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Research Article

Comparison of risk factors and complications in patients with myocardial infarction of two types, STEMI and NSTEMI, between the age groups greater than 40 years and less than 40 years

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Abstract

Background: AMI, commonly referred to in general terms as a heart attack, is often caused by reduced or interrupted blood flow to a part of the heart, leading to myocardial necrosis. This is generally the result of a blood clot in the coronary artery that supplies that area of the heart muscle.

Methods: An observational study of the type of cross-sectional study. This study targeted the patients of Damascus Hospital. Where the sample was randomly selected, about (200) patients were selected who met specific acceptance criteria, the most important of which is the presence of adequate information in the file, while all patients were excluded according to specific exclusion criteria.

- Admission Criteria: Patients admitted to the ambulance or internal department at Al-Mujtahid Hospital, who were treated within the hospital and were not referred to other hospitals.

- Exclusion criteria: Patients whose information important for conducting the research was not explicitly documented in the files or who had a lack of basic study information.

- Place of study: Damascus Hospital (Al-Mujtahid).

- Study time: between 1/12/2023 and 4/15/2023.

Results: The most important factors and determinants associated with a higher risk of developing myocardial infarction in a certain age group (under 40 years) than the corresponding ones (over 40 years) according to the conducted statistical analysis:

- Under 40 years of age: alcoholism and a family history of death from heart disease.

- Over 40 years: BMI, low physical and physical activity, unhealthy diet, atherosclerosis, and high blood pressure.

Conclusion: Through our study that compared the risk factors for myocardial infarction, we recommend avoiding all risk factors for myocardial infarction, especially before the age of 40 years, as these factors accelerate the risk of myocardial infarction and the risk of life-threatening complications or even death. Therefore, we recommend the following:

- Avoid excessive alcohol consumption at a young age because of its current and cumulative effect on the risk of myocardial infarction.

- We recommend that all patients under the age of 40 and those with a family history of myocardial infarction visit a cardiologist regularly for examinations and reassurance.

- Maintain low-effort exercise on a daily basis, such as walking. And moderate-intensity sports twice a week for all age groups, especially for those under 40 years old.

Many of the risk factors for myocardial infarction do not often exist suddenly or without warning, but rather they are cumulative with age, so paying attention to heart and physical health before the age of 40 has the greatest impact in preventing or avoiding the risks of infection in the future.

Keywords: STEMI; NSTEMI; inflammatory cues; cardiac markers; complications; risk factors; damascus hospital

Introduction

Our understanding of the causes, diagnosis, and treatment of acute myocardial infarction (AMI) has evolved dramatically over the past 40 years. In the early 20th century, AMI was generally considered a fatal event diagnosed only at autopsy. Until the 1970s, with a proper understanding of the usual clinical presentation and prognosis, it was managed conservatively with prolonged bed rest and thereafter with a sedentary lifestyle. Since then, the evolution of information has accelerated our understanding of the pathogenesis of disease and markedly altered our treatment options, leading to vastly improved outcomes.

Epidemiology:

The most common cause of death and disability in the Western world and worldwide is coronary artery disease. Based on 2015 mortality data from the National Health Interview Survey (NHIS CDC), the mortality rate for MI was 114,023, and MI was cited as a contributing factor to the incidence of death in 151,863 cases. According to NHANES-CDC National Survey data from 2011 to 2014, an estimated 16.5 million Americans older than 20 had coronary artery disease, and the prevalence was higher in males than females for all ages. According to NHANES 2011 through 2014, the overall prevalence of MI is 3.0% in American adults over 20 years of age.

Methods

Objectives of the study:

Our study aims to compare risk factors and complications in patients with myocardial infarction, both types of STEMI and NSTEMI, between the age groups greater than 40 years and less than 40 years. We have included this research to enrich previous scientific research that has already dealt with this topic.

Inclusion criteria and exclusion criteria:

Inclusion criteria:

Patients admitted to the ambulance or internal department at Al-Mujtahid Hospital, who were treated within the hospital and were not referred to other hospitals.

exclusion criteria:

Patients whose important information for conducting the research was not explicitly documented in the files or had a lack of basic study information.

Place of study

Damascus Hospital (Al-Mujtahid).

