



ABO and Rh Blood Groups in Ischemic Heart Disease Patients: A Cross Sectional Study from Rural Tertiary Care Hospital of South Karnataka

Author

Shruthi Bettgowda*¹

¹Associate Professor, Department of Medicine, Adichunchanagiri Institute of Medical Sciences
Balangadharanatha Nagara, Nagamangala, mandya-571448, Karnataka, India

Corresponding Author

Dr. Shruthi B

Adichunchanagiri Institute of Medical Sciences, Balangadharanatha Nagar, Nagamangala (Tq), Mandya
(District) .PIN- 571448, Karnataka (State), India

Phone+917353285911, FAX: +08234287344, Email: bettgowda.shruthi@gmail.com

Abstract

Background: Genetic factors are one of the non modifiable risk factors for ischemic heart disease. The ABO blood group is one such pivotal genetic determinant that can give valuable information for early detection of risk population. The objective of our study was to assess the relationship between blood group and ischemic heart disease.

Method: 200 ischemic heart disease patients were included in this study. Study protocol included detailed clinical history, examination and investigations. Blood groups were determined using the slide haemagglutination technique.

Result: In the present study of 200 patients, 45% (90) had blood group B, 30% (60) had blood group A, 16%(32) had blood group O and 9%(18) had blood group AB. A total of 200 patients 150(75%) were Rh-positive, while 50 (25%) were Rh -negative.

Conclusion: Ischemic heart disease was higher in patients with blood group B (45%) than in other blood groups. More case control studies with a larger population are needed to confirm this association.

Keywords: ABO blood group, Ischemic heart disease, Rh blood group.

Introduction

Many studies have found that blood group phenotypes play as important genetic risk factors in many diseases. Previous studies found an association between ABO blood group and ischemic heart diseases (IHD)¹. Previous studies have shown that various blood group phenotypes have been implicated in increased risk of developing IHD^{2,3,4}. Some studies concluded that there was no association between development of

IHD and a particular blood group^{1,5,6}. Even though the blood group is a non modifiable risk, having knowledge of association between IHD and blood group can help to make healthy life style modification. These healthy life styles can be implemented in early life of at risk individuals as a preventive measure before the development of IHD. Although IHD is very common in south India, studies on blood groups in IHD patients from rural Indian areas are lacking. Therefore, the

aim of this study was to find out the association between ABO and Rh blood groups with IHD.

Materials and Methods

Consecutive 200 adult ischemic heart disease patients admitted in the medicine department of territory care hospital were considered for this descriptive observational study. Ethics committee approval was taken for the study. The written and informed consent of the patients was obtained. The IHD cases were diagnosed from the electrocardiogram findings, clinical features and biochemical marker as per World Health Organization guideline.⁷

Following patients were excluded from study

- Patients with valvular heart diseases
- Patients with pericarditis and inflammatory, malignant pericardial effusion
- Patients with aortic aneurysm
- Patients with renal disease
- Patients with liver disease
- Patients with hypothyroid/hyperthyroid disease
- Patients with anaemia, chronic obstructive lung disease
- Patients with connective tissue disorder

Study protocol included detailed clinical history and examination and investigations. A detailed clinical work up incorporating details of age, presenting complaints, diet, smoking, alcohol consumption, physical activity, reproductive history, socioeconomic status, body mass index and pedigree chart was made. Risk factors for IHD like hypertension, diabetes, dyslipidemia, family history of IHD was evaluated. Patients were subjected to ECG recording. ABO and Rh blood grouping was determined by slide haemagglutination method.

Data Analysis: Data were compiled and tabulated by using standard appropriate statistical technique, which includes numbers and percentages.

Results

In our study of 200 patients maximum incidence of IHD occurred in fifth decade (Table 1). In our study 122 were males and 78 were females. The percentage distribution of ABO blood groups in females showed predominance of blood group B(18%) and least in blood group AB(4%) In IHD males prevalence of blood group B(27%) was high and blood group AB prevalence low (5%) (Table 2). In males 100(50%) were Rh positive and 50(25%) females were Rh positive (Table 3).

Table 1: Age incidence

Age groups in years	Number of IHD patients	Percentage
40-49	32	16%
50-59	70	35%
60-69	64	32%
70-79	26	13%
80-89	8	4%

Table 2: Gender wise distribution of ABO blood groups [n(%)]

Blood group	IHD males	IHD females
A	38(19%)	22(11%)
B	54(27%)	36(18%)
O	20(10%)	12(6%)
AB	10(5%)	8(4%)
Total	122(61%)	78(39%)

Table 3: Distribution of Rh factor

Rh factor	IHD male	IHD females
Rh factor + ve	100(50%)	50(25%)
Rh factor- ve	22(11%)	28(14%)
Total	122(61%)	78(39%)

Discussion

IHD ranks high as main cause of mortality and morbidity worldwide⁸. There is growing evidence showing genetic influence on IHD⁹. Previous studies have shown blood group associations with various diseases like peptic ulcer, carcinoma¹⁰. Several reports have showed an pivotal role of the ABO blood group system in the susceptibility to IHD^{9,11,12,13}. The reason for thrombosis in ABO blood group is found, and its major determinants are Von Willebrand Factor (VWF) and coagulation factor VIII (FVIII)¹⁴. Another mechanism is higher levels of intestinal alkaline

phosphatase in O blood group individuals, protecting them from higher cholesterol and IHD¹. The finding of IHD and blood group association emphasizes the fact that knowledge can be utilized to initiate healthy life style in the risk population. In this study more IHD patients were belonged to blood group B(45%) followed by blood group A (30%), blood group O (16%)and blood group AB (9%). Similar findings were observed in other studies^{15,16,17}. Some studies have showed prevalence of IHD in blood group A^{9,18}. In some studies blood group O was prevalent among IHD patients^{19,20}. Some studies did not show any association between blood groups and IHD^{1,5,6}. In our study Rh +ve males were 100(50%) and females were 50(25%). Similar higher prevalence of Rh positivity among IHD patients was observed in other study²¹.

