Myocardial Infarction: Factors Influencing Age of Onset and Comparison with the Past Decade

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Abstract

Background- Coronary artery disease is the most common cause of death worldwide. The objective of this study was to determine the average age of onset of myocardial infarction (MI) and compare it with that in the past decade. Also, the frequency of risk factors for MI in different age groups and in military personnel compared to the general population was evaluated.

Methods- In this two-stage case series study, patients admitted with acute MI in three hospitals, Baqiatallah General Hospital, Jamaran Heart Hospital and Shaheed Rajaie Cardiovascular Medical Center, were studied. Data including age, sex, occupation, risk factors, etc. were gathered. A total of 471 patients with AMI were studied, 349 of whom were admitted in 2001 with AMI and underwent interviews and medical record evaluation, and 122 had AMI in 1991 and had their records evaluated and research forms completed.

Results- In 2001, the average age of the patients was 59.1±12.2 years old, and in 1991, this figure was 59.18±10.8 yrs (p=0.94). In 2001, 60 patients from the total of 349 studied (17.2%) were below 45 years old, and the remainder were older than 45 years of age. In the younger than 45 years old group, the most common risk factor was smoking (23.3%), followed by hyperlipidemia (20.9%). In the over 45 group, smoking was also the most common risk factor (21.9%, P=0.36). In 1991, 13 of the 122 patients studied (10.7%) were below 45 years old. The most common risk factor in this group was smoking (53.8%). In the over 45 years old group, smoking (22.2%), followed by hypertension (22.2%) were the most common risk factors (P=0.07). In the military personnel, the average age of the patients was 45.7±8.4, and in the general population, the average age was 61.8±11.0 (P<0.001). Frequency of patients with no risk factors in the military personnel group was 11 patients (31.4%), and 38 patients (17.9%) in the general population (P=0.16).

Conclusion- The average age of patients with AMI in the past decade has not significantly changed. Although the average age of onset of AMI in our country is not very young, it is younger than that in some countries. The frequent risk factors involved are mainly smoking and hyperlipidemia, which are a reflection of lifestyle. Also, age of onset of acute MI in military personnel is significantly earlier than that in the general population, and risk factors are slightly more prevalent in this group ***(Iranian Heart Journal 2005; 6 (1,2): 11-16).***

Key words: myocardial infarction ■ average age ■ risk factors

Cardiovascular disease, especially coronary artery disease, is the most common cause of death worldwide. In the US, one person suffers from myocardial infarction every 20 seconds. [1,2]

Coronary atherosclerosis, which causes myocardial infarction, is one of the major health concerns of humanity today, and nearly all cases of MI are a direct result of coronary artery atherosclerosis.[1]

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About 45% of patients with AMI are below 65 years of age, and 37% of men who die as a result of MI are below 55 years of age.[1]
Patients who survive MI are at risk of developing complications, the most common of which is heart failure. Thus, each year, a significant number of the active work force is lost, imposing a heavy burden on the society. In the US, 50 to 100 million dollars' worth of medical care is lost in this way each year.[1]
In this study, we attempted to determine the average age of onset of acute MI and compare this with the past decade. We also studied the frequency of risk factors for MI in different age groups, and the average age of onset and risk factor distribution among military personnel compared to the general population.

Methods

In this two-stage, retrospective and prospective case series study, all patients with AMI admitted to the Baqiatallah General Hospital, Jamaran Heart Hospital and Rajaie Cardiovascular Medical Center were evaluated. From a total of 471 patients, 349 patients admitted in 2001-2 were studied prospectively. For purpose of comparison, 122 patients with AMI admitted in 1991-2 were evaluated. Questionnaires containing data for age, sex, occupation, risk factors, etc. were completed by patients and their relatives or derived from their medical files for both groups. In the retrospective group, incomplete medical records were a limiting factor which was present. After data collection, SPSS software was used to analyze the data. Chi square and student t-test were also used for qualitative and quantitative variable analysis, respectively.

Results

122 patients (25.9%) were in the retrospective group pertaining to 1991, and 349 patients (74.1%) were in the 2001 group. In the latter group, 242 patients (69.3%) were male. Concerning occupation, 46 patients were military personnel (14.2%), 97 patients were retired (30%), 99 were housewives (30.7%) and 52 were self-occupied (16.1%).
The most common clinical presentation was typical chest pain (322 patients, 97%), and the remainder presented with atypical chest pain or cardiac arrest. Family history of MI was present in 94 patients (28.4%).
In ECG, 197 patients (81.1%) had Q-wave MI and 46 (18.1%) had non-Q wave MI. 114 patients (43.2%) had anteroseptal MI, 85 (32.2%) had inferior and 26 (9.8%) patients had inferior and right ventricular MI. Average serum cholesterol level was 203±55.4mg/dL, triglyceride level was 175.7±115mg/dL and average blood sugar level was 165.7±85.4mg/dL.
In the 1991 group, 95 patients (77.9%) were male. 112 patients (91.8%) presented with typical chest pain, and four patients (3.3%) presented with cardiac arrest. 12 patients (9.8%) had a positive family history for heart disease. 102 patients (83.6%) had Q-wave MI, and the remainder were non-Q wave MI. Forty-seven patients (38.5%) had inferior MI, 46 patients (37.7%) had anteroseptal MI and 18 patients (24.8%) had extensive anterior MI. Average serum cholesterol level was 223.1±64.2, triglyceride level was 184.2±42 and blood sugar level was 141.4±88.2mg/dL. In the 2001 group of patients, the average age of onset of MI among all the patients (male and female) was 59.1±12.2 years old.
The youngest patient was 32 and the oldest was 89 years old.
The average age of onset of MI in the 1991 group was 59.18±10.8 years, the youngest patient being 23 and the oldest 86 years of age.
Average age of onset using student t-test was not significantly different between the two groups (P=0.94, Table I).

