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Research Article

Blood Groups, BT and CT in Medical and Para Medical Students-Gender Based Distribution and Their Relation. An Observational Study.

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ABSTRACT:

Background: Evaluation of blood groups, bleeding and clotting time are the most important and initial hematological parameters done routinely and especially before any surgical procedure. Researches indicate that various gastrointestinal diseases like ulcers, cancers, UTIs, cardiovascular disorder , diabetes mellitus as well as thrombosis, epistaxis etc. are associated with ABO blood group system. Hemostatic parameters like BT and CT also vary in different blood groups.

KEY WORDS ; blood grouping, clotting time, bleeding time.

Materials and methods: The available data of 400 students of 1st year of mbbs, bds and para medical courses was analyzed in every required aspects i.e. sex, age, ABO and Rh blood groups, bleeding and clotting times. The standard antisera (A, B, & D) was used to determine the blood group, Duke's Method and Capillary tube method were used to find out bleeding and clotting time respectively. Finally, all the parameters were compared and analyzed statistically.

Results: Blood group B (44.5%) was the most common blood group in both genders followed by O (30.5%), A (21%), and AB (4%). Bleeding time was found to be prolonged >4 min in maximum number of group O (53%) followed by group A (26.4%), group B (14.2%), and then group AB(6.1%) but the difference was statistically significant (p = 0.00005). Similarly clotting time was >6 min in group O(54.5%) followed by group B=A(18.1%), group least in AB (9%), but the difference was statistically significant (p = 0.19). Gender-wise bleeding time was more prolonged in females (67.3%) than males (32.6%) but the difference was statistically insignificant (p = 0.07), similarly clotting time too was prolonged more in females (81%)than males (18.2%) but again the difference was statistically significant (p = 0.04).

Conclusion : In our study, blood group B predominated followed by O, A, and AB. Bleeding time was prolonged >4 min in blood group O followed by A,B, and AB whereas clotting time was prolonged >6 min in blood group O followed by A=B and then AB. Gender-wise bleeding and clotting time were higher in females than males.

Various blood related disorders, cardiovascular and gastrointestinal diseases are associated with blood groups, so people can take preventive measures according to their blood groups.

Key words; Blood grouping , bleeding time ,clotting time.

INTRODUCTION

Evaluation of blood groups, bleeding and clotting time are the most important and initial hematological parameters done routinely and especially before any surgical procedure. The ABO and Rh blood group system remains so far the most significant in blood transfusion. The magnificent discovery of ABO blood group system is credited to Austrian scientist Karl Landsteiner in 1900[1].

He discovered three blood groups (A, B & O) for which he was awarded Nobel Prize in 1930. Fourth blood group AB was discovered by Alfred Von Decastello and Adriano Sturli in 1902[2]. 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[3].

The ABO blood group system influences the bleeding time (BT) and clotting time (CT). BT is the time interval between the skin puncture and spontaneous unassisted stoppage of bleeding. CT is the time interval between the puncture of blood vessels and formation of fibrin threads[4]

Stoppage of bleeding from damaged blood vessels is hemostasis, an essential factor to be checked before any surgical process. Hemostasis consists of two phases, one is a vascular (platelet) phase and the other is coagulation phase. The activity of first phase can be checked by using the parameters like bleeding time, platelet count and platelet function assay[5]. The bleeding time as a screening test for evaluation of platelet function. While the available test to check the second phase (Coagulation phase) include clotting time (whole blood), prothrombin time, plasma fibrinogen and activated plasma thromboplastin time. Some diseases are also having relation with blood groups.[6]

AIMS AND OBJECTIVE: The aim of this study was to evaluate blood group distribution among male and female students and to compare bleeding and clotting time among various blood groups, and also to identify the gender difference among the same, if any.

