Association between ABO/Rhesus blood groups and Gestational diabetes in Kashmir Valley. A hospital based study.

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Abstract
The objective of the study was to determine the relationship between the ABO and Rh blood groups and gestational diabetes mellitus in the pregnant population of Kashmir Division of the J&K state (India). The present study which is a case control study analyses ABO and Rh blood groups in 150 pregnant women of all age groups with gestational diabetes and a similar number of pregnant women of all age groups without diabetes. The study was conducted at Government Medical College and Associated Hospital (Lal Ded Hospital, an Associated Maternity Hospital of Government Medical College Srinagar and SMHS Hospital) from March 2015 to September 2015. Our study showed that there is no significant relationship between gestational diabetes mellitus in pregnant females and the ABO Rh blood group system. However further research needs to be done to establish this.

Keywords: ABO Rh blood groups, Gestational diabetes, association, GDM

Introduction
Right from the time of discovery of blood group system by Karl Landsteiner in 1900, there has been an effort by researchers to find a correlation between ABO Rh blood groups and different diseases. Several researchers did succeed in proving such a correlation e.g. gastric cancer, salivary gland tumours, duodenal ulcer, colorectal cancer, thyroid disorders, ovarian tumours, small cell carcinoma of lung and coronary heart disease have shown association with ABO blood groups*. Such results led to the presumption that associations may exist between other diseases and blood groups too, so that it would help to identify susceptible individuals in the community and that preventive measures may be taken to decrease the prevalence of such diseases.

Gestational diabetes mellitus (GDM) is defined as glucose intolerance of various degrees that is first detected during pregnancy. GDM is detected through the screening of pregnant women for clinical risk factors and, among at-risk women, testing for abnormal glucose tolerance that is usually, but not invariably, mild and asymptomatic. GDM appears to result from the same broad spectrum of physiological and genetic abnormalities that characterize diabetes outside of pregnancy. Indeed, women with GDM are at high risk for having or developing diabetes when they are not pregnant.

Like many other inherited traits, blood groups are also genetically predetermined and therefore may have an association with gestational diabetes mellitus. Identification of a positive association with blood groups might reflect increased susceptibility to and a negative association protection against gestational diabetes mellitus. Based on this hypothesis we conducted this study to find out a possible association between gestational diabetes mellitus and ABO & Rh blood groups. This study is the first of its kind conducted in this part of the world as extensive search of medical literature didn't reveal any such study conducted in Kashmir on association of ABO Rh groups and diabetes in pregnant females. Very few studies have been done around the world in this regard.

Material and Methods
The study was conducted from March 2015 to September 2015 in both outpatient and inpatient pregnant females irrespective of their age, socioeconomic status, religion, ethnic origin or duration of GDM. These included patients who were diagnosed as gestational diabetes mellitus in current pregnancy, were on treatment and were coming for their routine antenatal check up. A total of 150 pregnant females with GDM were enrolled for the study as cases and a similar number of non diabetic pregnant females were taken.
as a control. The study was done after taking a proper clearance from the institutional ethical committee of Government Medical College Srinagar. The purpose of the study was explained to the participants and a proper informed consent was obtained from them before enrolling them in the study. All the patients were diagnosed as GDM in accordance with the ADA criteria. The blood group analysis was done using a tile agglutination method.

All information was recorded on a proforma and saved for record and analysis of the findings at conclusion of the study. The data obtained were analyzed statistically to determine any association between GDM and different ABO blood groups. Logistic Regression Analysis was used to calculate the Odds Ratio which were reported then along with their 95% confidence intervals. Statistical analysis was done using SPSS version 20.0. A p-value of <0.05 was considered to be statistically significant.

Results

The results of the study have been expressed in tables 1 and 2. In our study we found that the frequency of the blood groups was in the order of O>B>A>AB. In our study we found that those with blood group A, B and O had 75.6%, 60.6% and 54.5% higher chances of having gestational diabetes as compared to group AB, however none of the values were statistically significant (p > 0.05). Same was true in Rh blood groups where again no association was found between Rh factor and GDM (p = 0.516). Hence based on our results we continue that there is no correlation between different blood groups and their subtypes and GDM.

