

Interdependence of major blood group with bleeding time and clotting time

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Abstract

Background: In the health world, investigations are plays precious role. Relationship to major blood group with bleeding time and clotting time plays important role to detect thrombosis, epistaxis and it is also important for the surgery. Deficiency of factor VIII and Von Willebrand factor generally seen in blood group O, so they are more prone to epistaxis but in thrombosis there is elevation of factoVII and Von willebrand factor level. Thus, previous studies endorse that individuals carry O blood group had lengthy bleeding and clotting time. **Aims and Objectives:** The objective of this study was to assess the impact of major blood groups on Bleeding Time and Clotting Time. **Materials and Methods:** Study enrolled 200 young adults, aged 17–25 years. Blood group was assessed by using standard antisera, Duke method and capillary tube method was used to estimate Bleeding time and Clotting time respectively. **Statistical analysis:** Blood groups, Bleeding time and clotting time of were compared and analyzed, All the data presented as Mean \pm Standard Deviation (Mean \pm SD) and subjected to Analysis of Variance (ANOVA) **Results:** Blood group- According to this study commonest blood group was B (31.5%) than A (27.5%), O (26.0%) and AB (9.5%) Extended duration of bleeding time (>4 min) was noted in blood group O (22%) than group B (18%), AB (5.9%), and group A (3.2%) with statistically insignificant ($p > 0.05$) difference. Clotting time- On the other hand B blood group showed >6 min with 14.8% than group O (14.6%), group AB (11.76%), and group A (9.7%) with statistically insignificant ($p > 0.05$). **Conclusions:** According to this study, B blood group dominated on O, A and AB blood group respectively. Least bleeding time was noted in A blood group, B and AB blood group but most elevated bleeding time was reported (>4 min) in O blood group. Whereas clotting time was highest in B blood group (>6 min) then O, A, and AB blood group.

Key words: vWf (von Willebrand factor). Clotting Time. Bleeding Time. Blood Group

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INTRODUCTION

With the economic progression, health issues also increased day by day. Investigation is the back bone of health world. Bleeding time, clotting time and Blood grouping are the fulcrum of treatment/ normal growth of

infant, kids, young adult or pregnant lady as well before any type of minor or major surgery. Karl Landsteiner was the 1st discoverer (1900) of ABO blood group system.¹ ABO and Rh Blood Group are assessed as major blood group from all recognized antigens. Researcher group have found that, O blood group is defecate to transferase enzyme, so they were prominent to epistaxis as compared other blood groups.² Tntransferase enzyme helps vWF helps in platelet adhesion and platelet aggregation and regulate circulating levels of anti-hemophilic factor A⁽³⁾. Factor-VIII and von Willbrand factor helps in temporary plug formation which activates clotting mechanism leads to formation of permanent plug. Deficiency of these factor (F- VIII and Vwf) leads to hemorrhagic like disorder, while elevated von wilbrand factor with factor VIII leads to thrombosis.⁽⁴⁻⁶⁾ Impact of Blood group on BT and CT stimulate or inhibit the bleeding time (BT)

and clotting time (CT) of an individual due to gene locus on the chromosome 9q34 vWF gene.⁷ Bleeding time (BT) is process to stop bleeding with the temporary plug forming. This process normally takes 3- 4 minutes.⁸ Clotting time (CT) is the process of first fibrin thread formation. Normal value is 5-8 minutes.⁹ Increased/ decreased clotting factors leads to pupura/hemophilia/epistaxis.¹⁰ Many researcher concluded that people with O antigen on the RBC surface have decreased amount of factor VIII and Von Willebrand factor than other antigen (A,B and AB).¹¹ Hence, Impact of Factor-VIII and von Willbrand factor might be reduce or increase bleeding time and clotting time of major blood group.¹² Therefore, the present study was planned to correlate between major blood group system with B.T and C.T.

MATERIALS AND METHODS

This observational study was conducted in Haematology laboratory (physiology department) of “Teerthanker Mahaveer Medical College and Research Center, Moradabad”. It is compulsory for all student to perform blood grouping, bleeding time and clotting time during their 1st semester. Over this duration of one year report of 200 healthy young adults was analysed.

Inclusion Criteria: Subject of age group 18-30 yrs.

Exclusion Criteria: Suffering from purpura /Hemophilia and related medicine like NSAID’S, asprine ecosprine.¹³

Blood Grouping -Done by standard procedure by mixing blood with commercially available antesira and examine

RESULTS

Table 1: Gender based comparison of blood group

Blood group	Male(n=84)	Female(n=116)	Total(n=200)
A ^{-ve}	0.0%	0.9%	0.5%
A ^{+ve}	34.5%	22.4%	27.5%
AB ^{+ve}	8.3%	10.3%	9.5%
B ^{-ve}	0.0%	1.7%	1.0%
B ^{+ve}	26.2%	35.3%	31.5%
O ^{-ve}	3.6%	4.3%	4.0%
O ^{+ve}	27.4%	25.0%	26.0%

Table 1- A positive blood group dominated (34%) followed by O,B and AB positive respectively in male subjects but in case of female B positive(35%) followed by O,A and AB positive respectively. Overall B positive is dominating blood group followed by A,O and AB respectively.

