



Research Article

STUDY OF RELATIONSHIP BETWEEN ABO AND Rh BLOOD GROUP WITH TYPE 2 DIABETES MELLITUS AND ITS COMPLICATIONS- IS THERE ANY ASSOCIATION?

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ABSTRACT

Aims & Objectives: The present study is to evaluate the relationship between ABO and Rh blood groups with type 2 Diabetes Mellitus and its complications.

Materials and Methods: It is a Prospective case control study with sample size of 400 (200 cases & 200 control) done in MVJ medical college & research hospital, Hoskote.

Results: Chi-square test results showed that there was a negative association between the ABO blood groups and DM type 2. It was found that B blood groups were negatively associated with DM type 2 (P=0.016). Blood group A is more likely associated with Diabetic Nephropathy (p value=0.012) & Blood group B & AB are less likely associated with diabetic nephropathy. Blood group B is more likely to be associated with Diabetic Retinopathy (p value =0.016) and Blood group O & A is less likely to be associated with Diabetic Retinopathy. Blood group A was more commonly seen in diabetic nephropathy patients & blood group AB less commonly seen but there was no statistical significance.

Conclusion: From our study we conclude that the Blood group B is less likely to be associated with diabetes mellitus. Blood group A are more likely associated with Diabetic Nephropathy.

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INTRODUCTION

Type 2 Diabetes mellitus is a multifactorial inherited disorder with distinct genetic and metabolic defects in insulin action and/or secretion giving rise to the common phenotype of hyperglycemia in Type 2 DM¹. ABO and Rhesus blood groups are also hereditarily determined. Few studies show a relationship between T2DM and Blood groups while other studies done have not shown consistent results, probably due to ethnic variability in the blood groups as a result of hereditary influences

MATERIALS AND METHODS

The data for study was collected from subjects fulfilling inclusion criteria/exclusion criteria

- Study design : Prospective case control study
- Sample size : 200 cases: 200 controls
- Sampling method : simple random sampling
- Duration of study : 4 month
- Place of study : MVJMC & RH, Hoskote

Methodology

Source of data

- CASES-200 patients aged >40 year & of both sexes as per the inclusion criteria, who are inpatients in the department of General Medicine of MVJMC & RH, Hoskote were taken for the study
- CONTROLS-200 healthy volunteers who came to donate blood in MVJ blood bank, who were age and sex matched with cases were taken

Inclusion Criteria

- Established cases of Diabetes Mellitus
- Newly detected cases of Diabetes Mellitus

Exclusion Criteria

- Hypertensive patients

RESULTS

Table 1 Relation between the blood group & Type 2 Diabetes mellitus

Blood group	Cases n=200 (%)	Control n=200 (%)	P value
A	54 (27)	44(22.0)	0.2456
B	48 (24)	69 (34.5)	0.0160
AB	14 (07)	15 (07.5)	0.7045
O	84 (42)	72(36.0)	0.2192
Rhesus +	192 (96)	189(94.5)	0.3594
Rhesus -	08(04)	11 (05.5)	0.3590

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From Table 1, it is seen that among the cases blood group B (24% p value=0.0160) is least among diabetics and in control group, blood group O (36%) is most common followed by blood group B. In both cases & control Rhesus positive (96% in cases & 94.5% in control) is most common.

Diabetic Nephropathy

Table 2 Relation between blood group and Diabetic nephropathy

Blood group	Cases with diabetic nephropathy n=26 (%)	Cases without diabetic nephropathy n=174 (%)	P value
A	14 (53.84)	40 (22.98)	0.012
B	02 (7.69)	46 (26.43)	0.22
AB	0	14 (8.04)	0.32
O	10 (38.46)	74 (42.52)	0.14

From Table 2, we can see that among the cases, blood group A (53.84% p value=0.012) is more likely to be associated with Diabetic Nephropathy. Blood group B & AB blood group are less likely associated with Diabetic Nephropathy but not statistically significant.

Diabetic Retinopathy

Table 3 Relation between Blood group and Diabetic Retinopathy

Blood group	Cases with diabetic retinopathy n=30 (%)	Case without diabetic retinopathy n=170 (%)	P value
A	04 (13.33)	50 (29.41)	0.0210
B	22(73.33)	26 (15.29)	0.0160
AB	02 (6.67)	12 (07.05)	0.1908
O	02 (6.66)	82 (48.23)	0.0001

Among the cases of diabetic retinopathy blood group B (73.33% p value=0.016) is more likely to be associated with Diabetic retinopathy and blood group O (6.66%: p value =0.0001) & A(13.33%: p value =0.0210) blood group are less likely associated with Diabetic retinopathy as shown in table 3.