Table I. Comparison of average age of MI in the two groups

Group	No.	Average age	SD	P value
1991	122	59.18	10.8	0.94
2001	349	59.1	12.27	

The average age of onset with respect to occupation (military or non-military) is shown in Table II and with respect to gender in both groups is depicted in Table III.

Table II. Comparison of average age of onset of MI in the two groups with respect to military and non-military occupation.

Group		No.	Average age	SD	P value
1991	Milit.*	27	53.8	8.5	0.03
	Non-milit.	95	60.6	11.02	
2001	Milit.	46	45.7	8.4	<0.001
	Non-milit.	276	61.8	11.02	

*Milit: military, Non-milit: non-military

Table III. Comparison of average age of onset of MI in the two groups with respect to gender.

	Group	No.	Average age	SD	P value
1991	Male	95	58.6	11.2	0.27
	Female	27	61.2	9.3	
2001	Male	242	57.3	12.4	<0.001
	Female	106	63.1	10.8	

and above 45 years old groups. In the 1991 group, 13 patients (10.7%) with MI were below 45 years old, while in the 2001 group, 60 patients (17.2%) were below 45 years of age. Chi-square test did not find this difference statistically significant (P=0.1).
In the 1991 group, the average age of onset for men was 58.6±11.2 years and 61.2±9.3 years for women (P=0.27, NS). In 2001, the average age of onset for men was 57.3±12.4 years and 63.1±10.8 years old for women, this difference being statistically significant (P<0.001).
In Figure 1, distribution of risk factors for the 2001 group in the below 45 and above 45 years old groups is depicted.

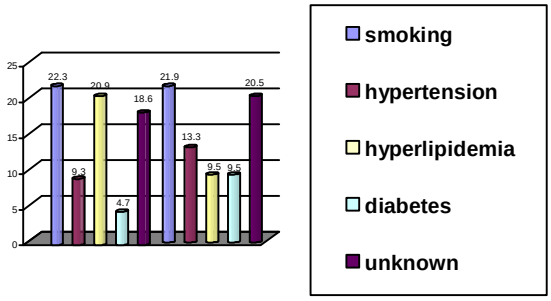

Fig. 1. Distribution of risk factors for the 2001 group in the below 45 and above 45 years old groups

Overall, the most common risk factor (disregarding positive family history) in the below 45 years old group was smoking (23.3%) and hyperlipidemia (20.9%), and in the above 45 years old group, smoking (21.9%) and association of smoking with other factors (21%). There was no significant difference between the two groups (P=0.36). In the above 45 group, 75 patients (27.6%) had a positive family history of heart disease, while in the below 45 group, this figure was 18 patients (31%). Thus as it is clear, after positive family history, smoking was the most common risk factor in both groups.
As depicted in Figure 2, in the 1991 group, 33 patients (29.5%) had no known risk factors, while in the 2001 group, 51 patients (20.1%) had no known risk factors. The most common risk factor one decade ago was smoking (25.9%), followed by hypertension (20.1%). In the 2001 group, smoking (22%) and smoking associated with other risk factors (20.1%) were the most common risk factors. In general, the distribution of risk factors in the recent group compared to the last decade shows a significant difference (P=0.001).

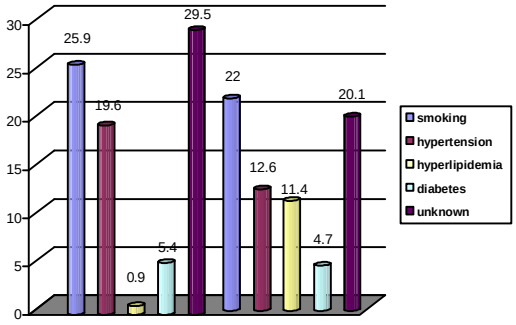

Fig. 2. Distribution of risk factors in the recent grou

Comparing MI and risk factors in military personnel with the general population in the 2001 group, we found that the average age of MI patients in the military group was 45.7±8.4 years old and 61.8±11 in the male general population, the difference being statistically significant (P<0.001). Eleven patients in the military personnel group (31.4%) had no known risk factors, while 38 patients (17.9%) in the general population had no known risk factors. Hypertension (14.3%), diabetes (5.8%) and smoking (28.6%) were more frequent in the military personnel group compared to the general population, but this difference was not statistically significant (P=0.16).

