ORIGINAL ARTICLE

Advancing Age as a Risk Factor for Acute Myocardial Infarction

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doi: https://doi.org/ 10.53685/jshmdc.v2i2.80

ABSTRACT

Background: Acute myocardial infarction (AMI) is one of the leading causes of death in developed and developing countries. Age is an important non-modifiable risk factor for acute myocardial infarction.
Objectives: The objective of the study was to explore the relationship of advancing age with the risk of acute myocardial infarction.
Methods: It was a cross-sectional study conducted in 2019 after getting approval from Institutional Review board of University of Health Sciences, Lahore. Written informed consent and thorough history was taken from the study participants. Group 1 included 45 AMI patients aged 20-60 years. Group 2 included 45 healthy individuals aged 20-60 years. Independent sample t test and chi-square tests were applied for analysis of data.
Results: Mean age was significantly higher in AMI patients (50.52±7.31) as compared to healthy controls (30.67±7.20). The risk of AMI increases with advancing age ($p<0.001$, OR= 2.78).
Conclusions: Advancing age is an important risk factor for acute myocardial infarction.

Key Words: Acute Myocardial infarction, Advancing age.

How to cite this article: Bashir A, Salam A, Kanwal A. Advancing age as a risk factor for AMI. JSHMDC. 2021; 2(2): 72-76. doi: 10.53685/jshmdc.v2i2.80

INTRODUCTION

Acute myocardial infarction (AMI) is one of the leading causes of death in developed and developing countries.[1] In event of irreversible damage to the heart muscle, a complete absence or deficiency of oxygen supply will lead to impairment of cardiac function, making the person prone to arrhythmias. [2] Globally the incidence of acute myocardial infarction varies greatly. Approximately 6, 50,000 and 1, 80,000 acute myocardial infarction patients are reported from USA and UK every year respectively.[3] More than 3 million people with

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Received 07.10.2021, Revised 05.11.2021,
Accepted 22.12.2021

ST elevation myocardial infarction and 4 million with non- ST elevation myocardial infarction episodes are reported every year globally. [4]

The Asian population is more vulnerable to AMI.[5] It has been evaluated that risk of AMI is fifty percent greater in Indian subcontinent than in caucasians in UK.[6] Pakistan is one of the developing country being populated by more than 18.7 crore people.[7] Over sixty percent of Pakistani population lives in rural areas and is responsible for huge load of coronary heart disease (CHD).[8]

There are many risk factors for AMI. Some of the risk factors are modifiable and the others are non- modifiable[9.] Advancing age could be a non- modifiable risk factor for AMI. There are many studies which reported the incidence of myocardial infarction in different age groups, but majority of these studies indicated a relationship between advancing age and increased mortality in acute myocardial infarction [10]. It is often reported that 80% of heart disease related mortality occurs in people with 65 years or above. The age range of occurrence of this event in most of the males is between 50-65 years whereas in females it is 10 years later, especially after the onset of menopause. This aspect has many serious implications in many countries as there is an increasing trend in the number of geriatric populations in many countries [11.]

In Pakistan ischemia heart disease (IHD) is the 2nd leading cause of death in all age groups, contributing to 11% of all deaths [12.] So, we should have a proper understanding regarding the risk factors of AMI in our country.

Objective:

The objective of the study was to explore the effect of advancing age on the risk of AMI in our population.

MATERIALS AND METHODS

It was a cross-sectional study conducted in 2019 after getting approval from Institutional Review board of University of Health Sciences, Lahore. Written informed consent and thorough history was taken from the study participants. Group 1 included 45 AMI patients aged 20-60 years. Group 2 included 45 healthy individuals aged 20-60 years. The subjects with malignancy, chronic kidney disease, history of smoking, thyroid disorders, pregnant or lactating women, hepatic disease, hyperparathyroidism, hypertension, tuberculosis, autoimmune disease were excluded from the study. The diagnostic criteria were based on presence of at least one of the following: symptoms of myocardial ischemia i.e., severe chest pain, lasting >30 minutes <24 hours, not responding to nitroglycerine, echocardiography (ECG) changes indicating acute ischemia, appearance of pathological Q waves, imaging evidence indicating acute loss of viable myocardium.

Statistical Analysis

The data were analyzed by SPSS version 23. Independent sample t test was used to compare the quantitative variables between two groups. Logistic regression analysis was done to test association of age with AMI. $P<0.05$ is considered statistically significant.

