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Study of the relationship between hyperglycemia and hyperlipidemia and ACS in patients referring to a hospital in Tehran

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A B S T R A C T

Today, cardiovascular diseases are as one of the most important causes of death in the world. Much of heart patients with coronary problems have ACS disease. This disease is one of the serious cardiovascular diseases, which is more paid attention nowadays. The point of interest in the cardiovascular disease is the level of lipid and blood sugar that can be considered as one of the major factors in this disease. This study is aimed to assess the correlation between these two factors and the ACS. This cross-sectional study was conducted in the emergency departments of Tehran and among patients referred to the emergency department with chest pain. Patients with changes in enzymic levels and also with a finding in angiography, in favor of ischemia after admission to CCU, were considered as ACS. The information about the patients such as risk factors, paraclinical investigations and history were entered into questionnaire. In this study, from 49 patients with high blood 24 had atypical chest pain. 23 patients also had high blood sugar of which 11 patients had ACS. The results obtained were analyzed with SPSS software and were interpreted using descriptive statistics and statistical tests. The results indicated that there is an effective correlation between these two factors and ACS.

Introduction

Acute coronary syndrome (ACS) is a term used to show symptoms associated with acute myocardial ischemia [1]. ACS includes unstable angina (AU), without elevating ST myocardial infarction. ACS symptoms are similar in men and women. However, there are evidences that indicate the clinical symptoms of ACS may show gender differences [2]. The important features of the disease include cracking or rupture of *atheromatous plaques*, platelet aggregation

and thrombosis, and heart muscle may also be affected by the disease. As a result of the clinical appearances depending on the severity of the blockage in the coronary arteries, the presence or absence of perfusion and the volume of oxygen is required.

All of these may be effective in heart failure. The disease is a dangerous disease since it is the inability of the heart to maintain a normal blood circulation. Currently in the

United States approximately 5.7 million people have been diagnosed with the disease, which are mainly over 65 years old [3]. Common symptoms of this failure include respiratory problems even at rest, fluid accumulation and Lower limb edema, and general weakness [4]. Current treatments for heart failure, could stop progression of the disease, but they do not cure it [5]. To manage and minimize the negative symptoms of the disease a major change in lifestyle is required as well as various types of drugs used for this purpose [6]. Patients with heart failure, in addition to physical limitations, need to be hospitalized and receive special care to prevent disease progression which is associated with death threats [7]. Such pressures applied on patients by the disease makes the patients' life very difficult, these patients are at risk of many injuries, particularly depression [8]. This is also along with the low quality and satisfaction of life [9]. One of the important points in heart failures is related to vessels that are responsible for the blood transfusion to tissues throughout the body.

A heart attack occurs when a permanent injury or death is occurred in an area of heart muscle due to an inadequate supply of oxygen. Most blood clots which block blood path within the arteries cause heart attacks. Atherosclerosis changes cause narrowing of the arteries which acts as a factor to create blood clots. Sometimes, the atherosclerotic plaque inside the arterial wall cracks and results in the clot formation which is also called thrombus [10].

The clot in the coronary artery disrupts the blood flow and the oxygen supply to the heart muscle which causes the death of heart cells in that area. In most cases, heart attack and premature coronary artery disease have a direct correlation with the number and the severity of risk factors for atherosclerosis

[12-11]. Metabolic risk factors such as low HDL, high TG, and LDL cholesterol are observed in a significant percentage of the studied population (in some cases two to three times) [14-13]. Other factors such as high blood pressure [15], diabetes [16], smoking [17], and obesity [18] have been proposed and proven as risk factors for the coronary artery disease [19]. Heart is a visceral organ that is located in the middle of chest and its pain is felt in the same area. But the pain can be felt in other areas due to common neurological dermatomes. So as we said, the presentation sites of angina pectoris is from lower jaw to the top of umbilicus and epigastric pain or back pain may also be interpreted as a cardiac atypical pain. However, it is possible that the pain in the chest not be angina [21-20].

Coronary artery disease shows an increase in incidence rate by age. One of the major points is the family history of premature atherosclerosis (in men under 55 years and women under 65 years) which increases the risk of atherosclerosis. It is probably due to the environmental factors (such as dietary habits, smoking) and genetic susceptibility to atherosclerosis. There are some factors that their continuous monitoring and evaluation would reduce their effectiveness. The factors include high blood lipids, hypertension, hyperglycemia, metabolic syndrome, obesity, sedentary lifestyle and excessive consumption of alcohol that high blood fat and sugar are very important and should be considered [23-22]. This study is aimed to investigate the amount of fat and sugar in the blood of ACS disease, to study the effect of these factors in order to find a new step forward the treatment.

