

Bleeding time and Clotting Time in Healthy Male and Female College Students of Karukutty Village, Kerala

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Background

It was reported that females are having high Bleeding time and clotting time than males. The reason for prolonged bleeding and clotting time in females is not clear. The studies on Bleeding time and Clotting time in healthy male and female college students of Kerala are inadequate. Therefore the present study was undertaken to measure and compare bleeding time and clotting time in male and female college students.

Methodology

Two hundred and twenty two healthy male and female college students, were enrolled in the present study. Bleeding time was estimated by Duke Method and clotting time was estimated by capillary tube method.

Results

Mean age of the participants of present study is 19 ± 1 . We have observed higher bleeding time (BT) and clotting time (CT) in females (155.45 ± 34.91 seconds and 318.18 ± 64.40 seconds) than males (96.06 ± 55.05 seconds and 223.01 ± 50.74 seconds) which is statistically significant (p value < 0.001). Minimum and Maximum bleeding time observed in females is 2 minutes and 4 minutes respectively while in males, it is 30 seconds and 3 minutes 30 seconds respectively. Minimum and maximum clotting time observed in females is 3 minutes 30 seconds and 10 minutes respectively while in males, it is 2 minutes 30 seconds and 5 minutes respectively.

Conclusion

Our study suggests that bleeding and clotting time are slightly higher in females. We recommend further detailed study in this area.

Keywords: bleeding time; blood coagulation; Kerala.

Introduction

Spontaneous arrest of bleeding from injured capillaries and venules is called as hemostasis, which includes vasoconstriction, platelet plug formation, clot formation, clot retraction and clot lysis. (1-4) Test for hemostasis is performed before surgeries. 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. (5) BT and CT are performed during blood transfusion, diagnosis of platelet disorders and a variety of forms of treatment in hospitals. (6) Bleeding time is affected by platelet function and activation as well as interactions between endothelial cells in the artery, aggregation and coagulation pathways. (7-9) Bleeding time is prolonged in thrombocytopenia, disseminated intravascular coagulation (DIC), Bernard-Soulier disease, which is a rare autosomal recessive disorder that causes deficiency of the receptor for von willebrand factor and Glanzmann's thrombasthenia in which the

platelets contain defective or low levels of glycoprotein IIb/IIIa (GpIIb/IIIa), which is a receptor for fibrinogen. (10-11) Clotting time (CT) is the time interval from onset of bleeding to formation of first fibrin thread. Normal value of clotting time is 5 to 8 minutes. (12) CT is affected by clotting factors. Defect or absence of one or more clotting factors can cause prolonged CT. (13)

It was reported that females had high clotting time than males. (14) This might be due to presence of more amounts of estrogen in females which increases CT and decreases plasma fibrinogen levels. (15) Presence of more amounts of estrogen in females may suppress

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platelet function and prolongs bleeding time. (16-17) Short BT in male may be due to enhanced number of platelet reactivity and aggregation. (18-22)

It was reported that platelet count were shown to decrease progressively with age, with the consequence that thrombocytopenia was more common among the elderly, while thrombocytosis was more frequent among younger people. (23) Thrombocytosis is associated with an increased risk of thrombosis. (24) In contrast fibrinogen levels in the plasma increases with age which shortens clotting time in elderly people, which makes them more prone to thromboembolism. (25-27)

Even after thorough review of literature, we didn't find articles related to bleeding time and clotting time in male and female college students of Kerala. Hence, the present study was undertaken to compare bleeding time and clotting time in male and female college students.

Materials and Methods

Study Design and Participants

This retrospective study was carried out in the department of physiology in Little Flower Medical Research Centre, Angamaly and Kristu Raja Church, Karukutty, Kerala. A total of two hundred and twenty two healthy male and female college students were participated voluntarily in the medical camp comprising 110 males and 112 females.

Students with any hematological disorder were excluded. Bleeding Time was estimated by Duke method (28) whereas Clotting Time was estimated by Capillary Tube method. (29)

In Duke method, a puncture is made on finger tip and the time recorded when blood first appears. The blood is carefully blotted every 30 seconds, with care begin taken that the wound site is not touched. The time is recorded when bleeding stops. The time interval from onset of bleeding to stoppage of bleeding should be reported as bleeding time. The Capillary Tube method involves collecting blood in a capillary tube that does not contain anticoagulant. The timer is started when the blood first enters the tube. The outside of the tube is carefully wiped and every 30 seconds a piece of the tube is broken. The time is recorded when a strand of fibrin appears between the two pieces of capillary tube. (28)

The purpose and procedure of the study were explained to each subject. Written informed consent was taken from all the participants. Study protocol was approved by Institutional Ethics Committee of Little Flower Medical Research Centre, Angamaly.

Data Collection

The preset study was conducted at 9 am in the morning for the convenience of students. Two investigators of our study performed the tests for bleeding and clotting time and collected data from the student at the same time.

Data Analysis

The analysis of data was done by SPSS 20.0. Independent sample t-test is used for data analysis.

Results

Table: 1 Mean values of BT and CT in male and female college students.

	Male	Female	p-value
BT (seconds)	96.06±55.05	155.45±34.91	<0.001
CT (seconds)	223.01±50.74	318.18±64.40	<0.001

The mean value of bleeding time in males is 96.06±55.05 seconds and in females is 155.45±34.91 seconds, indicates that females are having higher bleeding time than males, which is statistically significant (p value <0.001). The mean value of clotting time in males is 223.01±50.74 seconds and in females is, 318.18±64.40 seconds, indicates that females are having more clotting time than males, which is statistically significant (p value <0.001).

Discussion

Prolonged bleeding time in females may be due to the differences of soft tissue, and hormonal effect on blood vessels. (30) Presence of more amounts of estrogen in females may suppress platelet function and prolongs bleeding time. (16-17) We agree with these studies as we have observed higher bleeding time in females than males. However, many reports demonstrated conflicting data about the difference of the BT between sexes. (31-33) It was reported that testosterone increases synthesis of thromboxane A2 and facilitates platelet aggregation. (34) We agree with this study as we have observed shorter bleeding time in males when compared with females. However, it was reported that testosterone inhibits platelet aggregation and this effect was dependent on endothelial nitric oxide synthesis, which disagree with our study. (3)

Higher clotting time in females may be due to presence of estrogen which prolongs clotting time by decreasing plasma fibrinogen levels. (35) Researchers found significantly lower concentration of fibrinogen in women taking oral hormone replacement therapy vs. the control group. (36) Low doses of 17beta-estradiol (E2) and norethisterone acetate (NETA) induced significantly lower plasma levels of factor VII, fibrinogen, antithrombin and plasminogen activator inhibitor-1 (PAI-1), compared with placebo treatment. (37) We agree with these studies as we have observed higher clotting time in females than males. However, testosterone does not adversely affect blood coagulation status. (38) In the present study we have observed lower clotting time in males than females.

Conclusion

Our study suggests that bleeding and clotting time are higher in females. We recommend further detailed study in this area.

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