

A STUDY IN SURGICAL PATIENTS ON ASSOCIATION OF BLEEDING TIME AND CLOTTING TIME WITH BLOOD GROUPS AT A TERTIARY CARE HOSPITAL

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ABSTRACT

Background and Objectives: Assessment of bleeding time (BT), clotting time (CT), and ABO blood groups holds significant clinical relevance, particularly in the context of various conditions like thrombosis, epistaxis, and cardiac surgery. However, the existing literature presents contradictory findings concerning the correlation between bleeding time, clotting time, and the ABO blood groups. Therefore, the primary objective of this study was to investigate and elucidate the potential associations between bleeding time and clotting time across the four ABO blood groups in surgical patients.

Materials and Methods: The present investigation encompassed individuals aged between 18 and 70 years. BT assessment was conducted utilizing Duke's method with Whatman filter paper, while CT was determined employing the capillary tube method. Additionally, ABO blood grouping was performed on all participating patients. The potential association between bleeding time, clotting time, and the ABO blood groups was statistically analyzed using the Chi-square test.

Results: A total of 157 patients, with 57% males and 43% females, were recruited for this study. The distribution of ABO blood groups among the participants was as follows: 47.77% (75/157) had blood group "O", 28.03% (44/157) had blood group "B", 17.83% (28/157) had blood group "A", and 6.37% (10/157) had blood group "AB." Neither BT nor CT in the cohort of participants exhibited any significant association with the ABO blood groups.

Conclusion: BT or CT values are not dependent upon ABO blood groups in either gender. The results of this study contribute to the existing knowledge in the field of medical sciences and may serve as a basis for further investigations in this area.

Key words: Bleeding Time, Clotting Time, Blood Grouping, ABO Blood-Group System, Thrombosis.

INTRODUCTION

The ABO blood group antigens are inherited as Mendelian determinants, leading to the classification of individuals into four distinct blood groups - "A," "B," "AB," and "O." These blood groups have significant clinical implications, particularly in the field of transfusion medicine. Studies have shown that the distribution of these blood groups varies geographically, with certain groups being more prevalent in specific populations [1].

Research has also demonstrated that the ABO blood groups have a profound impact on hemostasis [2], with differences in plasma levels of von Willebrand factor and factor VIII [3,4]. Deficiencies in von Willebrand factor have been linked to hemorrhagic disorders, while elevated levels are associated with an increased risk of thrombosis [5]. Furthermore, numerous studies have investigated the relationship between ABO blood groups and various diseases, including gastric carcinoma, diabetes mellitus, urinary tract infections, duodenal ulcer, venous thrombosis, and epistaxis [2,3,6-9].

In order to assess the functional aspects of blood coagulation, bleeding time (BT) and clotting time (CT) are often evaluated during blood transfusions and in the diagnosis of various diseases. Studies examining the correlation between bleeding time and clotting time with the four ABO blood groups have yielded inconsistent results [10-15]. While many studies have reported longer BT, CT for blood group "O" compared to non-"O" blood groups, others have failed to detect

such associations. Interestingly, it has been suggested that individuals with blood group "O" have lower levels of plasma von Willebrand factor, which may contribute to their reduced risk of thrombosis.

Given the scarcity of literature on this topic and the contradictory findings of previous studies conducted in India, the current study aimed to investigate the association of BT and CT with the four ABO blood groups in surgical patients. By exploring this relationship, we hope to contribute to the understanding of the complex interplay between genetics, hemostasis, and disease susceptibility.

MATERIAL & METHODS

The present prospective observational study was conducted at a tertiary care hospital in India, spanning over 6 months. The study comprised of patients posted for various surgeries aged between 18 and 70 years, encompassing both male and female individuals. Patients with a history of bleeding and/or clotting disorders, history of medication usage known to cause abnormal BT or CT, such as nonsteroidal anti-inflammatory drugs were excluded.

Blood samples were collected from the study participants via finger prick under aseptic conditions. A suspension of red blood cells was prepared by mixing the collected blood with normal saline. The red blood cell suspension was then combined with anti-A and anti-B antisera, and the clumping of red blood cells was observed under a compound microscope using a low-power objective for ABO blood groupin [16].

Bleeding time was determined using Duke's filter paper method [17]. A deep finger prick was made, and the time taken for bleeding to cease was recorded by blotting the blood droplet from the incision site every 30 seconds using blotting paper. Bleeding time was calculated by multiplying the number of spots on the filter paper by 30 seconds. The normal bleeding time, as measured by Duke's filter paper method, typically falls within the range of 1–5 minutes.

