107 69.9%	111 68.9%	49 65.3%	25 86.2%	0.03
Triglyceride ≥150 mg/dl	81 16.2%	5 26.3%	8 12.9%	29 18.9%	25 15.5%	11 14.6%	3 10.3%	0.581

* *chi square test p <0.05 statistically significant*

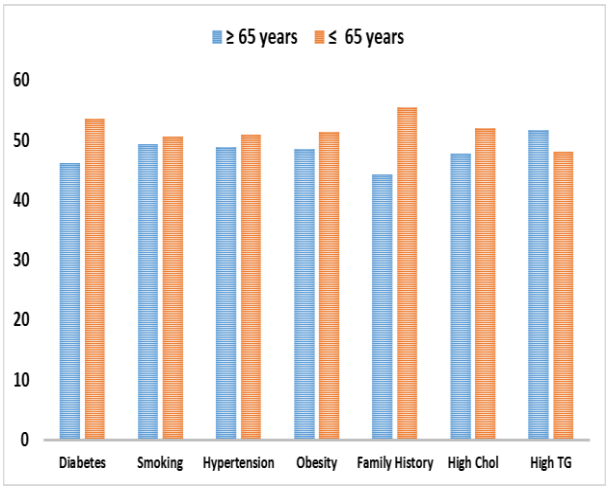

Figure 1: Distribution of risk factors by age groups.

Of 499 patients, 15.7% presented with one risk factor (RF). 33.8% with 2 RF, 29.3% with 3RF and 18.3% with ≥ 4 RF.Fig 1. The age group patients 65-74 years presented with ≥ 4 risk factors (37.5%). The age group over 85 yrs have more than two risk factors. Tab 2. Fig 2.

Tab 2: Distribution of number risk factor accorfing to age-group.

Variable N (%)	**Total 499 100%**	**25-44yrs 19 3.8%**	**45-54yrs 62 12.4%**	**55-64yrs 153 30.7%**	**65-74yrs 161 32.3%**	**75-84yrs 75 15%**	**≥ 85yrs 29 5.8%**	**Value P 0.076**
Number RF								
1	78 15.7%	2 10.5%	13 20.9%	21 13.7%	22 13.7%	14 17.9%	6 20.6%	
2	168 33.8%	4 21%	23 37.1%	51 33.3%	54 33.5%	25 33.3%	11 37.9%	
3	145 29.2%	8 **42.1%**	15 24.1%	46 30.1%	50 31%	21 14.5%	5 17.2%	
≥ 4	91 18.3%	3 15.8%	9 14.5%	28 18.3%	31 **37.5%**	13 19.2%	7 24.1%	

**chi square test p <0.05 statistically significant*

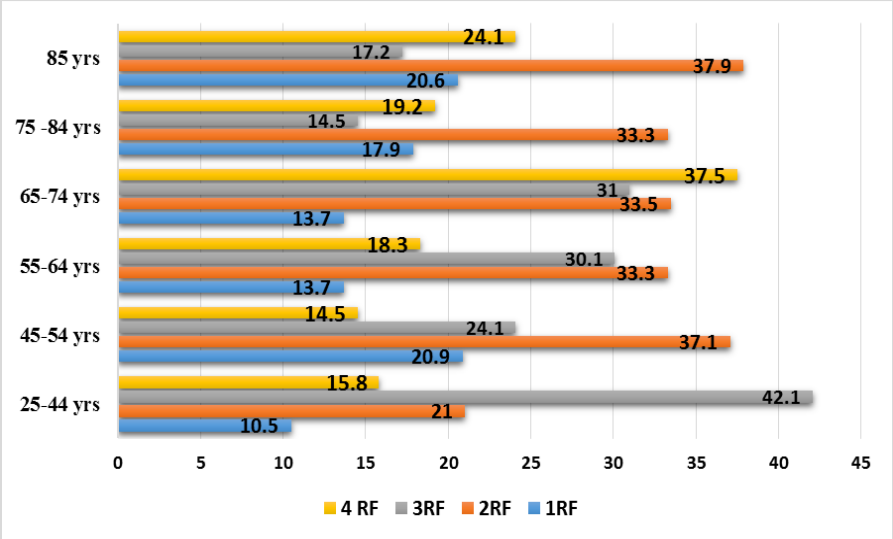

Fig 2: Distribution of Number Risk Factors according to age-groups.

The significant difference was found regarding the localization of AMI. The age group patients 65-74 years more frequently had an anterior infarction (58.3%) and the higher percentage of pulmonary edema (18%) p 0.001.The age group ≥85 vj more frequently had an inferior infarction (68.9%) and congestive heart failure (33.3%) p 0.001. On the other hand the age group 25-44 yrs old presented more frequently with inferior infarction but without pulmonary edema. Based on coronary angiography a small proportion of elderly patients underwent coronary angiography (16%) and revascularization (58.3%). The incidence of complication increased with age. In hospital mortality were higher in the age group ≥85 yrs (17.2%) p 0.002. Tab 3.

Tab 3: Location, angiographic characteristic and complications by age groups.