Study period

between 12/1/2023 and 15/4/2023.

Study design and preparation:

An observational study of the type of a cross-sectional study.

This study targeted the patients of Damascus Hospital. Where the sample was randomly selected, about (200) patients were selected who meet specific acceptance criteria, the most important of which is the presence of adequate information in the file, while all patients were excluded according to specific exclusion criteria.

Statistical Analysis:

This data from the paper questionnaires was entered into a SPSS file version 25 to be analyzed and the results of this study found. Where the descriptive analysis (frequencies and percentages) was found for all variables in the study, and the inferential analysis included the study of the existence of relationships and correlations between many of the studied variables using Chi-square tests and One way-ANOVA.

Ethical considerations:

Ethical approval was obtained from the Institutional Review Board (IRB) Faculty of Medicine, Syrian Private University and director of Damascus Hospital.

Results

This study includes a total of 200 patients who visited the hospital during the research period. In terms of statistical distribution by gender, the percentage of males is predominant (about 81%), while the percentage of females is only 19%. (Table 1). The subject of the research is focused on the study of myocardial infarction diagnosed in patients reviewed, so the percentage of patients with STIMI is 84.5%, compared to 15.5% for patients with with NSTIMI. (Table 1). The comparison between two age groups (under 40 years and over 40 years) is the focus of the research. The research sample was divided into two comparison groups representing these two age groups. As for the age distribution of the studied sample, the average is greater than 40 (about 46 years), and this indicates a tendency to have cases of older ages, although the two groups of myocardial infarction patients younger than 40 years are equal to those older than 40, as will be seen later. (Table 1). As for the state of smoking, about three quarters of the respondents are smokers (only 25.5% of the total respondents are non-smokers). (Table 1). The weights of the respondents were evaluated and classified into three main groups, the most common of which were those with normal weight (47%). As for the other half of the sample, their weights were distributed between what corresponds to a body mass index that indicates overweight, and their percentage is 30%, and 23% for the category of obese patients. (Table 1) In terms of the sample's practice of any physical activity or sporting activity, it is remarkable here that 61.5%, which is the highest percentage, do not practice any physical activity or even periodic movement activity such as walking or jogging. On the other hand, the percentage of those who indicated that they practice periodic sporting activity did not exceed 15% of the sample. (Table 2) The study of food pattern constitutes an important and major axis that must be discussed. What is remarkable in the studied sample is that only 18% follow a sound health system, which indicates a high rate of heart disease, especially infarction cases. (Table 2). There is no statistically significant difference between the two groups in terms of representation of males and females, where P-Value > 0.05. Thus, myocardial infarction cases are always more common among males, and there is no difference according to age, whether it is a young man under forty or the elderly and elderly. (Table 2). In comparison, according to the type of infarction that occurred, whether STEMI or NSTEMI, the difference is also not significant between the two age groups, as the first type is always common in both and in a close proportion. (Table 2). The association is limited to alcoholism, as the largest percentage of alcoholics with a myocardial infarction in the studied sample are under the age of 40 years, and therefore excessive alcohol consumption is a risk factor for heart disease pathologies in young ages less than 40 years in particular. As for smoking, there is no correlation, so the percentage is almost equal between the two age groups. (Table 2) The body mass factor and the weight of the patient with a myocardial infarction as a risk factor and a determinant is very important with the age group, so the percentages of

obese and overweight patients are concentrated in a large way among patients over 40 years old, while under 40 years, the largest percentage of patients with myocardial infarction have normal weights. (Table 2) Low physical activity and exercise is associated with a greater risk of heart attack in older people over 40 than in those under 40. This can be seen by testing the correlation between the two variables, where P-value $<<0.05$. (Table 2). The diet followed in patients with myocardial infarction is largely associated with the risk of developing the disease, and the factor is more important in older ages over 40 years, so the percentage of unhealthy food intake is relatively higher for them compared to ages under 40, and this difference is statistically significant as P-Value <0.05. (Table 2), There is no statistically significant difference between myocardial infarction patients over 40 years and under 40 years in terms of the association of psychological distress with their incidence. As for diabetes, here a variable related to the duration of the disease was chosen, as is the case with high arterial tension. It is noteworthy here that there is no difference between the two groups of patients, so the frequency of periods of diabetes is similar between them, and there is no significant correlation, P-Value >0.05. In cases of atherosclerosis, the risk is