Conclusion

This study showed that more IHD patients were belonged to blood group B and fewer patients were in blood group AB. The finding of IHD and blood group associations gives clue that there may be significant physiological differences among individuals of various blood types. They may be of clinical significance and more case control studies are needed to give high level of evidence to confirm this association in order to establish the need to be more aggressive in risk factor control in these individuals. The main limitation of our study is small sample size. More population based studies with large sample size needed in future; various geographical areas and populations should be considered.

Acknowledgement: none

Sources of support: Nil

References

1. Sheikh M K, Bahari MB, Yusoff NM , Knight A. Association of ABO Blood Group B with Myocardial Infarction. Journal of the College of Physicians and Surgeons Pakistan 2009; 19 (8): 514-517.
2. Von Beckerath N, Koch W, Mehilli J, Gorchakova, Braun S, Schomig A, et al. ABO locus O1 allele and risk of myocardial infarction. Blood Coagul Fibrinolysis 2004; 15:61-67.
3. Platt D, Muhlberg W, Kiehl L, Schmitt-Ruth R. ABO blood group system, age, sex, risk factors and cardiac infarction. Arch Gerontol Geriatr 1985; 4:241-249.
4. Meade TW, Cooper JA, Stirling Y, Howarth DJ, Ruddock V, Miller GJ. Factor VIII, ABO blood group and the incidence of ischaemic heart disease. Br J Haematol 1994; 88:601-607.
5. Sari I, Ozer O, Davutoglu V, Gorglu S, Eren M, Aksoy M. ABO blood group distribution and major cardiovascular risk factors in patients with acute myocardial infarction. Blood Coagul Fibrinolysis 2008; 19:231-4.
6. Amirzadegan A, Salarifar M, Sadeghian S, Davoodi G, Darabian C, Goodarzynejad H. Correlation between ABO blood groups, major risk factors, and coronary artery disease. Int J Cardiol 2006;110:256-258.
7. Pedoe TH, Kulasma k, Arnouejel P. Myocardial infarction and coronary deaths. WHO Monica project. Circulation. 90583, 1994.
8. Finegold JA, Asaria P, Francis DP. Mortality from Ischaemic heart disease by country, region, and age: Statistics from World Health Organisation and United Nations. International Journal of Cardiology 2013;168 :934-945.
9. Djibril Marie BA et al. Cardiovascular disease and ABO blood-groups in Africans. Are blood-group A individuals at higher risk of ischemic disease?: A pilot study. The Egyptian Heart Journal 2017; 69: 229-234.
10. Kaur M, Gill K, Bassi R, Kaur D. Association of abo and rh blood groups With hypertension. Pak J Physiol. 2016; 12(2):11-14.

11. Medalie J, Levene C, Papier C, Goldbourt U, Dreyfuss F, Oron D. Blood groups, myocardial infarction and angina pectoris among 10,000 adult males. *N Engl J Med* 1971;285:1348–1353.
12. Garrison R, Havlik R, Harris R, Feinleib M, Kannel W, Padgett S. ABO blood group and cardiovascular disease. *Atheroscler* 1976;25:311–318.
13. Erikssen J, Thaulow E, Stormorken H, Brendemoen O, Hellem A. ABO blood groups and coronary artery disease (CHD): a study in subjects with severe and latent CHD. *Thromb Haemost* 1980;43:137–140.
14. Dentali F et al. Non-O blood type is the commonest genetic risk factor for VTE: results from a meta-analysis of the literature. *Semin Thromb Hemost* 2012;38:535–548.
15. Chowdhary S, Sharma V, Chowdhary S. Study of association of ABO blood group with ischemic heart disease. *International Journal of Medical Science and Public Health* 2016;5(3): 468-472.
16. Nydegger UE, Wullemin WA, Julmy F, Meyer BJ, Carrel TP. Association of ABO histo-blood group B allele with myocardial infarction. *Eur J Immunogenet* 2003; 30: 201-206.
17. Garg P, Kumar J, Choudhary R, Chawla VK. Association between ABO Blood Groups and Myocardial Infarction in Jodhpur City of India. *Journal of Bangladesh Society of Physiologist* 2012; 7(1):13-17.
18. Tarjan Z, Tonelli M, Duba J, Zorandi A. Correlation between ABO and Rh blood group: Serum Cholesterol and Ischemic Heart Disease in Patients Undergoing Coronarography. *Orvosi Hetilap* 1995; 136(15): 767-769.
19. Biswas J et al. Relationship between blood groups and coronary artery disease. *Mymensingh Medical Journal* 2008; 17(2 Suppl): S22-27.
20. Mitchell J R. An association between ABO blood-group distribution and geographical differences in death-rates. *Lancet* 1977; 1: 295-297.
21. Januszkiewicz L et al. Association of blood groups with prognosis in acute coronary syndrome. *Polskie Archiwum Medycyny Wewnętrznej* 2013; 123 (9):460-465.