Variable	**Total N %**	**25-44 19**	**45-54 62**	**55-64 153**	**65-74 161**	**75-84 75**	**≥85 29**	**P value 0.03** *
Anterior	267 53.5%	7 36.8%	37 59.6%	83 54.2%	94. 58.3%	38 50.6%	8 27.7%	
Inferior	223 44.7%	12 63.1%	24 38.7%	68 44.4%	63 39.1%	36 48%	20 68.9%	
Others	9 1.8%	0	1 1.6%	2 1.3%	4 2.4%	1 1.4%	1 3.4%	
NYHA IV	73 14.6%	2 10.5%	4 6.4%	10 6.5%	27 16.7%	21 28%	9 33.3%	**0.001**
Pulmonary Edema	37 7.5%	0	0	3 1.9%	29 18%	1 1.3%	4 13.7%	**0.001**
Cardiogenic shock	24 4.8%	0	0	0	22 13.6%	0	2 6.8%	0.160
Ventricular Fibrillation	40 8.1%	1 5.2%	3 4.8%	14 9.1%	13 8%	7 9.3%	2 6.8%	**0.05**
AV block	28 5.7%	0	6 9.6%	6 3.9%	13 8%	2 2.6%	1 3.4%	
TV,FA,ESV	61 12%	3 15.7%	7 11.2%	20 13.1%	19 11.8%	8 13.6%	4 13.7%	0.238
Angiography	197 32.3%	11 57.8%	41 66.1%	84 54.9%	49 30.4%	12 16%	0	**0.001**
PCI	161 32.3%	11 100%	34 82.9%	75 89.2%	34 69.8%	7 58.3%	0	0.0180.
In hospital Mortality	51 10.3%	3 15.7%	7 11.2%	17 11.1%	13 8%	6 8%	5 **17.2%**	**0.002**

* *chi square test p <0.05 statistically significant*

DISCUSSION

Coronary artery disease is the most prevalent disease in the elderly population, with an estimated 3.6 million patients. It accounts for about two-thirds of all deaths in elderly population in the United States.[12,13] As population and its longevity is growing there are many older people at the high risk for acute myocardial infarction. This current study is the first to investigate the profile of risk factors and in-hospital outcomes by age groups in patients with AMI in Durres, Albania focus on elderly (over 65 years old). Of 499 patients with AMI 265 (53.1%) belonged age group over 65 years old. Of them the percentage of female were higher in age group ≥ 85 years old (37.9%) and the percentage of male were higher in age group 25-44 years old. Our result were similar with the other studies.[14,15] This current study shows that with increasing age the percentage of male in the patients with AMI admitted to the hospital decreases and ratio male to female becomes smaller. This possibly represents a higher percentage of females in an elderly population and also a more equal distribution of risk factors for AMI between both genders at high age.[16,17] Another possible reason for this could be a loss of estrogen and its cardiovascular effects in the elderly females.[9] In our study, among the risk factors, the commonest risk factor was smoking (51.7%) in the age groups over 85 years old. Our results were similar with Bayer AJ et al[14] but it was different from the previous studies in which smoking was a less common risk factor in the elderly population. 36% of the patients were hypertensive, 37% had hypercholesterolemia, and 17.4 % were diabetics. In one of the study done before, hypertension was commonly seen in elderly patients (39%). Smoking was seen in only 17.1% of the patients.[11] Another study which compared elderly and young MI patients observed that the young MI patients were more likely to be smokers and have hyperlipidemia.[18] However, in our study there was no difference between the age groups over 65 years old with regard to the presence of diabetes mellitus, hypertension, obesity and history of prior myocardial infarction. In the age groups over 85 years old was noticed the high level of cholesterol p 0.03. Similar observation were found in the study of Woon VC et al.[18] The elderly patients have two and more risk factors when comparing to young patients. As age increased and number of risk factors increases. The significant difference was found regarding the localization of AMI. The age group patients 65-74 years more frequently had an anterior infarction (58.3%) and the higher percentage of pulmonary edema (18%) p 0.001.The age group ≥85 years old more frequently had an inferior infarction (68.9%) and congestive heart failure (33.3%) p 0.001. On the other hand the age group 25-44 years old presented more frequently with inferior infarction but without pulmonary edema. This perhaps due to the fact that older age is associated with significant cardiovascular structural and physiologic changes that might predispose patients to adverse outcomes, including abnormalities of left ventricular diastolic function[19,20], decrease in systemic vascular compliance[21]. Based on coronary angiography a small proportion of elderly patients (75-84 age groups)

underwent coronary angiography (16%) and revascularization (58.3%). On the other hand, none of over 85 years old underwent coronary angiography. The incidence of complication increased with age. When compared to young patients, the elderly patients with AMI showed that cardiac failure (33.3%), acute edema pulmonary (18%) and cardiogenic shock (13.6%) were presented as more common complications p 0.001. In hospital mortality were higher in the age group ≥85 years (17.2%) p 0.002. This due to the fact that co-existence of co-morbid conditions like diabetes, hypertension, chronic kidney disease, prior MI, CHF and poor myocardial reserve increases the mortality in this subset of population.[6,22,23] It is known that cardiac failure is a predictor of poor outcome after AMI.[24] It is also known that the prognosis of the elderly patients with heart failure remains poor[25] even with "the best practice" interventions. In our study, the next common complications observed in elderly with MI were arrhythmias as compared to young with MI. This is not related to differences in location and extent of myocardial necrosis and ischemia.

Limitations

Our study have some limitations. The small number of patients included in the study because of the results for smaller subgroups should be interpreted with caution. This was a small single center study and selection bias might exist. We cannot exclude that a number of elderly 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. Our study included data only on in-hospital mortality and no follow up data were taken. Therefore, these findings should not be generalized. Our results suggest that the emphasis for the elderly population should be oriented towards a better control of hypertension, diabetes and the other risk factors and a better treatment of heart failure.

CONCLUSION

The risk factors for an AMI event are more likely to be present among patients who belong to elderly and they have more than two risk factors. The percentage of female were higher in the elderly. The elderly received less frequently a coronary angiography after episode of AMI. The prevalence of cardiac failure was higher in the elderly AMI patients. In hospital mortality were higher in this subset population. Knowing the modifiable risk factors between the two age groups can help in planning properly secondary preventive programs to target the different age groups. More research are needed to improve effective strategies in the prevention and management of cardiac failure in the elderly with the hope of improving the outcome in elderly AMI patients.

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