

# Distribution of Blood Groups among Patients with Cardiac Myxoma

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## ABSTRACT

**BACKGROUND:** Atrial myxoma is the most common type of primary cardiac tumor. The number of studies examining the possible role of blood groups in cardiovascular diseases is increasing. Our aim was to demonstrate the distribution of ABO and Rh blood groups in a large population of patients with atrial myxoma in Iran.

**METHODS:** In a case-control study design, 35,192 patients undergoing cardiac surgery in a tertiary heart care center in Iran were retrospectively reviewed. Demographic and clinical characteristics of patients with histologically confirmed diagnosis of cardiac myxoma were recorded. Control group consisted of age, gender and year of surgery matched 468 non-cardiac myxoma patients.

**RESULTS:** Of the 117 patients with cardiac

myxoma, 64 patients (54.7%) were female. Blood group A and O were the most frequent blood types (42.7% and 30.8%, respectively) as well as Rh<sup>+</sup> group (82.1%) in the cardiac myxoma group, and blood group O and A were the most frequent blood types (37.8% and 32.8%, respectively) as well as Rh<sup>+</sup> group (87.8%) in the control group, although the differences were not statistically significant ( $p>0.05$ ). There was no significant difference between different ABO blood groups and Rh status for tumor size, family history, recurrence, and mortality rate ( $p>0.05$ ).

**CONCLUSION:** Blood group A and O and Rh<sup>+</sup> status are equally prevalent in patients with and without cardiac myxoma. Whether blood groups have an effect on mortality of patients with cardiac myxoma remains to be seen.

Keywords: Cardiac myxoma; Blood group; Prevalence; Rh factor

## INTRODUCTION

Atrial myxoma is the most common primary cardiac tumor mainly originating in the left atrium [1,2]. Due to the lack of specific symptoms, diagnosing atrial myxoma can be challenging before serious clinical manifestations [3-5]. Congestive heart failure is the commonest clinical presentation followed by syncope, cough, and angina [3,5-7]. Surgical resection is the standard treatment for myxoma of the heart with variable recurrence rate [5-7].

Several studies have presented clinical and surgical entity of this rare condition with description of pathologic and imaging characteristics [7-9]. Nevertheless, there is no study examining the predisposing factors for this tumor. For several years, attention has been paid to the possible role of blood groups in some cardiovascular conditions including coronary

artery disease [10], aortic aneurysm [11, 12], and congenital heart defects [13].

However, no study has examined the distribution of blood groups in patients with atrial myxoma. Our aim was to demonstrate the prevalence of ABO blood and Rh blood groups in a large population of patients with cardiac myxoma referred to a tertiary care heart center in Iran.

## METHODS

In a case-control study, we retrospectively reviewed medical records of 35,192 patients who underwent cardiac surgery between January 2000 and January 2013 in a tertiary care heart center in Tehran, Iran. We retrieved medical records of patients with histologically confirmed diagnosis of cardiac myxoma. Control group consisted of 468 age, gender and year of surgery matched non-cardiac myxoma patients.

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Demographics and clinical characteristics of myxoma patients as well as tumor dimension and sizes, recurrence and mortality rates were recorded. ABO and Rh blood groups of patients with cardiac myxoma were analyzed in relation to these study variables. Patients had received standard surgical and medical treatment for their conditions and were followed on regular basis after their surgery. Institutional Review Board of our hospital approved the study protocol and all the extracted data were maintained confidential during the study period.

#### Statistical Methods

Data were analyzed using Statistical Package for Social Sciences (PASW, version 18, Chicago, SPSS Inc). One-way ANOVA was used to compare continuous variables between ABO blood groups and student t-test for Rh groups. Categorical variables were analyzed by Chi-Square test. Data were presented as mean  $\pm$  SD and N (%) and a  $p < 0.05$  was considered statistically significant.

#### RESULTS

A total of 117 patients with cardiac myxoma underwent surgical resection during our medical record review period. Mean  $\pm$  SD age was  $53.6 \pm 11.6$  and  $53.8 \pm 8.3$  years in the cardiac myxoma and control group respectively (range, 1 to 77 years) and male to female ratio was 53/64 (male 45.3% and female 54.7%). Blood group A (n=50, 42.7%) and O (n=36, 30.8%) constituted most types of ABO blood groups. Moreover, 96 patients (82.1%) had an Rh<sup>+</sup> blood group (Table1). In the control group blood group O (37.8%) was the most prevalent, followed by group A (32.8%). Rh<sup>+</sup> blood group was present in 87.8% of the controls. Statistical analysis revealed that the difference between both groups was not significant ( $p > 0.05$ ). There was no significant difference between blood groups for tumor size, recurrence, or mortality rate (Table 2). Similarly, there was no significant difference between 2 Rh groups in terms of tumor features and clinical outcomes (Table3).