Table 2: Comparison of bleeding time of ABO groups

Blood group	Bleeding Time		F-value
	No. of sub.	Mean ± S.D	
A	56	121.07 ± 41.63	5.439
B	65	124.62 ± 37.59	
AB	19	126.32 ± 34.03	
O	60	149.83 ± 50.74	p-value <0.05

under low power after 8-10min of rest. Determination of blood group on the bases of agglutination⁽¹⁴⁾.

Bleeding time-After assembling necessary material and proper instruction to subjects about the blood test sterile finger/ear lobe make a deep puncture. Start the stopwatch immediately, absorb first drop of blood on the Blotting paper. Repeat this procedure after every 30 sec. till stoppage of bleeding than stop the stopwatch. After Counting number of dropes then multiplies it with 30 second⁽¹⁵⁾.

Clotting time- After assembling necessary material and proper instruction to subjects about the blood test sterile finger/ear lobe, make a deep puncture. Wipe first drop of blood, now allow big drop of blood to enter in capillary by keeping it to downward position toward second end. Start the stopwatch immediately. Filled capillary kept between palms for one sec. than break 5mm. bits of capillary after every 30 sec till fibrin thread found. Note the time.¹⁶

Data Analysis

SPSS 23 software was use to analysis data. The Comparison between mean of Bleeding time and Clotting time in various blood groups were done by using the One-way ANOVA test. Comparison of inter-group bleeding time and clotting time was done the Post-hoc bonferroni test. P-value of bleeding time and clotting time was calculated by unpaired t-test. The results were presented in number, percentage, mean and standard deviation as appropriate. A p-value of <0.05 was considered as statistically significant.

In Table 2- Comparison of Bleeding time in major blood group showed, Elevated Bleeding time in O blood group (149.83 ± 50.74) followed by AB,B then A(126.32 ± 34.03 , 124.62 ± 37.59 , 121.07 ± 41.63) respectively with statistically significant difference ($p < 0.05$).

Table 3: Comparison of Bleeding Time among Inter-blood groups

Blood-group	Bleeding time	
	Mean Difference	p-value
A to B	-3.54	>0.05
A to AB	-5.24	>0.05
A to O	-28.76	<0.05
B to A	3.54	>0.05
B to AB	-1.70	>0.05
B to O	-25.22	<0.05
AB to A	5.24	>0.05
AB to B	1.70	>0.05
AB to O	-23.52	<0.05

Table 3- Comparison of bleeding time between inter-group which shows statistically significant difference between A and O blood group ($p < 0.05$), B and O blood group ($p < 0.05$) and between AB and O blood group ($p < 0.05$). The mean difference was statistically significant more in O blood group than (A, B and AB) blood groups.

Table 4: Comparison of clotting time of ABO blood groups

Blood group	Clotting time		F-value
	No. of sub.	Mean±SD	
A	56	213.39±49.44	3.203
B	65	239.23±58.26	
AB	19	212.11±52.45	
O	60	215.33±53.53	p-value <0.05

Table 4- Comparison of Mean±SD between blood major blood group (ABO), Maximum Mean±SD was obtained in B blood group with statistically significant difference ($p < 0.05$) than A, AB and O blood groups.

Table 5: Inter-group Mean comparison of clotting time among A, B, AB and O blood groups

Blood Group	Clotting time	
	Mean Difference	p-value
A to B	-25.84	<0.05
A to AB	1.29	>0.05
A to O	-1.94	>0.05
B to AB	27.13	<0.05
B to O	23.90	<0.05
AB to O	-3.23	>0.05

Table 5- Comparison of mean clotting time difference between inter-blood group (ABO), showed the statistical significant difference between A to B blood group between A to AB, A to O, B to AB, B to O and AB to O blood group. Difference between O blood group with any other blood group obtained large value with $p < 0.05$.

DISCUSSION

Blood group distribution. This study was concluded that B+ blood group (31%) was more prominent, followed by A+ (27%) than O+, AB+(26%, 9.5%), This study supports Abhishekh *et al.* but not support to Pramanik *et al* study, they states O blood group followed by A, B and AB (35.5%, 28%, 27.3% and 8.7 respectively).¹⁷⁻¹⁹ On the bases of gender difference, A blood group (34.5%) showed maximum percentage in female group which was followed by O, B and AB (27%, 26% and 8.3%)

respectively than male group, B blood group (35.3%) dominating on blood group O (25%), A (22.4%) and AB (10.3%).

Comparison of BT and CT according to blood group

This study concluded that O blood group had maximum value of bleeding time as compared to other blood groups with statistically significant difference ($p < 0.05$). Similarly in other study the BT was highest in blood group O than A, B and AB blood groups. On the bases of inter group comparison O blood group showed statistically

significant difference with any other blood group. B blood group predominate to A, B and AB, this result was not support to some previous studies, they concluded that O blood group showed the highest value than other (A, B and AB) blood group.¹⁷⁻²⁰ On the bases of inter group comparison B blood group showed statistically significant difference with any other blood group

CONCLUSION

This study showed definite correlation between major blood group with BT and CT, due to getting higher value of O blood group. Prevalence of bleeding disorders such as gastrointestinal infections and epistaxis is more in O blood group and these individuals can be advised to acquire healthy measures and regular health checkup to reduce the risk of communicable diseases, morbidity and mortality.

Limitations

There is certain limitation of this study, sample size is very small (200) large sample could strengthen the study. Secondly, major blood group includes ABO and Rh system due to unavailability of Rh Negative blood group individual's study was not strengthened.

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