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Original Research Article

A Study on Blood Group Distribution and its Correlation with Bleeding Time and Clotting Time among First Year Undergraduate Medical Students

Abirlal Sen*, Dibakar Dey, Soma Choudhuri

Department of Physiology, Tripura Medical College & Dr.BRAM Teaching Hospital, Hapania, Agartala,West Tripura

*Correspondence: Dr. Abirlal Sen (drabirlalsen@gmail.com)

ABSTRACT

Background: There is a clear association between ABO blood group status and levels of Von Willebrand factor (vWF). Blood group O is related with lower expression of vWF which leads to relative bleeding tendency. Thus, relationships between Bleeding time (BT), Clotting time (CT) and blood groups are important in certain conditions like epistaxis, surgery, thrombosis etc.

Aims and Objectives: i) To determine the blood group, of the students and to determine their relationship with BT and CT.

Materials and Methods: Institution based cross-sectional observational study done in Department of Physiology**,** Tripura Medical College & Dr. BRAM Teaching Hospital. BT and CT were done by Duke's Method and Capillary glass tube method respectively. Blood groups were determined on basis of presence or absence of agglutination. Qualitative data was expressed in percentage and quantitative data in frequency, mean and standard deviations. Chi square test was applied. P value of <0.05 was considered as statistically significant.

Results: BT more than 4 minutes was found maximum in group O (78.5%) compared to other blood groups (p = 0.001 by Chi-square analysis). Clotting time > 6 minutes found to be maximum in blood group O (53. 8%). Gender wise distribution showed CT >6 minutes in 39% females as compared to 34 % males (p value: 0.5826).

Conclusion: In our study, CT was > 6 minutes and BT was > 4 minutes' maximum in number in blood group O. Gender-wise BT and CT were higher in females than males. Our study showed that O blood group females are prone to certain diseases like epistaxis bleeding etc.

Key Words: Bleeding Time, Clotting time, Blood Group, Antiserum

INTRODUCTION

Blood group study is important in genetics, blood transfusion, forensic pathology and may be linked to diseases like duodenal ulcer, diabetes mellitus, urinary tract infection, feto-maternal incompatibility leading to hemolytic diseases of newborn[1]

The bleeding time (BT) test is a test for the assessment of platelet function. It is prolonged in congenital or acquired platelet abnormalities. Clotting time(CT) is

the time interval between puncture of blood vessels and formation of fibrin threads.[2] CT is affected by clotting factors. Defect or absence of one or more factors can cause prolonged CT.[3-5]

There is a clear association between ABO blood group status and levels of Von Willebrand factor (vWF) and FVIII:C.Blood group O is related with lower expression of vWF which leads to relative bleeding tendency.[6-8] Thus, relationships between BT, CT, and blood groups are important in certain conditions like epistaxis, surgery, thrombosis etc.

Gill et al[9] conducted a study in 1117 healthy individuals and reported that blood group O subjects have lowest plasma von Willebrand factor levels and highest in group AB subjects. While, Daniel M et al [10] in his study, could not find any association between ABO group and von Willebrand factor.

Thus, available literature shows conflicting findings regarding the various factors influencing BT/CT. So this study was aimed to determine the blood group, BT and CT of the students, to detect correlation between blood groups with BT, CT and also to determine any association between gender of participants and their BT, CT.

MATERIAL AND METHODS

The present study was done in Department of Physiology, Tripura Medical College & Dr. BRAM Teaching Hospital. It was an institution based cross-sectional observational study. Sampling technique used was Purposive sampling. Study duration was 6 months from 1st January 2024 to 1st June 2024. 105 Students of 1st year MBBS took part in the study.

Inclusion and Exclusion criteria:

The study included student volunteers of 1st year MBBS of age group 18-24 years who signed written informed consent.

The study excluded students whose BT and CT were not within normal limits (Normal BT by Duke's Method: 2-6 minutes, Normal CT by capillary glass tube method: 3-8 minutes)[11,12] Also, students with family history of bleeding and clotting disorder and students who were on NSAIDs (Non-steroidal Anti-inflammatory drugs) in the preceding 7 days of blood tests were excluded.

Study materials:

Sterile lancet, Filter paper, Capillary glass tube, anti-A, anti-B, and anti-D serum, Microscope.

Procedure:

Blood samples were collected by finger prick with sterile lancet after cleaning the puncture site with spirit in ring finger of non-dominant hand of the subjects.[13,14] Bleeding and clotting time were done by Duke's Method and Capillary glass tube method respectively. For Blood group, the sample blood was mixed with anti-A, anti-B, and anti-D serum. Blood groups were determined based on presence or absence of agglutination. Agglutination was confirmed by observing under low-power microscope.

Statistical analysis:

The available data were entered in MS Excel, then in software SPSS version 21 (SPSS, Inc., Chicago, IL). The qualitative data was expressed in terms of percentage and quantitative data expressed in terms of frequency, mean and standard deviations. Chi square test was applied in appropriate places. P value of <0.05 was considered as statistically significant.

Ethical Aspect:

Ethical Clearance was obtained from Institutional Ethical Committee (H), Tripura Medical College, & Dr. BRAM Teaching Hospital.

