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Research Article

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Frequency of Abo Blood Groups among the Type II Diabetes Mellitus Patient

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Abstract

Aim: The objective of this study is to determine the frequency of ABO blood groups among patients of type II Diabetes Mellitus.

Methods: This cross-sectional study was conducted at department of Endocrinology and Metabolism Services hospital Lahore for six months from March 01, 2017 to August 31, 2017. 380 Patients were included after informed consent from either the patient or their attendant admitted to medical wards and diabetic clinic of Services Hospital Lahore. Patients identity kept confidential. Risk and benefits of the study were explained to the patients or their attendants. Investigation done was blood grouping.

Results: Results of study were accessed on SPSS version 11. Out of 380 patients, 179(47.1%) were male and 201(52.89%) were female. The mean age of the patient was 56.31 years, for females it was 50.36 years and for males it was 49.25 years with standard deviation of 6.992. It was found that out of 380 selected patients 20(5.26%) had blood group A, 193(50.78%) patients had blood group B, 114(30%) patient had blood group AB and 53(13.94%) patient had blood group O. Gender distribution for different blood group was as for blood group A 12(3.42%) were male and 8(1.84%)were female, for blood group B 99(21.31%) were male and 101(29.47%) were female, for blood group AB 42(8.94%) were male and 72(21.05%) were female and for blood group O 33(9.47%) were male and 20(4.47%) were female.

Conclusion: Present study has supported the hypothesis that diabetes mellitus type 2 and blood groups are interrelated because of the broad genetic immunologic basis in both. It is concluded that the frequency of blood groups B and A is significantly higher and lower respectively in the diabetes mellitus type 2 patients.

Keywords

ABO blood group; Diabetes mellitus

Introduction

Diabetes mellitus (DM) is a syndrome characterized by hyperglycemia resulting from defects of insulin secretion and/or increased cellular resistance to insulin [1]. DM is generally divided as insulin-dependent diabetes mellitus (IDDM or type I), characterized by an absolute deficiency of circulating insulin and non-insulin-dependent diabetes mellitus (NIDDM or type 2), characterized by elevated insulin levels that are ineffective in normalizing blood sugar levels or by impaired insulin secretion [1]. It was reported that DM type 2 is the most common type, accounting for 90_95% of all diabetic cases [2]. The global prevalence of diabetes was estimated to 4% in 1999 and projected to raise this to 5.4% by the year 2025. It is estimated that total number of adult people with diabetes will raise from 135 million in1995 to 300 million by the year 2025 [3]. The major human blood group system is ABO. The blood group of a person depends upon the presence or absence of two genes, A and B, indirectly coded by two alleles A and B of ABO gene. A third allele O, produce neither A or B. These three allele combine to effect four phenotypes A, B, AB and O [4]. Until the past two decades blood types were considered neutral human characteristic, unrelated to health and disease. Physicians were concerned with blood type for transfusion only. During the past twelve year, some investigators have associated the blood types with incidence of other diseases: cancers, duodenal ulcer, pernicious anemia and diabetes. These investigators have offered for consideration a theory that blood type are not neutral but indicate a increased resistance or susceptibility to specific disease processes [5].

It was found that A and O blood groups were negatively associated with DM type 2 ($P<0.05$) with higher percentage of A and O groups individuals were non-diabetic. No significant association was noted between DM type 2 and blood groups B ($P=0.423$) and AB ($P=0.095$). It was also noted that B blood group was distributed with highest percentage among patients with DM type 2 (53.71%) [6]. Comparison of blood groups frequency between the general population and diabetes type 2 patients was carried out in term of percentage. It was noticed that the values were 4.36, 17.15 and 7.34% for A, B and AB blood groups respectively in the diabetic patients. On the contrary, the value was 28.94% for the blood group O [7]. data lacking in our country regarding this issue so I decided to do this study to see how frequently ABO blood groups present among patients having type II DM. So that our physicians would be able to get help in a way that person having more susceptible blood group would be be under more vigilant surveillance for early diagnosis and would be able to advise to persons with more susceptible blood group to adopt healthy life style to decrease\the risk of diabetes mellitus.

Material and Methods

This cross-sectional study was carried out at Department of Endocrinology and Metabolism, Services hospital Lahore for six months from January 2016 to June 2016. Non-probability sampling was used in this study informed consent was obtained from all the patients. Total No. of 340 patients were included in this study risk and benefits of study were explained to patients or their attendants. Investigations included blood grouping. Blood sample is mixed with antibodies against type A and B blood, and the sample is checked to see whether or not the blood cells stick together (agglutinate). If blood cells stick together, it means the blood reacted with one of the antibodies.

The second step is called back typing. The liquid part of blood without cells (serum) is mixed with blood that is known to be type

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A and Type B. Persons with Type A blood have anti-B antibodies, and those with Type B blood have anti-A antibodies. Type O blood contains both types of antibodies. These two steps can accurately determine blood type.

Results

In a period of six months i studied 380 patients to determine the frequency of ABO blood groups among type II diabetes mellitus. In this study all patients were 30-90 years of age. The mean age of the patient was 52.41 years, for females it was 50.36 years and for males it was 49.25 years. The standard deviation and range was 12.94 years and 60 years respectively (Table 1). In the distribution of sex, there were 179(47.1%) male patients and 201(52.89%) female patients (Table 2). All the patients were diagnosed cases of type II diabetes mellitus who were taking either oral hypoglycemic agents or insulin. All the patients were evaluated for blood groups by ABO typing method in Services hospital lab and results were analyzed and evaluated on SPSS version 11 for window. Important features of study and results are summarized below. Out of 380 patients 20 patients had blood group A (5.26%), 193 patients had blood group B (50.78%), 114 patients had blood group AB (30%) and 53 patients had blood group O (13.94%) (Table 3). Out of 179 male patient 12 had blood group A (3.42%),99 had blood group B (21.31%),42 patient had blood group AB(8.94%) and remaining 33 patient had blood group O (9.475). Out of 201 female patient 8 patient had blood group A(1.84%), 101 patient had blood group B(29.47%), 72 patient had blood group AB(21.05%) and remaining 59 patient had blood group O(4.47%s) (Table 4).