#### DISCUSSION

An ABO blood group has been related to several cardiovascular conditions [10-15]. In a meta-analysis, it has been shown that non-O blood groups are associated with coronary artery diseases as well as some other peripheral vascular conditions [15]. Moreover, a relation-

**Table1:** Primary -characteristics of study patients

Characteristics	Myxoma N (%)	Control Group N (%)	P value
Age (mean $\pm$ SD, years)	53.6 $\pm$ 11.6	53.3 $\pm$ 8.3	0.84
Sex			0.54
Male	53 (45.3%)	212 (45.3%)	
Female	64 (54.7%)	256 (54.7%)	
ABO group			0.06
A	50 (42.7%)	153 (32.8%)	
B	21 (17.9%)	113 (24.2%)	
AB	10 (8.5%)	24 (5.2%)	
O	36 (30.8%)	176 (37.8%)	
Rh			0.07
Rh <sup>+</sup>	96 (82.1%)	409 (87.8%)	
Rh <sup>-</sup>	21 (17.9%)	57 (12.2%)	

-ship has been drawn between non-O blood group antigens and serum levels of von Willbrand factor as a possible mediator. It has also been demonstrated that type B blood group is more prevalent in children of African descent with congenital heart diseases [16]. However, no apparent relationship has been found between types of blood group and atrial myxoma.

To the best of our knowledge, this is the first study addressing the distribution of ABO and Rh blood groups in patients with ABO blood groups. This study demonstrated that blood groups A and O and Rh<sup>+</sup> are more prevalent in an Iranian population of cardiac myxoma patients in comparison with non-cardiac myxoma population. Most myxoma patients were female and left atrium was the most common site of tumor. Distribution of blood groups in our study population represents a similar pattern as the general population of Iran with blood group A as the most prevalent and blood group AB as the least prevalent blood group [10, 11]. Most studies have reported female as the predominant gender among patients with cardiac myxoma and reported a range of 2 to 97 years for their population [2-5, 8, 9, 17-19]. Our study also revealed that 58.5% of patients were female and their age ranges from 1 to 77 years. Furthermore, left atrium is the most common site of myxoma origin which is in line with other reports [2-5, 8, 9, 17-19].

A study by Gaszewska-Żurek stated that dyspnea/heart failure, syncope, and cough follow-

**Table2:** Comparison of tumor features, patient data and outcomes according to the type of ABO blood groups

	A (N=50)	B (N=21)	AB (N=10)	O (n=36)	P value
Tumor dimensions (mm)					
Length	4.8±2.2	5.1±1.6	5.6±0.9	5±1.7	0.67
Width	3.5±1.6	3.2±1.1	3.7±0.9	3.5±1.2	0.82
Height	2.2±1.1	2.3±0.9	2.6±1	2.1±1.6	0.77
Tumor volume (mm <sup>3</sup> )	57.5±92.7	48.4±45.3	61.4±41	38.8±29.8	0.59
Family history	5 (10%)	4 (19%)	1 (10%)	5 (13.9%)	0.75
Recurrence	3 (6%)	1 (4.76%)	0 (0%)	1 (2.7%)	0.80
Mortality	4 (8%)	1 (4.76%)	0 (0%)	2 (5.4%)	0.78

**Table3:** Comparison of tumor features, patient data and outcomes according to the type of Rh blood groups

	Rh <sup>-</sup> (N=21)	Rh <sup>+</sup> (N=96)	P value
Tumor dimensions (mm)			
Length	4.8±1.5	5.1±1.9	0.49
Width	3.1±1.1	4.7±1.5	0.33
Height	2.5±2	5±1.9	0.22
Tumor volume (mm <sup>3</sup> )	42.1±45	52.3±70.7	0.53
Family history	14 (14.6%)	1 (4.8%)	0.22
Recurrence	1 (4.7%)	4 (4.1%)	0.90
Mortality	0 (0%)	7 (7.2%)	0.20

-ed by chest pain and weakness were among the most common symptoms leading to the diagnosis of myxoma [4]. Another study however demonstrated a variety of symptoms and signs as clinical presentations of myxoma patients including emboli, murmur, fainting, and other cardiac complaints [3]. Due to a variation in characteristics of study environment and population, presentations, course of disease may vary and differ from one study to another. There were 7 in-hospital deaths (5.9%) in our myxoma population which is relatively similar to the reports by Gaszewska-Zurek with 6.7% inpatient mortality rate [4]. It should be noted that in other reports, mortality has not been exclusively analyzed because of inclusion of autopsy data into living population records.

More studies to evaluate clinical features and laboratory parameters of patients with cardiac myxoma may highlight other variables important in atrial myxoma presentation or natural history. Although this study suggests a possible role of blood groups, its small size population and limited study variables should be enriched by future studies to determine any relationship between these two entities.

## CONCLUSION

In conclusion, most patients with cardiac myxoma have blood group A and O and are Rh<sup>+</sup>. There is a female preponderance in this Iranian myxoma population and recurrence and mortality rate seems insignificant.

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