

Original Article

Association of Diabetes Mellitus with ABO and Rh Blood Groups

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Objective: To find out the association of diabetes mellitus with ABO and Rh blood groups.

Study Design:

Study Place and Duration: This study was conducted at Pakistan Railway General Hospital Rawalpindi, Pakistan, from January to March 2011.

Materials & Methods: during the year 2011, involving 201 patients with Diabetes Mellitus. The controls were taken from blood bank record of non-diabetic patients and healthy donors in same population. Blood samples were collected, labeled and sent to laboratory for identification of blood group.

Results: Our study shows a higher percentage of blood group AB in the diabetic group (14.92%) as compared to controls (9.87%). Blood groups A and B were less common in diabetic group as compared to controls (20.37% vs. 27.4% and 28.86% vs. 33.05% respectively). Blood group O had same distribution among both groups. Rh negative blood group is more frequent in Diabetic group (12.44% vs. 7.73%).

Conclusion: We conclude that there was an association between Rh - negative blood groups and Diabetes Mellitus. There is a negative association between blood groups A and B, as these groups were less common in diabetics.

Key words: Blood group ABO; blood group Rh; diabetes mellitus

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Introduction

Ever since the discovery of blood groups in 1900, there have been efforts to discover a possible association between ABO and Rh blood groups and different diseases. The data obtained from studies on patients with gastric cancer, salivary gland tumors, duodenal ulcer, colorectal cancer, thyroid disorders, ovarian tumors, small cell carcinoma of lung and coronary heart disease have shown association with ABO blood groups¹⁻⁶. This information has led to the assumption that some other diseases might also be associated with ABO and Rh blood groups. Such associations may have significance to identify susceptibility to diseases and adopt possible preventive measures to decrease the prevalence.

Diabetes mellitus is a common medical problem having significant morbidity and mortality. It has a genetic predisposition, although environmental factors do play their role in its genetic expression. Like many other inherited traits, blood groups are also genetically pre-determined and therefore may have an association with diabetes mellitus. Identification of a positive association with blood groups might reflect increased susceptibility to and a negative association protection against

diabetes mellitus. Based on this hypothesis we conducted this study to find out a possible association between diabetes mellitus and ABO & Rh blood groups. This study was conducted at IIMCT/Pakistan Railways Hospital Rawalpindi, Pakistan.

Materials and Methods

This study was conducted from January to March 2011 at unit 2 of Department of Medicine, Pakistan Railways Hospital/Islamic International Medical College, Rawalpindi, Pakistan. The purpose and procedure of study was explained to all diabetics coming to medical OPD or admitted in medical ward. 201 consecutive diabetic patients who consented to be included in study were enrolled irrespective of their age, sex, socio-economic status or duration of the disease. These patients were already diagnosed to have diabetes, were under treatment and coming for follow up to hospital for their management. The controls were taken from healthy individuals coming for blood donation at hospital blood bank over this study period.

Two ml of blood sample was collected from patients by a phlebotomist at PRH in EDTA tube, labeled and transferred to laboratory for determination of blood

groups. ABO and Rh blood groups were determined using tile method.

All information was recorded on a proforma and saved for record and analysis of the findings at conclusion of the study.

Results

The distribution of ABO and Rh blood group distribution among healthy individuals and diabetic patients is shown in table's I-III.

Blood groups A and B are less common in diabetes whereas blood group AB is more common in diabetes as compared to controls. Blood group O has same distribution among both groups.

Less number of subjects with diabetes are Rh positive (87.56 vs. 92.27%) whereas higher percentage of diabetics have Rh negative group (12.44% vs. 7.73%). This difference is more interesting when we take both ABO and Rh types into account together i.e. higher percentage of diabetics with blood group A, B and AB are negative (4.47% vs. 0.43%, 4.47% vs. 2.58% and 2.98 % vs. 1.29 % respectively) whereas it is reverse in blood group O (0.50% vs. 3.43%).

Table I: Distribution of ABO blood groups in diabetics as compared to controls

Blood group	Diabetics %(n)	Controls %(n)
A	20.37(51)	27.04(63)
B	28.86(58)	33.05(77)
AB	14.92(30)	9.87(23)
O	30.85(62)	30.04(70)
Total	100(201)	100(233)

Table II: Distribution of Rh blood groups in diabetics as compared to controls

Blood group	Diabetics %(n)	Controls %(n)
Rh+	87.56(176)	92.27(215)
Rh-	12.44(25)	7.73(18)

Table III: Distribution of combined ABO & Rh Blood Groups in Diabetics as compared to controls

Blood group	Diabetic %(n)	Controls %(n)
A+	20.89(42)	26.61(62)
A-	4.47(9)	0.43(1)
B+	24.38(49)	30.47(71)
B-	4.47(9)	2.58(6)
AB+	11.95(24)	8.58(20)
AB-	2.98(6)	1.29(3)
O+	30.36(61)	26.61(62)
O-	0.50(1)	3.43(8)

Discussion

Many investigators have tried to identify a possible association between ABO & Rh blood groups and diabetes mellitus. The results have been variable, inconsistent and differed from one region to other. Some people have identified an association between blood groups and diabetes but there are studies where no association could be established.

Results of this study indicate that individuals with blood group A and B are less likely while those with blood group AB are more likely to have Diabetes Mellitus, whereas blood group O has no difference. Blood group Rh positive is less frequent in diabetics when compared to healthy controls whereas blood group Rh negative is more frequent in diabetics. This higher frequency reflects a positive association of Rh negative blood group with diabetes.

Our findings are similar to those of Kamil and his colleague⁷. They also found that blood group A was less commonly seen in diabetics with the difference that they also found a negative association with blood group O as well, whereas in our study blood group O was equally distributed in both groups. In Trinidad, Henry and Poon-King⁸ found increased frequency of blood group B in diabetics. The results are similar to our study. Dali et al⁹ made similar observations in a recent study conducted in Algerian population. In their study they found decreased blood groups A and B and increased Rh negative group in diabetics, however these differences were not statistically significant. In contrast, some studies have shown positive association of blood group A and diabetes¹⁰ i.e. increased frequency of blood group A in diabetics. However they found an association of blood group O negative and Diabetes. Our study also shows similar results.

We have found an increased frequency of Rh negative blood group in diabetic group as compared to control group. Same observation was made by Sidhu et al¹¹ in their study conducted in Indian Punjab.

Many investigators have found equal distribution of ABO blood groups among diabetics and non-diabetics. In 1964 Macafee¹² tried to find out an association between blood groups and Diabetes Mellitus. He observed similar distribution of different blood groups in Diabetics and controls. Koley¹³ also demonstrated no significant difference of blood groups distribution in diabetics and non-diabetics. Similar observations have been made by Sidhu et al⁵ and Qureshi and Bhatti¹⁴

The possible explanation of these conflicting findings is that probably racial and geographical factors have a role in genetic expression of disease. Moreover most of the studies conducted in this regards have small sample size. Probably studies on larger scale and a meta-analysis of work done so far will provide a solution to this dilemma

Conclusion

The study shows a lower percentage of Blood group A and B and a higher percentage of blood group AB in the diabetic group as compared to controls. There is also a positive association between Rh negative blood groups and Diabetes.

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