clearly concentrated in the ages over 40 years compared to the ages under 40 years, as cases of myocardial infarction occur more commonly in them, and this association has great statistical significance according to the chi-square evaluation, which resulted in a margin of error of less than 0.05. Here the correlation is at its highest pointer where P-Value $<<0.05$. This indicates that prolonged periods of high blood pressure constitute a greater risk factor for the development of myocardial infarction in people over 40 years of age. There is no statistically significant difference between myocardial infarction patients over 40 years and under 40 years in terms of the association of psychological distress with their incidence. There is no statistically significant difference between patients with myocardial infarction over 40 years and under 40 years in terms of the psychological distress related to their disease incidence, where P-Value >0.05. The factor of family history is one of the most important factors studied in detail and is significantly associated with a higher risk of myocardial infarction in patients aged less than 40 years compared to ages older than 40 years, according to the following statistical evaluation in the studied sample, where it has a P-value $<<0.05$. (Table 2).

Demographic information		N	%
Age	Under 40 years old	100	2
	Over 40 years old	100	20
Gender	Female	38	19
	Male	162	81
smoking	Yes	149	74.5
	No	51	25.5
infarction type	NSTEMI	31	15.5
	STEMI	169	84.5
weight	Obesity	46	23
	Overweight	60	30
	normal weight	94	47

Table 1: Demographic information and habits of sample members.

		Age		P. value	Chi-square
		Under 40 years old	Over 40 years old		
Gender	Male	77%	85%	0.149	2.079
	Female	23%	15%		
Smoking	Yes	74%	75%	0.871	0.026
	No	26%	25%		
Type infarction	STEMI	86%	83%	0.558	0.344
	NSTEMI	14	17%		
Alcoholic	Yes	23%	9%	0.06	7.292
	No	77%	91%		
Weight management	Obesity	6%	17%	0.000	30.15

	Overweight	**11%**	**19%**		
	Normal weight	**33%**	**14%**		
physical activity	**Yes**	**23%**	**7%**	**0.017**	**12.037**
	No	**56%**	**67%**		
	Waking	**0%**	**1%**		
	Sometimes	**20%**	**25%**		
food pattern	**Healthy**	**90%**	**10%**	**0.011**	**8.99**
	Unhealthy	**74%**	**25%**		
Stress	**Yes**	**67%**	**57%**	**0.82**	**5**
	No	**24%**	**23%**		
	Sometimes	**9%**	**20%**		
period of diabetes	**Less than 5 years**	**10%**	**7%**	**0.758**	**1.179**
	More than 10 years	**3%**	**5%**		
	Between 5 and 10 years	**13%**	**15**		
atherosclerosis	**Yes**	**23%**	**35%**	**0.06**	**3.497**
	No	**77%**	**65%**		
Period of hypertension	**Less than 5 years**	**15%**	**9%**	**0.000**	**21.719**
	More than 10 years	**1%**	**10%**		
	Between 5 and 10 years	**2%**	**16%**		
Lipid disorder	**Yes**	**10%**	**15%**	**0.393**	**1.143**
	No	**90%**	**85%**		
History of myocardial infarction	**Yes**	**8%**	**13%**	**0.249**	**1.330**
	No	**92%**	**87%**		
Family history of myocardial infarction	**Yes**	**39%**	**20%**	**0.05**	**8.679**
	No	**61%**	**80%**		

Table 2: Comparison of risk factors for both over 40 and under 40 years of age.

Discussion

Myocardial infarction (MI), commonly known as a heart attack, is a leading cause of death worldwide. Risk factors and indicators differ between individuals, and age is one of the most important factors affecting disease incidence and severity (1–6). This discussion aims to compare risk factors and indicators of myocardial infarction in patients over 40 years of age and under 40 years of age.

