Research Article

The relationship between ABO blood group and acute myocardial infarction in patients referring to Amiralmumiin Hospital in Zabol in 2016

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Abstract

Introduction: Acute myocardial infarction is caused by a long-term myocardial ischemia.The ABO blood group exhibits a blood cell surface protein and an endothelial cell-associated Willebrand factor, and there is evidence that the blood type of individuals can determine the risk of thrombosis in advance.. Due to the importance and high prevalence of coronary artery disease, the association between myocardial infarction and ABO blood groups has not been proven so far and there are, even, controversial results; therefore, the present study was conducted to evaluate the relationship between ABO blood group and acute myocardial infarction.

Method:

The present case-control study was carried out at Amiralmomenin Hospital in Zabol. Samples were randomly divided in two groups, with blood serum of 300 patients with history of infarctionas the case group and that of 303 subjects with no history of infraction as the control group.The collected data was organized and analyzed using SPSS21 and descriptive and inferential statistics (ANOVA, Chi square, T test). All variables were considered significant in case of P<0.05 and the test was double-checked.

Findings:

A total number of 603 patients, with an age range of 30 to 80 years, were analyzed in the present study; general blood group map of patients with myocardial infarction (case group) was like this: 91 subjects (30%) A, 71 subjects (24%) B, 35 subjects (11%) AB, and 103 subjects (35%) O. General blood group map of patients with no history of myocardial infarction (control group) was like this: 96 subjects (32%) A, 85 subjects (28%) B, 27 subjects (9%) AB, and 95 subjects (31%) O. the analysis of Chi-square findings showed that, with a confidence of 95% and 0.5%, there is a significant correlation between the incidence of myocardial infarction and the blood group (P<0.012)

Discussion and conclusion:

. The results of this study may have been obtained with respect to the environmental and genetic conditions and characteristics of the Zabul. These results may also be due to subunit blood groups that have not been evaluated in our study; however, given their limited number and the findings of the present research, it can be stated that O blood group in women can predispose a person to myocardial infarction. However, in order to collect more solid and comprehensive data, more studies are needed to be conducted on ABO blood groups in Iranian populations.

Keywords: blood group , ABO,myocardial infarction

Introduction

Acute myocardial infarction is caused by a long-term myocardial ischemia(1). The onset of coronary artery disease causes narrowing of the vessels and the reduction of blood flow to the affected area(2). In the atrial area, plaques of cholesterol and tissue fibrosis develop along with sediments of calcium(3). These plaques cause more stenosis of the veins and rupture of the inner surface of the vein. The plaques are exposed to these laconic surfaces; consequently, they are activated and attached(4). As clots increase, the stenosis of the vein is increased and ultimately the vessel closes. With the weakening of the heart and decreased cardiac output, the amount of oxygen transmitted from the lungs decreases and, consequently, the content and pressure of the arterial, tissue and veins oxygen is reduced significantly(5). Over the past few decades, studies have shown that ABO blood group is associated with coronary artery disease more frequently(6). The ABO blood group exhibits a blood cell surface protein and an endothelial cell-associated Willebrand factor, and there is evidence that the blood type of individuals can determine the risk of thrombosis in advance(7). There is no enough evidence to support the association between blood group and the risk of coronary artery disease; actually, the findings of numerous studies are quite contrary(8). The results of Amirzadegan et al study (2006) in Tehran, Sari et al study (2008) in Turkey, and Sheikh et al study (2009) in Malaysia, showed that there is no correlation between blood groups and coronary artery disease(9). However, according to the findings of Setoode Anvari et al study (2009) in Tehran, coronary arteries diseases are more common in O blood group in comparison to other blood groups. Lee et al study (2012) in Taiwan showed that individuals with A blood group are at higher risk for coronary artery disease and cardiac infarction in comparison to other blood groups(10). Due to the importance and high prevalence of coronary artery disease, the association between myocardial infarction and ABO blood groups has not been proven so far and there are, even, controversial results; therefore, the present study was conducted to evaluate the relationship between ABO blood group and acute myocardial infarction.

Methodology

The present case-control study was carried out at Amiralmomenin Hospital in Zabol. Samples were randomly divided in two groups, with blood serum of 300 patients with history of infarctionas the case group and that of 303 subjects with no history of infraction as the control group. Definitive diagnosis was realized through clinical symptoms, diagnostic findings such as ECG, and echocardiography. The clinical record of the patient included required information on age, sex, risk factors such as high blood pressure, diabetes, obesity, smoking, and high blood lipids. The collected data was organized and analyzed using SPSS21 and descriptive and inferential statistics (ANOVA, Chi square, T test). All variables were considered significant in case of $P<0.05$ and the test was double-checked.