RESULTS

Table 1 shows that the mean age of the cases was found to be 50.52±7.31 and of controls was 30.67±7.20. There was a statistically significant difference between the age of the AMI patients and healthy controls ($p<0.001$). The mean pulse rate of the cases was found to be 78.4±10.7 and of controls was 74.35±8.83. The mean pulse rate of the AMI patients was significantly higher as compared to controls ($p=0.049$). The mean systolic blood pressure of the cases was found to be 150± 6.2 and of controls was 120±4.4.

The mean systolic blood pressure of the AMI patients was significantly higher as compared to controls (p<0.001). The mean diastolic blood pressure of the cases was found to be 80±2.2 and of controls was 82±1.2. The mean diastolic blood pressure of the cases was significantly higher as compared to controls (p=0.023).

Table 1: Comparison of patients with acute myocardial infarction and healthy controls

Parameters	AMI Patients	Healthy Controls	P-Value
Age (years)	50.52±7.31	30.67±7.20	<0.001*
Pulse (rate / min)	78.4±10.7	74.35±8.83	0.049
Systolic Blood Pressure (mm Hg)	150± 6.2	120±4.41	<0.001*
Diastolic Blood Pressure (mm Hg)	80±2.2	82±1.23	0.023*

Independent sample t test was applied; <0.05 considered statistically significant

Table 2 is exhibiting the stats for logistic model between the AMI patients and healthy control groups. The table shows that the risk of AMI is significantly higher in older age (p<0.001, OR= 2.78). The systolic BP was showing a positive impact on the odds ratio for the probability of having AMI issues (p<0.001, O.R=0.082). Diastolic BP was also showing a positive impact on the odds ratio for the probability of having AMI issues (p=0.023, OR=0.148). It was also found that the impact of pulse was insignificant in this regard.

Table:2 Association of advancing age with the risk of acute myocardial infarction

Parameters	SE	p value	OR	95% CI for odd's ratio
Age (years)	0.43	<0.001*	2.78	.016-3.24
Pulse (rate / min)	0.69	0.049	1.06	0.45-1.62
Systolic Blood Pressure (mm Hg)	0.04	<0.001*	0.082	0.08-1.04
Diastolic Blood Pressure (mm Hg)	.064	0.023*	0.148	0.05-1.22

Logistic Regression test was applied; <0.05 considered statistically significant

DISCUSSION

In this cross-sectional study, we found that the risk of AMI increases with advancing age. On comparison of age between two groups, our study found that the age of AMI patients was significantly higher than the age of healthy controls (p<0.001). These findings are supported by other studies which found that the occurrence of AMI increase in older age may be due to increased prevalence of comorbid conditions in old age i.e., T2DM and HTN.[13]

An international study conducted on 400 subjects concluded that ageing increases the risk of AMI.[14]

Our study is also supported by a few studies done in Pakistan. A study conducted at Agha Khan University revealed that the risk of AMI is more in older patients.[15] Another study conducted in Sindh on 100 cases of AMI found that age group 40-50 years, male gender, over-weight, stress, hypertension, and positive family history are the major risk factors for acute AMI in the study population and most of these risk factors are modifiable.[16]

In our study, it was found that systolic blood pressure of AMI patients was significantly higher as compared to healthy controls (p=0.000). Previously it was revealed that in old age, hypertension is even worse to heart and responsible for at least 70 percent of heart disease.[17] Several mechanisms can account for the increased coronary risk in hypertensive patients. Hypertension accelerates the effects of atheroma, increases shear stress on plaques, exerts adverse functional effects on the coronary circulation, and impairs endothelial function and control of sympathetic tone.[18]

Present study has few limitations that include small sample size, and it only studied the effect of age and blood pressure as risk factors for AMI. Future studies on larger sample size and including more risk factors are recommended.

CONCLUSION

Advancing age is an important risk factor for AMI**.**

Source of funding

University of Health Sciences, Lahore.

Conflicts of interest

All authors have no conflict of interest.

Contributors

AB: Conception, data collection, data analysis, results, primary drafting, and final approval.

AS: Data collection, results, discussion, and literature review.

AK: Results, discussion, and literature review.

All authors approved the final version and signed the agreement to be accountable for all aspects of work.

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