Risk factor

Many risk factors contribute to the development of myocardial infarction, including age, gender, family history, smoking, high blood pressure, diabetes, obesity, physical inactivity, and high cholesterol levels (1–6). Studies have shown that the prevalence of these risk factors differs between patients over 40 and under 40 (3–6). For patients over 40 years of age, the most common risk factors for MI are high blood pressure, diabetes, and smoking. A study by Khot et al. (2003) found that hypertension was present in 67% of patients over the age of 40 years with MI. Similarly, diabetes was present in 29% of the patients, and smoking was present in 52% of the patients 3. In contrast, the most common risk factors for myocardial infarction in patients under 40 years of age are smoking, obesity and hyperlipidemia. A study by Gupta et al. (2014) showed that smoking was present in 72% of patients under 40 years of age with MI. Obesity was present in 45% of the patients, and hyperlipidemia was present in 34% of the patients 4. In our studied sample, there was no significant difference between the two groups in terms of smoking, while our results agree with previous studies in the fact that hypertension is a major factor in pathogenesis. As for obesity, it affects the elderly more, while there is no difference in terms of high blood lipids. MI also differs among patients over 40 years of age or younger. The most common indications for a myocardial infarction are chest

pain or discomfort, shortness of breath, nausea or vomiting, and dizziness or lightheadedness. For patients over the age of 40, chest pain or discomfort is the most common indication of a myocardial infarction. A study by Khot et al. (2003) found that 91% of patients over the age of 40 with myocardial infarction had chest pain or discomfort. Dyspnea was present in 42% of patients, nausea or vomiting in 38%, and dizziness or lightheadedness in 28% (3). In contrast, chest pain or discomfort is less common in patients younger than 40 years of age. A study by Gupta et al. (2014) showed that only 63% of patients under the age of 40 had chest pain or discomfort. Dyspnea was present in 44% of patients, nausea or vomiting in 34%, and dizziness or lightheadedness in 20% 4. Alcohol consumption has been identified as a risk factor for myocardial infarction, however, there is little research on comparing MI patients over 40 and under 40 in terms of alcohol risk factor. 5 A study by Mukamal et al. (2003) found that alcohol consumption was associated with a lower risk of MI among men aged 40–75 years. However, this association was not observed in women or men under the age of 40. The study also suggested that moderate alcohol consumption (up to one drink per day for women and up to two drinks per day for men) may be beneficial for reducing the risk of MI.!!!5 Another study by Roerecke et al. (2018) analyzed the relationship between alcohol consumption and MI in different age groups. The study found that heavy alcohol consumption (more than 60 grams per day) was associated with an increased risk of myocardial infarction in all age groups, including those under the age of 40. However, moderate alcohol consumption was not associated with an increased risk of myocardial infarction in individuals younger than 40 years of age 6. A study by Khera et al. (2018) analyzed the association between family history of early cardiac death and MI in different age groups. The study found that a family history of premature cardiac death was associated with an increased risk of myocardial infarction in both age groups. However, the risk was higher for individuals under 40 years of age compared to those over 40 years of age which is quite similar to what we found in our research 7.

Conclusion

Through our study that compared the risk factors for myocardial infarction, we recommend avoiding all risk factors for myocardial infarction, especially before the age of 40 years, as these factors accelerate the risk of myocardial infarction and the risk of life-threatening complications or even death.

Therefore, we recommend the following:

Avoid excessive alcohol consumption at a young age because of its current and cumulative effect on the risk of myocardial infarction.

We recommend that all patients under the age of 40, who have a family history of myocardial infarction, visit a cardiologist for check-ups and reassurance.

Maintaining low-effort exercise on a daily basis, such as walking. And moderate-intensity sports twice a week for all age groups, especially for those under 40 years old.

Many of the risk factors for myocardial infarction do not often exist suddenly or without warning, but rather they are cumulative with age, so paying attention to heart and physical health before the age of 40 has the greatest impact in preventing or avoiding the risks of infection in the future.

Declarations

Ethics approval and consent to participate:

The Research Ethics Committee in the Syrian Private University and the ethical committees in the concerned Syrian private university approved the study protocol. Verbal informed consent was obtained from every participant before participation. All procedures performed in studies involving human

participants were by the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Consent for publication:

Not applicable.

Availability of data and materials:

All data related to this paper's conclusion are available and stored by the authors. All data are available from the corresponding author on a reasonable request.

Conflict of interest:

The authors declare that they have no conflict of interest

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