Methods

The Patients with atypical chest pain admitted to the Tehran's hospital were

studied. Non-random sampling was conducted and forms were filled out for each patient with patient's information including Hypertension, diabetes, hyperlipidemia and patient's history. Among patients with atypical pain, the patients with ECG changes or enzyme elevation and also with a finding in angiography, in favor of ischemia after admission to CCU, were considered as ACS.

Inclusion and exclusion criteria

People who were admitted with chest pain were examined. The patients with chest pain were divided into two groups: the first group involves atypical pain and the second group involves typical. The patients whose pain was atypical were studied and those who were typically were excluded. In the following, the patients with ACS were studied to assess the amount of fat and sugar in the blood.

Methods of data analysis

The data collected and the results were analyzed with SPSS software. Chi square (X²) and Fisher's exact tests were used to study the relationship between the risk factors and ACS. If the data in each cell be greater than 5, the chi-square (X²) was applied and if it be less than 5, the Fisher's exact test was applied. Companionship chance of the risk factors associated with ACS was analyzed using odds-Ratio statistical analysis.

Implementation constraints and the method to reduce it

About the risk factors such as hyperlipidemia and hyperglycemia, given the fact that TG and CHO tests are not performed on patients who are under care in emergency, it was tried to solve the problem

in terms of hyperlipidemia and hyperglycemia with taking a thorough history from patients based on anti-hyperlipidemic drugs and also, if possible, bringing the previous tests.

Ethical considerations

Ethical issues were considered during the examination, medical history and filling out the forms and the patients were assured that their information would be kept confidential.

Result and Discussion

A major problem for patients in the emergency department was chest pain. But given that hyperglycemia is also a risk factor for ACS, our research sought to examine the correlation between hyperglycemia and ACS. To achieve this goal, we asked to evaluate the blood sugar of the patients with ACS. In this study conducted among 23 patients, 11 patients had ACS and based on mentioned statistical analysis, there was a significant relationship between hyperglycemia and ACS ($P < 0.05$) (Table 1).

Hyperlipidemia is another risk factor for ACS. In this study, the blood fat level of patients who referred to the emergency department with chest pain was assessed, followed by studying in term of having ACS. According to the study conducted 49 patients had HLP of those 24 patients had ACS. Based on the mentioned statistical analysis, there is a significant relationship between HLP and ACS ($P < 0.05$) (Table 2).

Several studies have indicated the important role of fat and sugar in the incidence of cardiovascular disease, which demonstrate the importance of evaluating the amount of blood lipid and glucose.

Table.1 Relationship between hyperglycemia and ACS
 Comparison is based on statistical of Fisher's exact test

Variables under study		ACS		Total people	p-value
		Yes	No		
Diabetes	Yes	11	12	23	0.000*
	No	9	222	231	
Total people		20	234	454	

* Indicates a statistically significant correlation (P <0.05)

Table.2 Relationship between hyperlipidemia and ACS
 Comparison is based on statistical of Fisher's exact test

Variables under study		ACS		Total people	p-value
		Yes	No		
HLP	Yes	24	25	49	0.000*
	No	24	285	309	
Total people		48	310	358	

* Indicates a statistically significant correlation (P <0.05)

For example, the study conducted by Deedwania and his colleagues showed the relationship between hyperglycemia and ACS, and another study showed the relationship between hyperlipidemia and ACS [24 ,22]. In this study 150 patients referred to the emergency department with atypical chest pain were studied. Questionnaires were filled out for each patient with patient's information including Hypertension, hyperlipidemia, para-clinical investigations and patient's history.

In this study conducted among 454 patients. 23 people had diabetes of those 11 patients had ACS. According to the study conducted 49 patients had HLP of those 24 patients had ACS. In a study conducted in 1385 by Nasiri and her colleagues Showed a relationship between coronary artery disease and levels of triglycerides [24]. The results show that the ACS in patients with hypertension, diabetes and hyperlipidemia is more prevalence and HTN, DM and HLP are the risk factors for coronary heart disease.

According to this study, the patients with atypical chest pain who are admitted in the emergency department and have the risk factors, especially more than 2 risk factors, must be hospitalized and their enzymic serial and EGG must be investigated. But the patients with no risk factor can be discharged from the emergency department.

This process is very effective for better treatment of heart disease. According to the results, which demonstrated a relationship between ACS patients and blood lipid and sugar level, it can be concluded that diet is an important factor in the Immunity of Cardiovascular Disease. The incidence of cardiovascular disease would be reduced in case of consuming foodstuffs with a proper amount of sugar and fat, moreover, the problems would also be minimized if a proper amount of fruits and vegetables be consumed [24]. The studies mostly indicate the relationship between dietary and blood fat and sugar levels. The patients are recommended to consume low-fat foods in their diets and fewer sweets that are likely to

raise the blood sugar level, in order to reduce the risk of cardiovascular disease by reducing the amount fat and sugar levels in blood.

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