<table>
<thead>
<tr>
<th>Blood Group</th>
<th>Cases</th>
<th>Controls</th>
<th>OR (95% CI)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>38</td>
<td>34</td>
<td>1.756 (0.612-5.042)</td>
<td>0.295</td>
</tr>
<tr>
<td>B</td>
<td>46</td>
<td>45</td>
<td>1.606 (0.572-4.513)</td>
<td>0.368</td>
</tr>
<tr>
<td>O</td>
<td>59</td>
<td>60</td>
<td>1.545 (0.561-4.257)</td>
<td>0.400</td>
</tr>
<tr>
<td>AB</td>
<td>7</td>
<td>11</td>
<td>Reference</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>150</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2

<table>
<thead>
<tr>
<th>Rhesus Type</th>
<th>Positive</th>
<th>Negative</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
<td>140</td>
<td>10</td>
<td>150</td>
</tr>
<tr>
<td>Controls</td>
<td>137</td>
<td>13</td>
<td>150</td>
</tr>
<tr>
<td>OR (95% CI)</td>
<td>1.328</td>
<td>(0.564-3.131)</td>
<td>0.516</td>
</tr>
<tr>
<td>P</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

Various studies have been undertaken in different parts of the world to prove or disprove an association between the ABO Rh blood groups and diabetes mellitus in general and GDM in particular and the results so far best to say have been inconsistent and variable in different parts of the world. Many researchers have recognized a relationship between blood groups and diabetes even though in some studies no relationship could be established. Zhang et al. Conducted a study from 2010 to 2012 in 14198 pregnant women in Tanjin China within the first twelve weeks of gestation, he found out that women with A, B or O (i.e. Non AB) were associated with increased risk of GDM.

Similarly study was done by Phalopakarn and Tangjitgamol to find association of ABO blood groups and adverse outcomes in pregnancy they found out no significant relationship between blood types and GDM.

Zeytinoglu I and Maher showed no significant difference between controls and patients with diabetes mellitus. 190 patients with diabetes mellitus were tested for several genetic erythrocyte and serum protein markers, and compared with healthy controls by Dr. K Berg et al. and did not find an association between diabetes mellitus and the ABO system, as reported in earlier literature. But Bibawi and Khatwa from Egypt found increased incidence of Group A and AB and a correspondingly lower incidence of B and O blood group in diabetes.

On the other hand, several investigators observed varying results. Anderson J and Lauritzen E found significant excess of group O among male diabetics. In diabetics female too, there was excess of group O but not significant. Jolly JG and Sarup BM et al. found significant preponderance of group O among diabetic patient. Again W.E. Jassim found significantly higher occurrence of blood group O than other groups in male and female patients in Baghdad, Iraq.

Different clinical studies have shown that individuals of the O phenotype blood group are more susceptible to Diabetes mellitus diseases.

In western Algerian population, 280 patients with type 2 diabetes mellitus and 271 healthy controls studied by Dali Sahi M et al. and they confirmed that there was no association between ABO/Rh blood group and diabetes mellitus.

Rahman M tested 3212 diabetics for ABO blood groups and compared their frequency with normal (8936) subjects. The data were analysed statistically to detect any possibility of an association between ABO blood groups and diabetes mellitus. No such association was apparent in the subjects studied. Kapoor C et al. showed no statistically significant correlation in distribution of blood groups (ABO) and secretor status among diabetics as compared to controls. Lamery P.J studied 55 patients with type I diabetes and 50 with type II diabetes & found no significant difference in distribution of ABO blood groups between those with type...
I and these with type II disease.

**Conclusion**

Considering all these previous varying results from different parts of globe, this study attempted to evaluate the association of ABO blood groups with Gestational Diabetes in Kashmir Province of J&K. Data on the association between ABO blood type distribution and Gestational Diabetes Mellitus from all over the world are conflicting and most of them show no concrete association. From our study we conclude that no association exists between any of the blood groups and Gestational Diabetes. In view of paucity of data regarding the association of ABO Rh groups in gestational diabetes, a need for further study on a larger and multicentric level is felt to establish whether a definitive relationship exists or not between the two entities.

**References**