DATA COLLECTION AND PROJECT DESIGN: The study was done during sep. 2017 and jan. 2018 in Department of Physiology, Government medical college Srinagar. A pre-designed questionnaire was used to collect the information from the students regarding their age, gender, blood group, bleeding time and clotting time after taking informed consent. Blood grouping, bleeding time and clotting time is done by the students as a part of their physiology practical work in hematology laboratory of the department. Students having any bleeding/clotting time disorders or drug intake (NSAIDS) were not included in this study to avoid bias.

Material And Methods: Our study included 400 students of same age group who participated in our study (17–20 years), all students belonged to first year of mbbs ,bds and para medical courses. Students having any missing study variable were omitted from the study. The presented data of 400 students was analyzed.

Procedure for blood grouping and rhesus factor (Rh factor) : Blood groups were determined by using standard antisera during physiology practical time in a hematology laboratory. Sterile lancet was used to prick the finger after sterilizing the puncture site with spirit. A blood sample was taken on glass slides and mixed with anti-sera A, B and D, and presence or absence of agglutination was checked to determine the blood group and Rh status. The low-power objective of a compound microscope was used to confirm the agglutination.

Procedure for doing Bleeding Time: Duke's filter paper method was used to determine the bleeding time. A deep skin puncture of the finger (preferably middle or index finger) was made and the time period required to stop the bleeding from incision was recorded every 30 sec using blotting paper. Bleeding time was calculated by multiplying the number of drops on the filter paper with time (30 sec). The normal values of BT by Duke's filter paper method generally lie in the range of 1–5 min.

Procedure for doing Clotting time

Capillary tube method was used to find out the clotting time. A skin puncture was made and the first drop was wiped away. A special capillary tube was filled with blood and time was noted when the blood first appeared in the capillary. The tube was held between the thumb and index finger of both hands, and the time taken to clot the blood was counted by gently breaking the tube every 30 sec, 1-2 cm from the end, until the formation of fibrin thread across the gap between the ends of the tube. The normal Clotting Time valued by the method ranges between 5–11 min.[7]

Statistical Analysis

The available data was expressed in frequency table to find out the sex ratio and to compare different ABO blood groups. Statistical analysis was carried out using SPSS version 16 (SPSS Inc., Chicago, IL). The chi-square test was applied to examine relation between blood groups, BT, and CT; p-value of 00.05 was considered to be statistically significant.

RESULTS

The available data of 400 students was analyzed. Out of 400 students 176 were males and 224 were females. The age group was homogeneous in our study population (17–20 years). It was found that the predominant blood group in current study was blood group B followed by O then A and least common AB.

Most of subjects having more than 6 minutes clotting time were in O blood group in comparison to other groups of ABO system (p = 0.04) which was statistically significant. Most of subjects having more than 4 minutes bleeding time were also in O blood group in comparison to other groups of ABO system but was statistically significant (p = 0.00005). Clotting time and bleeding time were both prolonged in females in comparison to males was statistically significant (p= 0.04) while as bleeding time was statistically insignificant (p=0.07).

Female individuals having comparatively more bleeding time and clotting time may be due to the presence of hormone estrogen, which lowers the plasma level of fibrinogen and increase the clotting time.

Table 1. ***Number and percentage distribution of various blood groups in medical students***

Blood group	Males	Females	Total
A	33 (19.6%)	51 (21.9%)	84 (21%)
B	76 (45.2%)	102 (43.9%)	178 (44.5%)
O	50 (29.7%)	72 (0.3%)	122 (30.5%)
AB	9 (0.05%)	7 (0.03%)	16 (4%)
	168	232	400

Table 2. ***Showing gender based distribution of bleeding time below and above 4 mins in various Blood groups.***

	Bleeding time <4mins			Bleeding time>4mins		
Blood groups	Male	Female	Total	Male	Female	Total
A	29(19)	42(21.1)	71(20.2)	4(25)	9(27)	13(26.4)
B	74(48.6)	97(48.7)	171(48.)	2(12.5)	5(15.1)	7(14.2)
O	41(26.9)	55(27.6)	96(27.3)	9(56.2)	17(51.)	26(53)
AB	8(5.2)	5(2.5)	13(3.7)	1(6.2)	2(6)	3(6.1)
	155	19	351	16	33	49

