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Research Article

Association of Diabetes Mellitus with Salivary Secretor Status of ABO Blood Group

Dr. Saurabh Midha[1], Dr. Ashwani Dhawan[2], Dr. Rahul Midha[3*], Dr. Deepti Jain[4], Dr. Deepak Gahlan[5], Dr. Rosemary Peter[6], Mr. Abhishek Acharya[7]

[1]P.G Resident, Department of Physiology, Maharaja Agrasen Medical College, Agroha.
[2]Professor and Head, Department of Physiology, Maharaja Agrasen Medical College, Agroha.
*[3]*Associate Professor, Department of Anaesthesiology, Maharaja Agrasen Medical College, Agroha.*
[4]Assistant Professor, Department of Physiology, Maharaja Agrasen Medical College, Agroha.
[5]Professor, Department of General Medicine, Maharaja Agrasen Medical College, Agroha.
[6]Professor, Department of Physiology, Maharaja Agrasen Medical College, Agroha.
[7]Assistant Professor, Department of Physiology, Pacific Medical College & Hospital, Udaipur.

Abstract:
Diabetes mellitus (DM) is a metabolic disease which has a genetic predisposition, ABH secretor status is also genetically pre-determined and therefore we studied the association between secretor status of ABO & Rh blood group with diabetes mellitus. This case control study was conducted in the department of Physiology and collaborated with General Medicine at Maharaja Agrasen Medical College, Agroha, Hisar. Total 200 study subjects of both males and females of age between 30-60 years were selected to conduct the study. They were divided in two groups i.e. confirmed 100 non-diabetic subjects as control group and confirmed 100 diabetics as study group.ABO and Rh blood group was determined by slide agglutination method and presence or absence of water soluble ABH blood group antigens in saliva by Haemagglutination inhibition technique. Out of 100 diabetic subjects, 76 were secretors and 24 were non secretors and out of 100 non diabetic subjects, 81 were secretors and 19 were non secretors.There was statistically no significant correlation found between secretor status with diabetes mellitus (p=0.389). In ourstudy, we found significant association of non-secretors of B blood group with diabetes mellitus (p=0.01). Our study concluded that the non-secretors of B blood group were more prone to diabetes mellitus.

Key words: Diabetes mellitus, ABH antigen, secretor, non-secretors and ABO & Rh blood group.

***Author for correspondence: Email:** rahulmidha08@gmail.com*

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INTRODUCTION

People who secrete blood group antigens in bodily fluids such saliva, sweat, tears, semen, and serum are referred to as ABH secretors; people who do not secrete blood group antigens in bodily fluids are referred to as non-secretors.[1, 2] Two alleles, Se (dominant) and se (recessive), regulate the secretor gene (fucosyltransferase 2), which is inherited in an autosomal dominant manner. People who are homozygous recessive (sese) and homozygous heterozygous (SeSe/Sese) and who carry the dominant allele are called secretors and non-secretors, respectively.[3] Studies show that the absence of blood type antigens in bodily secretions is regarded as a drawback since it makes people more vulnerable to certain illnesses, such as periodontal disease, peptic and duodenal ulcers, and candidiasis.[4]

Recurrent urinary tract infections, Neisseria meningococcal illnesses, recurrent idiopathic hyperplastic candida vulvovaginitis, oral candidiasis, duodenal/peptic ulcer disorders, and hyperpepsinogenemia have all been linked to H. pylori infection and non-ABH secretor status. Myocardial infarction and autoimmune illnesses are two other disease conditions linked to non-ABH secretors. However, compared to non-secretors, secretors have been found to be more vulnerable to infections brought on by the norovirus, influenza virus, rhinovirus, respiratory syncytial virus, and echovirus.[5]

Compared to type 1, diabetes has a larger ancestry and family history correlation, while type 2 diabetes is heavily influenced by genetics. Race may also be relevant. Nevertheless, environmental influences also play a role. Since the ABO blood group's salivary secretor status is also genetically predetermined, we looked at the relationship between diabetes mellitus and this condition.

MATERIAL AND METHOD

The present analytical case control study was carried out in the Department of Physiology at Maharaja Agrasen Medical Collage, Agroha (Hisar) in patients with diagnosed diabetes mellitus. Total 200 study subjects of both males and females of age ranging from 30- 60 years wereselected to conduct the study. The study subjects were divided in two groups that is control and study group. Ethical clearance was obtained from Institutional ethical committee.

Inclusion Criteria

1. Diagnosed diabetic patients of both type I and type II were included in study group.
2. Confirmed diabetic patients whose blood sugar level is controlled and on oral hypoglycemic or insulin were also included in the study group.
3. Confirmed non-diabetics subjects without any family history of diabetes mellitus and known chronic diseases were included in the study as control group.

Exclusion Criteria

1. Subjects with malignancies like leukemia which leads to weakening or loss of blood group antigens on cells.
2. Subjects associated with gram negative septicemia, intestinal obstruction and carcinoma of colon or rectum which leads to acquired “B” antigen like activity.
3. Subjects with history of bone marrow transplantation leading to presence of 2 separate cell population

Control group: Confirmed non-diabetic study subjects; 50 males and 50 females were included in this group.

Study group: Patients suffering with either confirmed type I or type II diabetes mellitus; 50 males and 50 females were included in this group.

Determination of ABO and Rh bloodgroup

ABO and Rh blood group was determined by slide agglutination method.[6]

Principle:

The procedure used with antisera is based on the principle of agglutination. Normal human red cells possessing antigens are clumped in the presence of corresponding antibody.

