

Bleeding Time and Clotting Time in Pre-eclampsia, Eclampsia and Normal Pregnancy

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Abstract

Introduction: The most important cause of maternal and perinatal morbidity and mortality are hypertensive disorder (Preeclampsia and eclampsia). In preeclampsia and eclampsia there is hypercoagulable state which acts as a risk factor for thromboembolism and DIC. **Objective:** This study was carried out to compare the coagulation indices in normal pregnancy, preeclampsia and eclampsia. **Materials and Methods:** This cross sectional study was conducted in Dhaka Medical College from January to December' 2014. Total 150 women aged 18 – 40 years were selected for this study. Among them 50 normal pregnant, 50 preeclamptic and 50 eclamptic women were selected as study group and age matched 50 healthy nonpregnant women were considered as control group. Bleeding time was estimated by Duke's method and clotting time was estimated by capillary tube method. **Results:** In this study bleeding time and clotting time were significantly higher in preeclamptic and eclamptic women than those of healthy nonpregnant women. **Conclusion:** From this study it can be concluded that bleeding time and clotting time are closely related with preeclampsia and eclampsia.

Keywords: Preeclampsia, platelet count, bleeding time, clotting time.

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Introduction:

Preeclampsia is a pregnancy specific, idiopathic multisystem disorder characterized by the development of hypertension and proteinuria after the 20 weeks of gestation^{1,2}. Worldwide, the incidence of preeclampsia ranges between 2-10% of pregnancies³. Preeclampsia when associated with convulsion known as eclampsia³. Eclampsia is clinically characterized by a chronic, gradual process that begins with the development of preeclampsia and results in generalized convulsions or coma. But, in approximately 15-20% of cases, the onset of eclampsia may be abrupt without previous evidence of preeclampsia². Overall 10-15% of direct maternal mortality is associated with preeclampsia and eclampsia⁴. Preeclampsia creates a functional derangement of multiple organ system. Complications of preeclampsia include eclampsia, placental abruption, ascities, hepatic infarction and rupture, intra-abdominal bleeding, pulmonary edema and acute renal failure. Complications affecting the developing fetus include intrauterine growth retardation, prematurity, oligohydramnios, bronchopulmonary dysplasia and increased risk of perinatal death². Pre-eclampsia is an important obstetric problem and is associated with a five-fold increase in perinatal mortality⁵. During normal pregnancy profound changes occur in the coagulation and fibrinolytic system of the mother causing a hypercoagulable state which accentuate in preeclampsia⁶. Coagulation abnormalities such as thrombocytopenia and decrease in some plasma clotting factors may develop in preeclampsia⁷. Coagulation abnormalities may cause life threatening condition like disseminated intravascular coagulation (DIC) and HELLP syndrome. Monitoring of coagulation parameters may help to overcome these complications⁷. Numerous studies observed coagulation abnormalities in preeclampsia and eclampsia. The level of anticoagulants such as antithrombin III,

protein C and protein S are decreased in these groups. The clotting factors such as factor VIII and von Willebrand factors are elevated in preeclampsia and eclampsia. There is also increase in plasminogen activator inhibitor type 1 (PAI-1) in preeclampsia. So preeclampsia is a highly thrombotic and procoagulant state¹. Measurement of prothrombin time (PT), activated partial thromboplastin time (APTT), bleeding time (BT) and clotting time (CT) are the most commonly used laboratory tests in patients with a suspected abnormal coagulation. Several studies showed increase in BT and CT in severe preeclampsia and eclampsia^{6,9}. Jambhulkar et al. (2001) performed a cross sectional study on 50 severe preeclamptic and 30 eclamptic patients and found normal BT and CT in these patients⁸. From the above studies, it has been revealed that increase bleeding time (BT) and clotting time (CT) act as a future risk for complications in preeclampsia and eclampsia. Several studies have done abroad to observe these parameters in these groups but their exact relationship with preeclampsia and eclampsia still debatable. As, there is less published data available regarding this topic in our country, the relationship among this parameter in the Bangladeshi preeclamptic and eclamptic is not precisely known. Furthermore, we need a data from which we can compare these parameters in our population.

Materials & Methods:

The present cross sectional analytic study was conducted in the Department of Physiology, Dhaka Medical College, Dhaka from January to December' 2014. For this study, 150 women were selected as group B (50 normal pregnant women, 50 diagnosed preeclamptic women and 50 diagnosed eclamptic women) aged 18 to 40 years were selected as group B. Age matched 50 healthy nonpregnant women were considered as control group (group-A) for comparison. The subjects were selected from department of Obstetrics and Gynaecology, Dhaka Medical College Hospital and from personal contact in different areas of Dhaka city by simple random sampling. After selection the nature, purpose, benefit and risks of the study were explained in details. Informed written consent was taken from the participants. Before taking blood detailed family and medical history were taken and recorded in a prefixed data schedule. Bleeding time (BT) was estimated by Duke's method & clotting time (CT) was estimated by capillary tube method. In addition BMI was calculated and blood pressure was measured. Presence of proteinuria was determined by conventional heat coagulation test. Then interpretation of the heat coagulation test was done according to presence of turbidity in the urine as nil/trace (0), 1+, 2+, 3+ and 4+¹⁶. For statistical analysis one-way ANOVA test, Bonferroni test and Pearson's correlation co-efficient (r) test were performed as applicable using SPSS for windows version 22.

Result:

The mean systolic (159.8±19.2 mmHg) and diastolic (110.0±9.9 mmHg) blood pressure were significantly higher in preeclampsia compared to healthy non pregnant women (SBP112.2±7.1mmHg, DBP 73.0±6.1mmHg). Again the mean urinary protein level was significantly higher (1.34±1.72)gm/dL

in preeclampsia compared to healthy non pregnant women (Table I).