RESULTS

Table-1: Gender-wise distribution of Study Participants:

Gender	(n)	(%)
Males	**44**	**42%**
Females	**61**	**58%**

In the present study, 105 students ranging from the age groups of 17 to 24 years were involved. Out of 105 students, 61 (58%) were female and 44 (42%) were male. (Table 1)

Table-2: Blood Group Distribution among study participants based on gender:

Gender	Frequency (%) Blood group A	Frequency (%) Blood group B	Frequency (%) Blood group AB	Frequency (%) Blood group O	Total
Male	12 (27.2%)	12 (27.2%)	2 (4.5)	18 (40.9%)	**44 (100%)**
Female	12 (19.6%)	23 (37.7%)	9 (14.7%)	17 (27.8%)	**61 (100%)**
Total	24 (22.8%)	35 (33.3%)	11 (10.4%)	35 (33.3%)	**105 (100%)**

In our study, results showed that blood group O and blood group B (both 33.3%) were equally most predominant, followed A (22.8%) and AB (10.4%). (Table 2)

Table-3: Association of BT, CT with blood groups by Chi-square analysis

Variables	Time (min)	Blood Group A (N%)	Blood Group B (N%)	Blood Group AB (N%)	Blood Group O (N%)	P value*
Bleeding time (BT)	> 4 min	1 (7.1%)	1 (7.1%)	1 (7.1%)	11 (78.5%)	**0.00168649**
	< 4 min	23 (25.2%)	34 (37.3%)	10 (10.9%)	24 (26.3%)	
Clotting time (CT)	> 6 min	6 (15.4%)	8 (20.5%)	4 (10.2%)	21 (53.8%)	**0.00610286**
	< 6 min	18 (27.2%)	27 (40.9%)	7 (10.6%)	14 (21.2%)	

*(by Chi-square test analysis)

Table 3 shows BT > 4 minutes' maximum in group O (78.5%) compared to other blood groups viz. group A (7.1%), B (7.1%), and AB (7.1%).

Chi-square analysis on the data show statistically significant difference (p = 0.001) with the data of students having BT < 4 minutes.

Table 3 also shows that CT > 6 minutes' maximum in blood group O (53.8%) followed by group B (20.5%), group A (15.4%) and AB (10.2%). Chi-square test performed on the data shows statistically significant difference (p = 0.006) with the data of students having CT < 6 minutes.

Table-4: Gender-wise distribution of bleeding time and clotting time by Chi-square analysis

Variables	Bleeding time < 4min	Bleeding time > 4min	P value	Clotting time < 6	Clotting time > 6	P value
Gender	N (%)	N (%)		N (%)	N (%)	
Males	37 (84%)	7 (16%)		29 (66%)	15 (34%)	
Females	54 (89%)	7 (11%)	0.51	37 (61%)	24 (39%)	**0.58**
Total	91 (86.7%)	14 (13.3%)		66 (62.8%	(37.2%)	

*(by chi-square test analysis)

Table 4 shows that BT is more than 4 minutes in both 7 males and females (p value: 0.5095). CT is >6 minutes in 39% females as compared to 34% males having CT >6 minutes (p value: 0.5826).

DISCUSSION

The present study was done in Department of Physiology, Tripura Medical College & Dr. BRAM Teaching Hospital. 61 female students and 44 male students took part in the study. In our study it was found that blood group B and O were equally predominant (33.3%) followed by blood group A (22.8%) and AB (10.4%). Similar findings were found by Baishya R et al[15] Pramanik T et al [16], in which predominant blood group was O. Study conducted by R Singh et al revealed that the Nepalese students had predominant blood group O (35.2%), followed by A (30.5%), B (28.9%) and AB (5.5%). In contrast, prevalence of blood group A was maximum followed by group O, B and AB by many research studies.[17]

Our study showed BT >4 minute was maximum in group O (11 students,78.5%), followed by group A=B=AB and this was significant (p value: 0.00168649). Increased CT >6 min was also found in group O (21 students, 53.8%) followed by Blood Group B> A> AB with (20.5%,15.4% and 10.2%) respectively, similar to a study by Jha RK et al[18]

Several studies were performed to correlate the association between blood groups and BT, CT. Blood group O individuals have significantly lower plasma levels of Vwf (25% less) and Factor VIII compared to non-O group individuals. Thus the non-O group individuals can have an increased risk of thrombosis.[19] Reddy et al[20] found that epistaxis is commonly seen in O group compared to other ABO blood groups, and also found there is a lower expression of von Willebrand factor (vWF) in them. Franchini et al[21] proposed that the ABO group can affect the vWF catabolism, thus plasma vWF levels may depend on blood group of individual.

In our study, bleeding time was more in blood group O followed by A, B and AB (statistically significant). Similar results were obtained in study conducted by Baishya R et al[15] and other studies [22,23] however not significant. Contrastly, in a study, BT was found more prolonged in the blood group AB compared to other group (statistically significant).[24]

We found that female subjects have increased CT compared to male subjects, though not statistically significant. However, increased BT > 4 minutes was found equally in 7 males & 7 females each. This was similar to a study done by Jha RK et al [18] where there was increase in both BT, CT in females compared to males but not significant. Similar findings of raised BT and CT were seen in females compared to males but were statistically significant.[12,15,25].

However, Mahapatra and Mishra[24] in their study found no such gender wise difference in Bleeding time and clotting time. Thus, female individuals have comparatively higher CT probably due to presence of estrogen in female, estrogen is found to decrease the level of fibrinogen in the plasma and increase the clotting time.[26]

CONCLUSIONS

In our study, blood group B and O are equally found to be most predominant while blood group AB was the least common group. CT was > 6 minutes and BT was >4 minutes' maximum in blood group O. Gender wise, BT and CT were higher in females than males. So, from our study, we concluded that O blood group females may be more prone to certain diseases like epistaxis, thrombosis etc.

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