Anti-A sera and Anti-B sera were used to determine ABO blood group.

Rh factor was determined by pouring a single drop of Anti – D serum on a clean glass slide. By using Pasteur pipette, one drop of whole blood was added to Anti – D Sera. With the help of applicator stick, cell-serum mixture was mixed well. Slide was tilted back and forth and observed for agglutination. Tests that showed no agglutination within 2 minutes were considered as Rh negative and showed agglutination was considered as Rh positive.[6]

Determination of secretor and non-secretor status

The presence or absence of water soluble ABH blood group antigens in a person’s bodily fluids likes saliva. The determination was done in the subjects of both the groups and was identified by Haemagglutination inhibition technique.[7,8]

Principle of Haemagglutination inhibition technique

The blood group specific substance ABH antigen present in water soluble form if secreted in secretions such as in saliva then advantage is taken of the fact that this soluble substance is capable of neutralizing specifically its corresponding antibody. This neutralization is reflected in a complete or partial inhibition of the agglutinin titer. This is the basis of inhibition technique.

Interpretations

- Microscopic presence of agglutination indicated as non-secretor.
- Microscopic absence of agglutination indicated as secretor.

Reagents: Antisera A and Antisera B of human origin were used for the subjects belonging to A, B or AB blood groups. For the subjects a group “O”, Anti-H lectin was used. Blood samples of group A, B and O were collected in anticoagulants test tube. A 3% suspension of red cells was prepared just before the test.

Collection and processing of saliva

The subjects of both the groups were asked to rinse the mouth with antiseptic mouthwash and about 5 ml of saliva was collected in a dry test tube with all precautions not to allow it to get mixed with water. The tube was immediately placed in boiling water–bath for about 10 minutes. This destroyed the enzymes in saliva (Salivary amylase) which otherwise would affect the activity of antigens on standing and would also give false positive results of agglutination. After heating of the saliva, the tube was centrifuged at the speed of 2000 revolutions per minute for about 10 minutes. The supernatant fluid was separated and was stored in refrigerator till the time of testing. All the samples of saliva were examined on same day of their collection.[7,8] All the samples were tested at the room temperature ($25^0 – 27^0$ C).

RESULT:

We found that, the percentage of non-secretor of study group was higher as compared to controls and the percentage of secretor of control group was higher as compared to study group but there was statistically not significant correlation between secretor status with diabetes mellitus. (table 1)

Table1: Association of secretor status with diabetes mellitus

Secretor status	Control Group	Percentage (%)	Study group	Percentage (%)	χ^2	P value
Non secretor	19	44.2%	24	55.8%	0.741	0.389
Secretor	81	51.6%	76	48.4%		
Total	100	50%	100	50%		

Our study did not shows statistically difference in secretor status of A, AB and O blood group in study group with diabetes mellitus but the non-secretors of B blood group showed statistically significant correlation with diabetes (p-value 0.01). (table 2)

Table 2: Association of Secretor Status in Control and Study group with ABO Blood Group

Blood group	Control group				Study group				χ^2	P Value
	Secretor	%	Non secretor	%	Secretor	%	Non Secretor	%		
A	12	48%	07	58%	13	52%	05	42%	0.34	0.55
B	40	64%	05	27%	23	36%	13	73%	7.23	0.01
AB	09	37%	02	50%	15	63%	02	50%	0.22	0.63
O	20	44%	05	56%	25	56%	04	44%	0.37	0.54

DISCUSSION:

When ABO blood group antigens are secreted in bodily fluids like saliva, sweat, tears, semen, and serum, it's referred as ABH secretor. Approximately 80% of the population is secretor. Individuals that do not emit their blood type antigen are referred as non-secretor. Non-secretors make up about 20% of the population.[9]There have been concentrated efforts since the identification of these antigens to find a positive correlation between ABO (H) antigens and various disorders.[10]

The present study shows percentage of non-secretors of study group was higher as compared to controls and percentage of secretors of control group was higher as compared to study group but statistical analysis showed non-significant correlation between secretor status with diabetes mellitus. Our findings are similar to Akhteret al[11], Peters et al[12] and Sambo et al.[13]Association of type I diabetes has been reported with non-secretors earlier. [14]

In present study non-secretor of B blood group was higher in study group as compared to control group. This shows positive association between non secretor and diabetics of B blood group (p-value=0.01). That means non-secretors were found more prone to diabetes in B blood group. But In blood group A, O and AB secretors were found more in number in study group as compared to controls but difference between them were non-significant in contrast, Karpoor and shettar[15] does not show any statistically significant difference in ABO group and secretor status of control and study group. One risk factor for the development of diabetes mellitus in non-secretors is the absence of innate defensive mechanisms and local immunity. There is ongoing disagreement over the relationship between ABO blood types and the secretor status of control and diabetic people; Sambo et al[13] found more number of diabetic patients were non-secretors as compared to control in each blood group. This is in accordance with the research carried out by Patrick and Collier[16] which states that ABH non-secretors, and especially Lewis negative individuals, are at a greater risk of developing diabetes (especially adultonset diabetes) and they might be at a greater risk of developing complications from diabetes.

CONCLUSION:

Our study concluded that the non-secretors of B blood group showed significant difference and were more prone to diabetes mellitus. However, the study did not show any association between the diabetes mellitus and ABO blood group.

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CONFLICT OF INTEREST:

Authors have declared that no conflict of interest exists.

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