

Original Research Article

## Comparison of BT (Bleeding Time) / CT (Clotting Time) with Respect to Blood Group in Medical Students

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### ABSTRACT

The antigens of the ABO blood group system (A, B and H determinants, respectively) are complex Carbohydrate molecules on the extracellular surface of red blood cell membranes. However, along with their expression on red blood cells, ABO antigens are also highly expressed on the surface of a variety of human cells and tissues, including the epithelium, sensory neurons, platelets, and the vascular endothelium. Also there is association between ABO blood group status and von Will brand factor. Deficiency of vWF leads to Hemorrhagic disorders, while elevated levels are a risk factor for thrombosis. Earlier studies state that the O group individuals have prolonged bleeding time and clotting time. The objective of this study was to assess the relationship between Bleeding time and clotting time among various Blood groups. This is a cross sectional study including 433 Undergraduate students. There was a difference in BT & CT found with respect to blood groups but there was no statistical significance in it. Also no statistically significant difference was observed in BT & CT in Rh-ve & Rh+ve blood group. The difference in O blood group and Non O blood group was also not significant. A large multicentric study in which the levels of von Will brand's factor should be carried out to clear the gray area around this topic.

**Key words:** Bleeding time, Blood groups, clotting time, von Will brand's factor, and medical students.

### INTRODUCTION

The discovery of almost universally present naturally occurring antibodies in blood plasma led to the discovery of the ABO blood group system which remains, more than 100 years later, the most important and clinically significant of all blood groups. Blood group antibodies play an important role in transfusion medicine, both in relation to the practice of blood transfusion and in pregnancy.

Hemostasis means spontaneous arrest of bleeding from injured capillaries and venule which includes vasoconstriction, platelet plug formation, clot formation, clot retraction and clot lysis. [1] Bleeding time (BT) can be defined as the time interval between the movement when bleeding starts and the movement when the bleeding stops due to formation of temporary platelet plug. Bleeding ordinarily lasts for 3 to 4 minutes. [2] BT and CT are performed during blood

transfusion, diagnosis of platelet disorders and a variety of forms of treatment in hospitals. [3] BT is affected by platelet function and activation as well as interactions between endothelial cells in the artery, aggregation and coagulation pathways. [4,5] Clotting time (CT) is the time interval from onset of bleeding to formation of first fibrin thread. Normal value of CT is 5 to 8 minutes<sup>1</sup>. CT is affected by clotting factors. Defect or absence of one or more clotting factors can cause prolonged CT. [6]

Available literature shows conflicting findings regarding the various factors influencing BT/CT. Moreover Indian studies with adequate sample size are lacking. So we undertook this study with a larger size of sample with the objectives of assessing BT/CT in medical students & compare with known indices & to study association of BT /CT with blood group.

## MATERIALS AND METHODS

This was a cross sectional study carried out in the department of physiology in Smt Kashibai Navale Medical College & General Hospital, Pune, India. The duration of the study was 4 years. The study is undertaken in 433 apparently healthy 1st year medical students, during the academic year 2010-2014. Students having BT and CT related disorders are excluded from the study. Blood groups are determined by mixing the sample of blood with antisera A, B and D and appearance for clumping of RBC's under the microscope.

The BT and CT are done by Duke and capillary tube method respectively as mentioned by Ghai C L (1999). [7] Finally BT and CT of different blood groups in both the genders are compared and statistical analysis was done. Prior to the study, ethical committee approval was taken from college authorities. The purpose and procedure of the study were explained to each subject. Written informed consent was taken from all the participants

The preset study was conducted at 8.30 am in the morning for the convenience of students. Two investigators of our study

performed the tests for bleeding and CT and collected data from the student at the same time.

The analysis of data was done by Epi info version 7.1.2.0 software. ANOVA & Kruskal Wallis test were used to find out association. P value <0.05 was considered statistically significant. After applying the routine test like paired t test to our data to see the correlation, the software showed that its not valid test as the data is not normally distributed. Instead it suggested us nonparametric test like Kruskal Wallis. After applying it we got the DF (degree of freedom) which we quoted here.