Discussion

Study of patients with MI in 2001-2 revealed that most patients were male, less than 20% were

military personnel, and similar to that reported in the literature, most patients presented with typical chest pain and after initial diagnostic procedures, were admitted with a diagnosis of AMI.[1,3,4] Most patients had Q-wave MI, and the most common type was anteroseptal MI, followed by inferior MI.

In the 1991 group of patients, most were male, with a frequency slightly higher than that in the 2001 group, and about 20% were military personnel. Most patients presented with typical chest pain and had Q-wave MI on presentation, and the locations of MI were most frequently anteroseptal and inferior.

The main goal of this study was to evaluate the average age of onset of MI and compare it with that of the past decade. As stated previously, the average age of onset of MI in the 1991 and 2001 groups was about 59 years of age. This means that the age of onset of MI in our country is less than that in industrialized nations and that it has not changed significantly in the past decade.

In 1999 in Australia, a similar study on MI in 1986, 1994 and 1996 revealed that the average age of MI in that 10-year period increased from 67.5 to 68.1 years old (P=0.35, NS). However, the percentage of patients above 75 years old increased from 24.6% to 30.3%,[5] which was statistically significant. In our study, the percentage of patients above 45 years old was considered, and this showed an increase in the 2001 group of patients, although the increase was not statistically significant. As it is evident, the average age of MI in our country is nearly 10 years younger than that of Australia. Also, it is noteworthy that the average age of males decreased from 58.6 years in the 1991 group to 57.3 years old in the 2001 group, but in females this figure rose from 61.2 years to 63.1 years.

In both stages of the study, the average age in the females was higher than that in the males. This difference was not statistically significant in the 1991 group (61 years for females vs. 58 years for males), but was significant in the 2001 group (63 for females vs. 57 years for males). In other words, in the 2001 group, the average age for males decreased, while that for females increased. In a study in Japan, a significant age difference was reported for women compared to men with MI.[7] Also, in a study from the Netherlands in 1999, at the age of 55 years old and above, the relative risk for MI in males was 1.9 (CI 95%, 1.1 to 3.3) and for females 3.2 (CI 95%, 1.5 to 6.4).[8]

The second part of the study evaluated the frequency of risk factors for MI as compared to that in the past decade. In 2001 in the below 45 years old group, factors such as smoking and hyperlipidemia played a more important role compared to the above 45 years old group, but the difference was not statistically significant. This result is concordant with that reported in the literature.[3,9] For example, a study from South Africa in 2002 studied risk factors in 245 patients with MI, who were below 45 years of age. The most common risk factors were smoking (74%) and hypertriglyceridemia (54%).[10] Family history for heart disease was not significantly different in these two age groups.

In a study from Denmark in 1997, risk factors for MI in patients with a positive family history were evaluated. Results showed that smoking, systolic and diastolic blood pressure and hypercholesterolemia were factors that increased the risk of MI in these patients.[11] In a study in 1988, hypertension and diabetes were reported to play a major role in MI in patients younger than 35 years of age.[12] In another study, hypercalcemia was mentioned as an important factor for MI in middle-aged patients.[13]

Looking at the risk factors in the 2001 and 1991 groups, we see that in 2001, hypertension and hyperlipidemia and its association with smoking was strikingly increased. This issue must be considered by the authorities for prevention and control of risk factors in the society. In a study in Japan recently, hypertension, diabetes, obesity and smoking were common risk factors for MI, and a comparison with previous reports from that country showed that changing lifestyles and dietary habits were largely responsible for this change in the society.[7]

The third aspect of this study was a comparison between the average age of onset and risk factors for MI in military personnel and the general population. As stated previously, the average age of onset of MI in military personnel in 2001 was significantly less than that in the general population, such that the average age in military personnel was 16 years younger than that in the general population. Furthermore, risk factors such as hypertension, smoking and diabetes were more prevalent in military personnel with MI, but this difference was not statistically significant. Perhaps the younger age of onset of MI in the military personnel group can be attributed to the increased job-related stress tolerated by these personnel. Further confirmation of this matter requires additional and more detailed studies and research. A study in the US reported that the average age of onset of cardiovascular disease in air force pilots in that country was 3 years younger than the general population and that fighter plane pilots were especially at risk of MI.[14]

In conclusion, we must say that although the average age of onset of MI in our country is not very young, it is still much younger than that reported by other countries, and this issue requires special attention. Also, contrary to previous beliefs, a significant change in the past decade regarding the average age of onset of MI in our country was not seen, and this is in spite of increasing public awareness and major achievements in the field of prevention of cardiovascular diseases in the recent decade. It is worth mentioning that with respect to the increase in urban lifestyles and changes in living habits of the society towards those in industrialized societies, the respective authorities must effectuate more comprehensive and strict measures towards the prevention of this disease in our society.

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