Findings

A total number of 603 patients, with an age range of 30 to 80 years,were analyzed in the present study; general blood group map of patients with myocardial infarction (case group) was like this: 91 subjects (30%) A, 71 subjects (24%) B, 35 subjects (11%) AB, and 103 subjects (35%) O. General blood group map of patients with no history of myocardial infarction (control group) was like this: 96 subjects (32%) A, 85 subjects (28%) B, 27 subjects (9%) AB, and 95 subjects (31%) O. the analysis of Chi-square findings showed that, with a confidence of 95% and 0.5%, there is a significant correlation between the incidence of myocardial infarction and the blood group ($P<0.012$). Table 1 lists the frequency distribution of the blood type and RH of the patients in two groups of control and case.

Table1. Frequency distribution of the types of blood type of the patients studied in both groups with and without myocardial infarction

Coronary artery stenosis / Blood group	Experimental	Control	
A	91	96	187
B	71	85	156
AB	35	27	62
O	103	95	198
Total	300	303	603
RH	--------------------------	------------------------	--------------------------
+	267	264	531
-	33	39	72
Total	300	303	603
Blood group & RH	--------------------------	------------------------	--------------------------
A+	82	84	166
A-	9	12	21
B+	62	69	131
B-	9	16	25
AB+	31	26	57
AB-	4	1	5
O+	93	89	182
O-	10	6	16
Total	300	303	603

Discussion and Conclusion

The present study was conducted to evaluate the relationship between ABO blood group and acute myocardial infarction in patients referring to Amiralmomenin Hospital in Zabol. A total number of 603 patients were analyzed in the present study; the mean age of participants was 56.24±8.17 years and the oldest age group turned out to be 51 to 60 years. In terms of the sex of the patients, subjects were equally distributed in two groups of the study. 10461 patients participated in Anvari et al study, 28.1% of whom were female with the mean age of 60.5±8.63 years and 71.9% of whom were male with the mean age of 58.17±9.88. Sheikh et al study was carried out on 170 patients with myocardial infarction, with the mean age of 58.17±9.89, and 170 individuals, with the mean age of 47±8.66. lee et al study included 265 subjects, 51% of whom had coronary artery stenosis and, according to the results of angiography, 49% of whom turned out to be healthy and arranged as the control group; 73% of patients had a history of MI. the patient group turned out to have higher rates of total body mass index (BMI), total cholesterol, and triglyceride in comparison to the control group. Miri et al research studies 1000 patients, 54.8% of whom were men and 45.2% of whom were women with heart ischemia; 9.9% of patients aged less than 45 years and 27.9% of them were above 55 years; unlike the present study, the most frequent age group turned out to be 65 to 75 years. The present study indicated a significant correlation between blood group and myocardia infraction (P<0.0012). there was no significant difference between at risk and safe subjects in patients with blood groups of B and AB; however, patients with blood groups of A and O were at higher risk and there was significant difference between blood groups of A and O with B ad AB in terms of possible risk. Based on the findings of Abdollahi et al study, unlike the present study, there was a meaningful relationship between the history of heart disease in the family and blood groups; however, similar to the present research, other risk factors did not have a significant association with ABO blood group. Consistent with the present study, Sari et al research, as well, showed that there was no significant relationship between risk factors for cardiovascular diseases and blood groups(6).

The results of Stakishatis et al. Showed that the relationship between blood groups B and risk factors for atherosclerosis is significant, which is inconsistent with our study, which can be justified by considering the diversity of blood groups in two study populations(11). Except for significantly higher rate of O blood group in women in comparison to men arranged in the case group (p <0/001), there was found no significant difference between blood groups of subjects participating in the present study. However, there was found no significant relationship between different blood groups and the history of the disease (P> 0.05). There was a significant relationship between the blood type O and the incidence of MI (P= 0.03). Significant association was not found between the Rh groups of the patients in two groups of case and control (p = 0/8) and no significant association was found between the types of blood groups and Rh of patients in control and case groups (P= 0.8). unlike the present study, in Setoode Anvari et al study, 32.7% of patients had A blood group, 35% had O blood group, 24.6% had B blood group, and 32.7% had AB blood group. Distribution of cardiovascular risk factors in ABO blood groups did not show any significant relationship with the distribution of sex with blood groups that was significantly higher in men with A blood group than in women. There was a significant difference between sex and O blood group (P<0.001). their study did not show any significant correlation between blood type B and MI incidence. Lee et al study showed that blood group A was significantly higher in patients with coronary artery disease and MI than subjects in the control group(10). The results of this study may have been obtained with respect to the environmental and genetic conditions and characteristics of the Zabul. These results may also be due to subunit blood groups that have not been evaluated in our study; however, given their limited number and the findings of the present research, it can be stated that O blood group in women can predispose a person to myocardial infarction. However, in order to collect more solid and comprehensive data, more studies are needed to be conducted on ABO blood groups in Iranian populations.

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