Diabetic Neuropathy: Diabetic neuropathy was seen in 26 patients;out of that 14 patients blood group was A, 10 patients blood group was O and 2 patients blood group was B. Though blood group A was more likely associated & blood group AB least, it was not statistically significant.

Overall Complications

Table 4 Relation between blood group & Diabetic complications

Blood group	Cases with complications n=130(%)	Cases without complications n=70(%)	P value
A	42(32.30)	12 (17.14)	0.001
B	31(23.84)	17(24.28)	0.432
AB	6(4.15)	8(11.42)	0.342
O	51(39.23)	33(47.14)	0.321

In our study, out of 200 patient, 130 patients had complications, among these 42 with blood group A had complications which was statistically significant (p value-0.001) as seen in Table 4

DISCUSSION

Most of the populations where evidence of association between genetic markers and type 2 DM has been found are hybrid populations formed by recent mixing of parental populations. Despite the fact that the association of blood

groups with certain diseases is clearly demonstrated, and the evidence that blood groups may play an important role in certain diseases, for example, peptic ulcer and gastric cancer ...some studies report no association between ABO blood group with those diseases, including DM. It is not surprising that the data on association of diabetes with ABO blood groups is scanty and mostly shows no association. However, there is evidence of positive association as well.

Rahman² reported in a study from Bangladesh with a sample size of 2,312 patients and 8,936 controls that there was no association between ABO blood groups and DM. Rahman described no positive association, but our results show a significantly lower percentage of B blood group among diabetic patients, which means a negative association with this blood group. A larger sample study will be needed in our population to further investigate this finding. Another study carried out in India included 511 patients with DM type 2 at Varni Pathology Clinic, Sagar, Madhya Pradesh³. The samples represented adequately the Brahmin (n=146), Bania (n=127), Kayasth (n=52), Shudra (n=59), and Muslim groups (n=51). In total, 475 unrelated normal healthy individuals were sampled randomly from the same area, matching age, sex, socio-economic status, etc., but not the disease condition. For the ABO blood types, standard serological procedures were followed using the anti-A, anti-B, anti-D, and anti-sera. Statistical analysis was done using the Chisquare test and the findings suggested that there was no association between the ABO blood groups and DM type 2. An association of DM with blood group A was demonstrated by McConnell and Pyke⁴ and this was confirmed by Andersen and Lauritzen⁵.

Studies done by Sharma.*et.al*⁶(n=200) from Rajasthan & Basak.*et.al*⁷(n=234)from West Bengal show blood group B is more commonly associated with diabetes, it was not statistically significant, so they concluded there was no association with ABO blood group and diabetes. Our study is consistent with one more study done in Tamil Nadu by Ganesan. *et.al*⁸(n=244) which shows negative association with blood group B. This difference between north & south India may be because of ethnic variability.

Study of diabetic nephropathy in relation to blood group show that blood group A is more commonly associated with diabetic nephropathy. Unal.*et.al*⁹ from Turkey conducted a study to know the relation between blood group and diabetic nephropathy, out of 25,996 diabetics, 743 patient had diabetic nephropathy, among these 48.3% of patients are of blood group A, which was statistically significant & they concluded that Blood group A is more commonly associated with diabetic nephropathy. Our study is consistent with study done by Unal.*et.al*.

The most recent blood group to be detected is the RAPH group¹⁰ which has a single antigen MER2.ThisMER2 gene has also been mentioned in nephron membrane abnormality¹¹.it has not been possible in this study to detect RAPH group, nor to correlate it with Diabetic Nephropathy. However, in view of nephron membrane abnormality with RAPH there may be a link between nephropathy & RAPH blood group which requires further study.

CONCLUSION

From our study we conclude that the Blood group B is less likely to be associated with diabetes mellitus. Among the

complications, Blood group A are more likely to be associated with Diabetic Nephropathy. Blood group B is more likely & blood group O & A are less likely to be associated with diabetic retinopathy and the overall complications were more common with blood group A.

As blood group A is more commonly associated with diabetic nephropathy, screening for that blood group help us to anticipate complications & take further precautions. The relation between the blood group & the complications helps to identify vulnerability of the diseases and approve possible preventive actions and decrease the incidence.

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