## RESULTS

Total 433 subjects took part in the study, out of which 250 (57.7%) were females & 183 (42.3%) were males. their blood group wise distribution is shown in the table 1. In our study O blood group was more common in male as well as female students, and then B blood group followed by A blood group and least common was AB blood group. In female students O Rh + ve is more common and AB-ve was least common. In male students O Rh + ve was more common & AB-ve, B-ve were least common. (Table-1)

Table 1: Gender wise distribution of blood group

Blood Group	Female	Percentage	Male	Percentage
A+	61	24.40 %	46	25.14 %
AB+	22	8.80 %	15	8.20 %
AB-VE	0	0.00 %	1	0.55 %
A-VE	3	1.20 %	5	2.73 %
B+	72	28.80 %	49	26.78 %
B-VE	2	0.80 %	1	0.55 %
O+	84	33.60 %	58	31.69 %
O-VE	6	2.40 %	8	4.37 %
Total	250	100.00%	183	100.00 %

For association purpose BT & CT was assed against the various blood group. Since the data was not uniformly distributed we applied Kruskal Wallis test to get our df value (degree of freedom). After applying it we got the df which we quoted here.

**Table 2: Bleeding time against Blood groups**

Factors		Mean	SD	df	Pvalue
Rh specific blood group	Rh -ve	2.507	0.492	431	0.656
	Rh +ve	2.554	0.518		
Rh non specific blood group	A	2.554	0.518	429	0.711
	AB	2.497	0.526		
	B	2.531	0.503		
	O	2.587	0.529		
Non O and O blood group	Non O	2.531	0.509	431	0.281
	O	2.587	0.529		

Table 2 showing us the values of bleeding time (BT) correlated with Rh specific blood group and Rh nonspecific blood group.

Further we correlated clotting time (CT) with blood groups same manner as above

**Table 3: Clotting time against Blood groups**

Factors		Mean	SD	df	Pvalue
Rh specific blood group	Rh -ve	4.3327	3.9039	431	0.9457*
	Rh +ve	3.7538	1.3240		
Rh non Specific blood group	A	3.8039	2.0540	429	0.8656
	AB	3.6487	0.9360		
	B	3.7323	0.8401		
	O	3.8561	1.7940		
Non O and O blood group	Non O	3.7505	1.4756	431	0.4318*
	O	3.778	1.543		

\*P value statistically not significant, df = degree of freedom

To assess the role of Rh factor with BT & CT, A,B, AB,& O were clubbed and reclassified as Rh +ve and Rh-ve blood group. And again we reclassified O blood group and Non O blood group to assess their relation with BT & CT.

There was a difference in BT & CT of males and females but its not statistically significant. Also no statistically significant difference was observed in BT & CT in Rh-ve & Rh+ve blood group. The difference in O blood group and Non O blood group was also not significant.

## DISCUSSION

Till date many studies carried out to find out the association between blood groups and bleeding time & clotting time. As stated by Massimo Franchini et al, [8] when compared to the type O group, the non O group individuals can have an increased risk of thrombosis due to the higher levels of vWF. He also stated that the ABO blood group can affect the vWF catabolism. It means the plasma vWF levels may depend upon blood group of the individual. Same concept was accepted by by Jenkin's PO et al, [9] who stated that vWF is 25% more in non O group individuals compared to group O individuals, meaning the CT and BT will be elevated among the O group individuals compared to the other groups

On the same field of knowledge, in our study we also tried to find out the association between blood groups and the bleeding time and clotting time. For it we reclassified blood groups in 1) Rh +ve & Rh-ve category and then 2) O blood group and Non O blood group category. We found difference in both the category with respect to bleeding time and clotting time but it was not statistically significant. Our findings were not similar to above studies.

But study done by Mahapatra et al [10] states that CT was prolonged in blood group B compared to O group and BT was significantly higher in AB group .Similar findings shown by one more study [11] where the BT was comparatively increased among the B group and the CT was increased in the individuals among AB group.

Smita V. Patil et al [12] findings related to this topic went with our findings which shows that there was no statistical significant findings between bleeding time and clotting time with respect to blood group.

Thus it is clear that, there were so many studies done on bleeding time and clotting time with respect to blood group but none had clarified their exact correlation. Our study with bigger sample size was definitely a great help in clearing the present scenario of this topic.

## CONCLUSION

Our study suggests that there is no statistical difference in bleeding time and clotting time with respect to gender as well as blood group. We recommend further detailed study in this area. The levels of estrogen as well as Von Willebrand Factor should be done along with bleeding time and clotting time & blood group.

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