Table3. ***Showing gender based distribution of Clotting time below and above 6 mins in various Blood group***

	Clotting time < 6 mins			Clotting time >6 mins		
Blood groups	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
A	33(18.9)	49(22.7)	82(21)	0(0.0)	2(22.2)	2(18.1)
B	75(43.1)	101(46.9)	176(45.2)	1(50)	1(11.1)	2(18.1)
O	49(28.1)	67(31.1)	116(29.8)	1(50)	5(55.5)	6(54.5)
AB	9(5.1)	6(2.7)	15(3.8)	0(0.0)	1(11.1)	1(9)
	174	215	389	2	9	11

Table4. ***Distribution of CT and BT among ABO blood group with chi-square analysis.***

	Time(min)	A	B	O	AB	chi-square=4.6
	<6	82	176	116	15	p=0.19
CT	>6	2	2	6	1	
	<4	71	171	96	13	chi-square=22.2
BT	>4	13	7	26	3	p=0.00005

Table 5. Gender **wise distribution of CT and BT with chi-square analysis.**

	Time(min)	A	B	O	AB	chi-square=4.6
	<6	82	176	116	15	p=0.19
CT	>6	2	2	6	1	
	<4	71	171	96	13	chi-square=22.2
BT	>4	13	7	26	3	p=0.00005

DISCUSSON

A clear correlation has been established between the ABO phenotype and the level of two proteins in blood clotting ie factor VIII and von Willebrand 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[8]**.** As stated by Massimo Franchini et al[9], relationship between ABO blood group and von Will brand factor levels: from biology to clinical implications. 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. Recent researches indicate that diabetes mellitus, various gastrointestinal diseases like ulcers, cancers, UTIs, as well as thrombosis are associated with ABO blood group system[10]

The commonest type of blood group in our study was B followed by O and A and least common was AB. The same trend of prevalence of blood groups B > O > A > AB was observed by **Patil SV et al11** and various other researcher**12,13** which are similar to our study. In contrast to our study, results obtained from a study conducted on 322 medical students by **Pramanik T, Saikia TC and Bandopadhyya M[14],** and **Bedantaet al[15]** also reveals that the Nepalese students had predominant blood group O (35.2%), followed by A (30.5%), B (28.9%) and AB (5.5%).which reported blood group O as the most prevalent one (32%), followed by A (29%), B (26%) and AB (13%);

In the present study, Clotting time and bleeding time both are prolonged in blood group O which was statistically significant (p=0.19) and(p=0.00005) respectively. In contrast to our study non significant prolonged BT was seen in blood group O in a study done by **Thenmozhi S, Neelambikai N, Aruna P[16].** Similar to our study ,BT was found more prolonged in the blood group AB compared to other groups, which was statistically significant[17.]

The comparison of gender with bleeding and clotting times in our study shows that females have greater values of BT and CT as compared to males which was statically significant (p=0.04).This gender based difference might be because of higher levels of estrogen and lower levels of fibrinogen in blood plasma of females compared to males.

In contrast to our study, there was no such gender-wise difference in BT and CT in a study carried out by Mahapatra and Mishra N[18]**.**

Conclusion

Blood group B was the most common blood group among the students and AB was the least common blood group. CT was prolonged >6 min among blood group O >A and B=AB, in females while as in males 0>B=A>AB. Hence CT was more prolonged in blood group O in both males and females and was statistically significant.

BT was prolonged >4 min in blood group O and least in AB in both genders which was statistically significant.

Gender-wise BT and CT were higher in females than males, but the difference was statistically significant.