Clotting time was determined using Wright's capillary glass tube method [17]. A standard incision was made in the skin under aseptic conditions, and blood was collected in a clean capillary glass tube. The time taken for the blood to clot was calculated by breaking the capillary tube after 2 minutes, approximately 1–2 cm from one end, and recording the appearance of a fibrin thread every 30 seconds. The normal clotting time estimated by this capillary glass tube method usually ranges from 5 to 11 minutes.

The collected data were entered into a pre-designed Microsoft Excel sheet for subsequent analysis. Patients were categorized into two groups based on their BT: BT <4 minutes and BT >4 minutes. Similarly, patients were categorized into two groups based on their CT: CT <6 minutes and CT >6 minutes. The Chi-square test was employed to compare categorical data. A significance level of $P < 0.05$ was considered for statistical significance, and SPSS for Windows was used for all statistical analyses.

RESULTS

This study involved the participation of 157 patients. The average age of the patients was 45.91 ± 8.34 years, with an age range spanning from 18 to 70 years. Specifically, male patients exhibited a mean age of 46.36 ± 8.31 years, whereas female patients had a mean age of 45.71 ± 8.27 years. Notably, a statistical analysis revealed no significant difference in age between male and female patients ($P > 0.05$). The distribution of male and female patients among blood groups is presented in Table 1.

Table 1: Gender wise blood groups in study population

Blood Group	Male		Female		Total		P value (Male vs Female)
	n	%	n	%	n	%	
A	20	12.74	8	5.10	28	17.83	0.14
B	24	15.29	20	12.74	44	28.03	
AB	7	4.46	3	1.91	10	6.37	
O	39	24.84	36	22.93	75	47.77	
Total	90	57.32	67	42.68	157	100.00	

Based on the results obtained from the Chi-square test analysis, no statistically significant difference was observed in the BT across the four ABO blood groups. Similarly, the Chi-square test indicated no association between CT exceeding 6 minutes and any specific blood group. Table 2 presents the distribution of BT and CT concerning the four ABO blood groups.

Table 2: Distribution of BT, CT in various blood groups in study population

Blood Group	BT				P value	CT				P value
	< 4 minutes		> 4 minutes			< 6 minutes		> 6 minutes		
	n	%	n	%		n	%	n	%	
A	27	17.20	1	0.64	0.78	32	20.38	2	1.27	0.54
B	42	26.75	1	0.64		38	24.20	4	2.55	
AB	10	6.37	0	0.00		11	7.01	1	0.64	
O	71	45.22	5	3.18		62	39.49	7	4.46	
Total	150	95.54	7	4.46		143	91.08	14	8.92	

Table 3 displays the gender-wise distribution of BT and CT in patients. The statistical analysis, conducted using the Chi-square test, revealed no significant association between BT and CT with any specific gender.

Table 3: Gender wise distribution of BT, CT in study population

Blood Group	BT				P Value	CT				P Value
	< 4 minutes		> 4 minutes			< 6 minutes		> 6 minutes		
	n	%	n	%		n	%	n	%	
Male	88	58.67	2	1.27	0.19	82	57.34	8	5.10	0.89
Female	62	41.33	5	3.18		61	42.66	6	3.82	

DISCUSSION

In this current study, an examination of bleeding time across the four ABO blood groups did not reveal any significant associations. Additionally, a comparison of the gender-wise distribution of students with categorized bleeding time and clotting time demonstrated a lack of statistically significant associations.

In a research conducted among Nepalese population, the blood group "A" was found to be the most prevalent, followed by blood group "O," "B," and "AB". Notably, the distribution of ABO blood groups was observed to vary among different geographical regions inhabited by diverse races. Moreover, no significant difference was observed in the gender-wise distribution of students among the four ABO blood groups [18].

In our study, we observed that BT and CT did not significantly differ among the four ABO blood groups in our study subjects. This finding aligns with similar observations reported in various studies conducted in different regions of India, as well as in Nepal and Pakistan [14, 19-23]. However, some researchers have reported a significant association between BT and ABO blood groups, showing elevated BT in individuals with blood group "O" compared to non-"O" blood groups [5, 24]. This increase in BT in blood group "O" individuals is believed to be attributed to the presence of low plasma von Willebrand factor in their blood. Similar observations have also been reported concerning CT in association with the ABO blood groups.

Our study findings regarding the comparison of BT and CT among male and female students were consistent with some previous studies [11,19,21]. However, other studies have reported conflicting results, indicating significant differences in both bleeding time and clotting time between male and female students [10,13,22,25-28].

CONCLUSION

In conclusion, our study demonstrated that bleeding time and clotting time were similar across the four ABO blood groups in young adults. Additionally, no significant evidence of an association between genders and both bleeding time and clotting time was observed in our study subjects. However, it is essential to acknowledge that further investigation through a large cohort study is necessary to bridge the knowledge gap and gain deeper insights into this association.

Conflicts of interest: none

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