Table 1: General Characteristics of the Subjects in Different Groups (n=100).

Parameters	Healthy nonpregnant women (n=50)	Normal pregnant (n=50)	Patients with preeclampsia (n=50)	Patients with Eclampsia (n=50)
Age (years)	28.24±4.63	26.74±3.93	26.86±5.33	25.88±5.99
BMI (kg/m ²)	26.17±2.58	27.54±5.50	27.72±3.5	27.97±1.85
SBP (mmHg)	112.2±7.1	118.0±9.5	159.8±19.2	180.2±19.6
DBP (mmHg)	73.0±6.1	75.0±6.8	110.0±9.9	125.0±15.5
Urinary protein level (gm/dL)	-	.013±0.043	1.34±1.72	1.82±1.98

Results are expressed as Mean ±SD; Figures in parentheses indicate range; One-way ANOVA test was performed to compare among groups; n = Number of subjects; *p<0.001, compared to control; BMI= Body mass index; SBP= Systolic blood pressure; DBP= Diastolic blood pressure

Statistical analysis

Groups	SBP (mmHg) (p value)	DBP (mmHg) (p value)	Urinary protein (gm/L) (p value)
A vs B ₁ vs B ₂ vs B ₃	<0.001 ^s	<0.001 ^s	<0.001 ^s

Results are expressed as Mean ±SD. Figures in parentheses indicate range. One-way ANOVA test was performed to compare among four groups. n = Number of subjects; s = Significant; ns = Not significant. The test of significance was calculated and p values < 0.05 was accepted as level of significance.

Bleeding time and clotting time were higher in preeclampsia than healthy non pregnant women and the result was significant (Table II).

Table II: Bleeding time & clotting time of the Subjects in Different Groups (n=50)

Parameters	Healthy nonpregnant (n=50)	Healthy pregnant (n=50)	Preeclampsia (n=50)	Eclampsia (n=50)
BT (min)	3.48±0.45	3.94±0.67	5.28±0.59	5.76±0.55
CT (min)	5.68±0.48	5.98±0.48	7.01±0.70	7.44±0.75

Results are expressed as Mean ±SD. Figures in parentheses indicate range. One-way ANOVA test was performed to compare between groups. Bonferroni test was performed to compare between groups. n = Number of subjects; Group A: Healthy adult non pregnant women (Control group); Group B₂: Women with preeclampsia (Study group).

Statistical analysis

Groups	Bleeding Time (min) (p value)	Clotting Time (min) (p value)
A vs B ₁ vs B ₂ vs B ₃	<0.001 ^s	<0.001 ^s

Results are expressed as Mean \pm SD. Figures in parentheses indicate range. One-way ANOVA test was performed to compare among four groups. n = Number of subjects; s = Significant; ns = Not significant. The test of significance was calculated and p values < 0.05 was accepted as level of significance.

Moreover in this study, increased bleeding time (>6 min) and clotting time (CT) (>10 min) were found in different percentages of preeclamptic, eclamptic women and normal pregnancy (Table III)

Table III: Distribution of the subjects by bleeding time & clotting time in study groups (n=50)

Parameters		Normal pregnancy	Preeclampsia	Eclampsia
Bleeding time	1-6 min	37(74%)	23(46%)	18(36%)
	> 6 min	13(26%)	27(54%)	32(64%)
Clotting time	6-10 min	32(64%)	21(42%)	16(32%)
	> 10 min	18(36%)	29(58%)	34(68%)

Results are expressed as frequency and percentage. n = Number of subjects; Group A: Healthy adult non pregnant women (Control group); Group B: Women with preeclampsia (Study group)

Discussion:

Preeclampsia is a poorly understood condition of human pregnancy, which can affect multiple organs and is a leading cause of maternal mortality worldwide¹. Its exact pathophysiology is not yet fully understood². Out of all hematological changes that occur in preeclampsia thrombocytopenia is the most common and the degree of thrombocytopenia increases with the severity of disease³. Preeclampsia and maternal mortality might be reduced through serial monitoring of platelet count as a part of antenatal check-up. The main aim of this study is to detect levels of some coagulation indices like bleeding time and clotting time in preeclampsia. Aref, Mazny & Mazny (2012) found no statistically significant difference in coagulation profile in preeclamptic women than that of healthy nonpregnant female¹⁰. In the present study, mean BT was higher in preeclamptic women than that of healthy nonpregnant female and the result was statistically significant ($P < 0.001$). Almost similar type of result was found by Chauhan et al. 2014 where mean BT was also higher in preeclamptic women but the result was not statistically significant⁶. Bleeding time also showed an increasing trend from normal control to severe preeclampsia patients but the result was within normal range by Tadu, yerroju and Gudey¹¹. Again, mean BT & CT were in normal range in all group of patients of pregnancy induced hypertension but CT was significantly higher in eclampsia group than preeclampsia & gestational hypertension¹². Sameer et al. 2011 and Anjali, Garkal & Pratibha 2013 found prolonged BT & CT in preeclamptic and eclamptic women but the result was not statistically significant^{13,14}. In the present study, mean CT was significantly prolonged ($p < 0.001$) in preeclamptic women than that of healthy nonpregnant female and the result was significant ($P < 0.001$). Prolonged CT was also found by Namita et. al. 2022 but the result was not statistically significant. However, Chauhan et al. 2014 found no significant changes in CT in preeclamptic women.

Conclusion:

From the result of this study, it may be concluded that BT

& CT are increased in preeclampsia, eclampsia and normal pregnancy than that of healthy nonpregnant women. Therefore, measurement of these parameters may reflect the severity of preeclampsia, eclampsia and helps to provide appropriate treatment to ensure a satisfactory outcome for mother and fetus.

Conflict of Interest: None.

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