Further research with larger sample size and conduct of multicentric studies are necessary to confirm these finding of different ABO blood groups and also the plasma von Willebrand factor and estrogen levels should be estimated to rule out any possible reason for the different levels of clotting and bleeding time among the ABO groups. This will help us to identify the risk group and preventive measures could be adopted before the onset of such disorders.

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Bibliography

[1] 1.Land Steirier K. Zur Kenntnis der antifermentativen, lytischen and agglutinierenden wirkungen des Blutserums under lymphe. Zentralblatt Bakteriologic.1900; 27: 357)

[2] 2. Decastello and Adriano Sturli in1902. Von decastella A, Sturli A. Ureber die iso agglutininein serum gesunder and Kranaker Menschen" MfinerMed WSchr. 1902; 49: 1090–5.)

[3] 3 Ghai CL. A Textbook of Practical Physiology. 5th edition. Jaypee Brothers Medical Publishers (P) Ltd. 1999;84101.)

[4] 4.Ganong WF. Review of Medical Physiology.22nd edition. Mc Graw-HillEducation,2005. Pp 537

[5] 5. Harker LA and Slichter SJ (1972). The bleeding time as a screening test for evaluation of platelet function. *N. Engl. J. Med*., 287: 155-159.

[6] 6.Kinra P, Tewari V and Raman RTS (2009). Role of bleeding time and clotting time in preoperative hemostasis evaluation. *Ind J Aerospace Med.*, 53: 56-61

[7] 7. Pal GK and Pal P (2001). Textbook of practical physiology, Orient Blackswan.

[8] 8. Franchini M, Franco Capra, Giovanni Targher, Martina Montagnana,Giuseppe Lippi. Relationship between ABO blood group and von Willebrand factor levels: from biology to clinical implications.Thromb J. 2007;5:14.)

[9] 9. Massimo Franchini, Franco Capra, Giovanni Targher, Martina Montagnana and Giuseppe Lippi *J Reprod Med 2003, 48:515-524.*

[10] 10. Zhang H, Mooney CJ, Reilly MP (2012). ABO blood groups and cardiovascular diseases. *International journal of vascular medicine*., 2012:

[11] 11. Patil SV, Gaikwad PB, Vaidya SR, Patil US, Kittad SD. To study theblood group distribution and its relationship with bleeding andclotting time in dental students. Asian J Medical Pharmaceutical Sci.2013;1(1):1–4.

[12] 12. Roy B Banerjee, Sathian B, Mondal M, Saha CG. Blood group distribution and its relationship with bleeding time and clotting time: a medical school based observational study among Nepali. Indian and Sri Lankan students. Nepal J Epidemiol. 2011;1(4):135–40.

[13] 13. Abhishekh B, Mayadevi S, Meena D, Usha KC. Distribution of ABOand Rhesus-D blood groups in and around Thiruvananthapuram.Kerala Med J. 2011;1:28–9.)

[14] 14. Pramanik T, Saikia TC, Bandopadhyya M. Prelimilary report on the trend of blood group distribution among Nepalese and Indian medical students. J Nepal Med Assoc. 2001;41:258-61)

[15] 15. Roy B, Banerjee I, Sathian B, Mondal M, Saha CG. Blood group distribution and its relationship with bleeding time and clotting time: A medical school based observational study among Nepali, Indian and Sri Lankan students. *Egyptian Journal of Occupa-tional Medicine, 2017; 41 (1) :35-53*

[16] 16.Thenmozhi S, Neelambikai N, Aruna P. Comparison of bleedingtime and clotting time in different ABO blood groups. National Journal of Physiology. 2013;1(1):19–24.

[17] 17.Kohli PG, Kaur H, Maini S. Relationship of bleeding time and clotting time with blood groups. Res J Pharm Biol Chem Sci. 2014;5(2):1780–3)

[18] 18. Mahapatra B, Mishra N. Comparison of bleeding time and clotting time in different blood groups. American J Infectious Dis. 2009;)5(2):113–15