

# Research Journal of Pharmaceutical, Biological and Chemical Sciences

## Relationship of Bleeding Time and Clotting Time with Blood Groups.

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### ABSTRACT

Blood group antigens are inherited as Mendelian determinants. The relationship between bleeding time, clotting time and blood groups is important in certain clinical conditions like epistaxis cardiac surgery or thrombosis etc. Studies have reported that half of the epistaxis patients had blood group O and blood group O was associated with a lower expression of vWF (von Willebrand factor) as compared with non O groups . This study was carried out to find out if any relationship existed between ABO blood groups and Bleeding time(BT) and Clotting time(CT). This retrospective study was carried out in Deptt of physiology at Punjab Institute of Medical Sciences Jalandhar, Punjab on 215 medical students. The results were analysed and pearson coefficient was calculated using chi square test . : It was found that BT in blood group B was significantly raised as compared to other blood groups ( $p < 0.01$ ). However the correlation between CT of different blood groups was not significant.

**Keywords:** Blood Groups, Bleeding time, Clotting time , vonWillebrand factor.

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## INTRODUCTION

Blood group antigens are inherited as Mendelian determinants. The individuals are divided into four major blood types on this basis. Type A individuals have the antigen A, type B have antigen B, Type AB have both and Type O have neither of these antigens. These A and B antigens are complex oligosaccharides that differ in their terminal sugar [1]. The ABO blood group antigens appear to have been important throughout our evolution because the frequencies of different blood types vary among different populations [2]. Bleeding time is the time interval between the skin puncture and spontaneous unassisted stoppage of bleeding. Clotting time is the time interval between the puncture between the puncture of blood vessels and formation of fibrin threads [3]. A clear correlation has been established between the ABO phenotype and the level of two proteins in blood clotting ie factor VIII and vonWillebrand factor (vWF). Individuals with blood group O have about 25% less factor VIII and vWF in their plasma, thus increasing their clotting time and may cause excessive bleeding [4].

The relationship between bleeding time, clotting time and blood groups is important in certain clinical conditions like epistaxis cardiac surgery or thrombosis etc. Studies have reported that half of the epistaxis patients had blood group O and blood group O was associated with a lower expression of vWF (von Willebrand factor) as compared with non O groups . A longer bleeding time was demonstrated in patients with group O compared with non O groups [5,6]. An association between non O blood groups and thromboembolic disease including ischaemic heart disease and peripheral vascular disease has been recognised by several studies. A study indicated that blood group non O was associated with twofold increased cardiovascular mortality compared to blood group O [7,8].

### Aims and Objectives

This study was carried out to find out if any relationship existed between ABO blood groups and Bleeding time (BT) and Clotting time(CT).

### MATERIALS AND METHODS

This retrospective study was carried out in Deptt of physiology at Punjab Institute of Medical Sciences Jalandhar, Punjab on 215 medical students. The students do their own blood grouping and calculate their bleeding and clotting time during first year of their MBBS course as part of their study curriculum. Blood Group is done by mixing blood sample with antisera A and B and to look for clumping of RBCs under the microscope. If the blood sample forms clumps with antisera A, it is blood group A, with antisera B, blood group B, AB forms clumps with both, and O with none. Bleeding time was estimated by Duke Method and clotting time by capillary method. The results were analysed and pearson coefficient was calculated using chi square test.

Observations: Out of 215 subjects, 30 had blood group A, 79 had B , 16 had AB and 90 had blood group O. Out of 30 subjects who had blood group A, 2 had BT <1 min and 28 had 1-4 min, Similarly in B, this figure was 0 and 79, in AB it was 2 and 14 And in O it was 10 and 80 respectively. Also in subjects with blood group A, 2 had Ct <2 min and 28 had 2-6

min, in B, 17 had less than 2 min and 62 had 2-6 min. Similarly in AB and O it was 4,12 and 16,74 respectively. (table 1)

**Table 1: Distribution of subjects according to blood groups and BT, CT**

Blood Group	BT		CT	
	<1	1-4	<2	2-6
A (n=30)	2	28	2	28
B (n=79)	0	79	17	62
AB (n=16)	2	14	4	12
O (n=90)	10	80	16	74
Total	14	201	39	176

### RESULTS

It was found that BT in blood group B was significantly raised as compared to other blood groups ( $p < 0.01$ ). However the correlation between CT of different blood groups was not significant. (Table 2)

**Table 2: Comparison of BT and CT within different blood groups for significance**

Comparison	BT			CT		
	$\chi^2$ value	P value	Significance	$\chi^2$ value	P value	Significance
A and B	5.365	0.021	S	3.332	0.068	NS
A and AB	0.447	0.504	NS	3.092	0.079	NS
A and O	0.494	0.482	NS	2.179	0.140	NS
B and AB	10.087	0.001	S	0.094	0.760	NS
B and O	9.330	0.002	S	0.375	0.540	NS
AB and O	0.026	0.872	NS	0.463	0.496	NS

### DISCUSSION

In this study BT was raised significantly in blood group B. Similar results were seen in another study [9]. which shows that bleeding time was increased in blood group B and Ct was raised in AB blood group, however in our study, CT was not raised significantly. Some studies have shown different results. In a study, blood group O was shown to have a longer bleeding time [5]. This finding was associated with a lower expression of von Willebrand factor in blood group O. Another study [10] denies any relationship between plasma von Willebrand factor and bleeding time, rather according to them, it is the platelet vWF that determines BT. One study [11] found that race has an effect on vWF and found that Caucasians had significantly lower levels of vWF and consequently longer bleeding time than African Americans. So race has an independent effect on bleeding and clotting time. Another study [12] found that 66% of the total variation in plasma vWF levels was genetically determined and 30% of this genetic component was explained by ABO blood group.

## CONCLUSIONS

This was a preliminary study to study the relationship between blood groups and bleeding and clotting time. More research in form of larger multicentric study is speculated to verify these results and whether these results have any bearing on clinical disorders like epistaxis, thrombosis, post-surgical haemorrhages etc.

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