Table 1: Age distribution of the patients.

Age(Years)	
N	380
Mean	52.14
S.D	12.94
Minimum	30
Maximum	90
Range	60

Keywords: S.D= Standard Deviation

Table 2: Gender distribution of the patients.

		Frequency	Percentage
Gender	Males	179	47.1
	Females	201	52.89
Total		380	100

Table 3: Distribution of Blood Groups among Type-II diabetics.

BLOOD GROUPS	NO. OF PATIENTS	PERCENTAGE
A	20	5.26
B	193	50.78
AB	114	30
O	53	13.94

Table 4: Distribution of Blood Groups with Gender in Type II Diabetics.

BLOOD GROUPS	MALE	PERCNTAGE	FEMALE	PERCENTAGE
A	12	3.42	8	1.84
B	92	21.31	101	29.47
AB	42	8.94	72	21.05
O	33	9.47	20	4.47

Discussion

Association of blood group with different diseases was one of recognized fact, for example, association of blood group with peptic ulcer and gastric cancer [8]. This favored the concept of association of genetic markers with type 2 DM, however most of studies which showed association between genetic markers and type 2 DM were conducted on mixed populations farmed by recent mixing of parental populations [9]. The result of studies which showed association of ABO blood group with type 2 DM was mixed that some studies showed positive association and some showed negative association. In the present study out of 380 diagnosed diabetic patients 20 patients had blood group A (5.26%), 193 patients had blood group B (50.78%), 114 patients had blood group AB (30%) and 53 patients had blood group O (13.94%). In a study at Gujrat district of Punjab Anees M and Mirza MS found the distribution of phenotypic frequencies for ABO group in the total sample of 2647 subjects, were 24.89%, 36.91%, 6.88% and 31.32% for groups A, B, AB and O respectively [10]. These frequencies of ABO distribution were found comparable to present study which exhibited that the sample of type DM patients was true representative of the local population. Qureshi and Bhatti [7]. demonstrated that type 2 DM and ABO blood groups are interrelated; they found that amongst 70 patients with DM, blood group B was more common and represented 35.71% compared to that of control, which represented only 22.14% of the sample population, but statistical significance was not achieved (P>0.05). This is in comparison with present study which also showed that out of 380 patients 193 patients had blood group B (50.78%) which was found more frequent blood group in our population. Moreover, Qureshi and Bhatti [7]. found that O and A blood groups appear to be more frequent in healthy controls (39.28 and 25%) compared to patients with type 2 DM (34.28 and 15.71%), this is also in comparison with present study which showed negative association of blood group O (13.94%) and blood group A (5.26%). In diabetic population; which is Pakistani in Qureshi and Bhatti study and our study; although percentage was different but the order of blood groups was same i.e. blood group B more than blood group O and blood group O more than blood group A. Kamil, Nagi and Yusof [6]. demonstrated that blood group B was prevalent at a high percentage among patients wit type 2 DM (53.71%). This was in comparison with present study which also showed that blood group B (50.78%) was dominant among type 2 DM patients. A combined series from Lancashire, Cheshire, and Oxford 50 showed association of significant excess of blood group A with male type 2 DM; this was in comparison with our study which also showed predominance of blood group A among male type 2 DM as compared to female patients. Our study showed 179 male patients from which 12 had blood group A (3.42%) and out of 201 female patients 8 patients had blood group A (1.84%). There were certain studies which showed association of blood group A with type 2 DM as one of study conducted by McConnell and Pykewhich was in contrast with present study which showed negative association of blood group A with type 2 DM instead our study showed a positive association with blood group B type 2 DM. This comparison also favored the concept that diabetes has association with certain blood groups as blood groups are based on genetics and there was population difference in present study and study of McConnell and Pyke. In an Indian based study which included 511 patients with type 2 DM at Varni Pathology Clinic, Sagar Madhya Pradesh. The samples represented adequately the Brahmin (n=146), Bania (n=127), Kayasth (n=52), Shudra (n=59), and Muslim groups (n=51). 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 Chi-square test and the findings suggested that there was no association between the ABO blood groups and type 2 DM [10]. A study conducted in Bangladesh by Rehman [11] with a sample size of 2,312 type 2 DM patients and 8,936 controls showed that there was no association between ABO blood groups and DM. Reports from Italy [12] and Trinidad showed an increased frequency of blood group B among type 2 DM which was also in the favor of present study which also showed increased frequency of blood group B in type 2 DM. As obvious from the above discussion, certain studies showed a positive association of type 2 DM with ABO blood groups but the evidence is mixed. In the present study blood group A and O were negatively associated with type 2 DM, this was interesting as persons with these blood group had less chance of type 2 DM, however large sample controlled studies were needed to confirm this association. It was concluded that there was an association between blood groups A and O and type 2 DM, and the association was negative as these groups were less common in diabetics and these phenotypes seemed to be protective from the disease and blood group B was more prevalent with higher percentage in type 2 diabetics and hence persons with blood group B were at increased risk of type 2 DM.

Conclusions

Present study has supported the hypothesis that diabetes mellitus type 2 and blood groups are interrelated because of the broad genetic immunologic basis in both. It is concluded that the frequency of blood groups B and A is significantly higher and lower respectively in the diabetes mellitus type 2 patients.

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