

Evaluation of Haemoglobin and Platelet Count in Pre-Eclamptic Women

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Mortality and morbidity in pregnancy may occur due to preeclampsia. About 16% of maternal death is associated with pre-eclampsia in Bangladesh. It is necessary to diagnose pre-eclampsia for minimizing maternal morbidity and mortality. This case control study was carried out in the department of Clinical Pathology, in collaboration with department of Obstetrics and Gynaecology, BSMMU, Dhaka, during the period of March, 2011 to February, 2012 which included 20 mild pre-eclamptic and 20 severe pre-eclamptic patients and 30 gestation matched normotensive pregnant women within 28-40 weeks of gestation. Complete blood count (CBC) and peripheral blood film (PBF) examination were done to observe the association of hemoglobin, total WBC count, neutrophil count and platelet count with pre-eclampsia. Hemoglobin level (gm/dl), total count of WBC and percentage of neutrophil were significantly higher ($p < 0.05$) but platelet count was significantly lower in mild and severe pre-eclamptic group than normal control group

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Key words: Pregnancy, haemoglobin, platelet

Introduction

Pre-eclampsia is a multisystem disorder in pregnancy that is characterized by the development of hypertension and proteinuria after 20 weeks of gestation.^{1, 2} Edema is often seen.³ Pre-eclampsia may be subdivided into mild and severe forms. The distinction between the two is made on the basis of the degree of hypertension, proteinuria, and the involvement of other

organ systems.⁴ Pre-eclampsia is an important obstetric problems and leading cause of maternal mortality and premature delivery; it is associated with a five-fold increase in perinatal mortality.⁵ The global incidence of pre-eclampsia has been estimated at 5-14% of all pregnancies.⁶ The incidence is high in Bangladesh. About 16% of maternal death is associated with pre-eclampsia.⁷

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There is no single reliable, cost effective screening test for pre-eclampsia.¹ Han et al (1987)⁸ and Zafar and Iqbal (2008)⁹ measured hemoglobin level and found that hemoglobin was significantly higher in pre-eclamptic group than normal pregnant control group. Onisai et al., (2009)¹⁰ and Engin et al., (2007)¹¹ found thrombocytopenia in pre-eclampsia and a relationship between platelet levels and severity of pre-eclampsia. It helps to stop disease process and increase monitoring and administration of early preventative treatment for the benefit of the patients.

So, with the intention to reduce the maternal mortality by preventing pre-eclampsia through monitoring CBC and PBF as a part of antenatal check-up. Aim of this study was to explore the association of hemoglobin and platelet count with mild and severe pre-eclampsia.

Methods

A hospital based case control study was done from March, 2011 to February, 2012 at the department of Clinical Pathology, BSMMU, in collaboration with department of Obstetrics and Gynaecology, BSMMU, Dhaka. The research protocol was approved by the Institutional Review Board of BSMMU, Dhaka. All pre-eclamptic patients and all normotensive pregnant women within 28 - 40 weeks of gestation attending in outpatient department and admitted inpatient department of Obstetrics and Gynaecology, BSMMU, Dhaka were included. There were 40 cases of pre-eclampsia (20 mild group II and 20 severe group III pre-eclampsia) and 30 normotensive group I pregnant women were taken as control. After taking informed consent, a careful history and the details information were recorded by the investigator in a predesigned questionnaire. About 2.0 ml of blood was collected from each woman through an aseptic venipuncture from

antecubital vein. 2.0 ml of that blood was collected in EDTA tube for complete blood count (CBC). Hemoglobin (Hb %) and complete blood count (CBC) was estimated by automated hematology analyzer, which again rechecked manually by peripheral blood film. All these tests were done in the Department of Clinical Pathology, BSMMU, Dhaka. Statistical analyses of the results were obtained by descriptive statistics, ANOVA test, Chi-square test by using Windows based computer software devised with Statistical Packages for Social Sciences (SPSS-15).

Results

A total of 70 patients were included in the study. They were divided into five groups according to their age. The mean age was found 24.6 ± 3.79 years and range were (18-35) years in group I, the mean age was 26.85 ± 4.46 years and range were (20-36) years in group II and mean age was 25.2 ± 4.32 years and range were (19-35) years in group III. Most of the study patients were 26-30 years age group. The mean age difference was not statistically significant ($P > 0.05$) among the three groups in ANOVA test (Table I).

In this study primigravida was found 15(50.0%) in group I, 7(35.0%) in group II and 12(60.0%) in group III. Multi gravida was found 15(50.0%), 13(65.0%) and 8(40.0%) in group I, group II and group III respectively. In group I, percentage of primigravida and multi gravida was same. In group II nearly two-third (65%) was multi gravida and one third (35%) were primigravida. In group III 40% were multi gravida and nearly two-third (60%) were primigravida. The difference was not statistically significant ($P > 0.05$) among the three groups (Table II).

In this study the mean systolic blood pressure (SBP) was found 104.5 ± 7.92 mmHg in group I, 144.0 ± 8.83 mmHg in group II and 164.5 ± 7.59 mmHg in group III. The mean

diastolic blood pressure (DBP) was found 66.33 ± 6.01 mmHg, 94.25 ± 0.06 mmHg and 112.75 ± 5.52 mmHg in group I, group II and group III respectively. The mean difference was statistically significant ($P < 0.05$) among the three groups in ANOVA test. In group I minimum diastolic blood pressure was 60 mmHg and maximum systolic blood pressure was 120 mmHg, which was within normal limit. In group II and group III minimum diastolic blood pressure were 90 mmHg and 95 mmHg and maximum systolic blood pressure were 160 mmHg and 180 mmHg respectively, which was found to be significantly higher compared to control group ($p < 0.001$) (Table III).

The mean hemoglobin was found 10.28 ± 0.98 g/dl, range were (8.2- 12.1) g/dl in group I. In group II mean hemoglobin was 11.41 ± 1.25

g/dl and minimum hemoglobin was 10g/dl and maximum hemoglobin was 12.9g/dl. The mean hemoglobin in group III was 11.73 ± 1.75 g/dl and range were (10.2-14.5) g/dl. The mean difference was statistically significant ($P < 0.05$) among the three groups (Table IV).

The mean platelet was found $301.67 \pm 93.92 \times 10^9/L$, $223.5 \pm 69.45 \times 10^9/L$, and $206.0 \pm 67.31 \times 10^9/L$ in group I, group II and group III respectively. In group I range of platelet count (min-max) were $180-600 \times 10^3/L$, in group II range were $150-400 \times 10^9/L$ and in group III range were $140-420 \times 10^9/L$. The mean difference was statistically significant ($P < 0.05$) among the three groups (Table V).

Table I: Age distribution of the study patients (n=70)

Age (in years)	Group I (n=30)		Group II (n=20)		Group III (n=20)		t value	P value
	n	%	n	%	n	%		
≤ 20	6	20.0	2	10.0	4	20.0		
21-25	11	36.7	6	30.0	7	35.0		
26-30	12	40.0	9	45.0	8	40.0	1.806	0.172 ^{ns}
31-35	1	3.3	2	10.0	1	5.0		
> 35	0	0.0	1	5.0	0	0.0		
Mean \pm SD	24.6 \pm 3.79		26.85 \pm 4.46		25.2 \pm 4.32			
Range (min-max)	(18-35)		(20-36)		(19-35)			

ns=not significant

P value reached from ANOVA test

Group I: Normal pregnancy

Group II: Mild preeclampsia

Group III Severe preeclampsia

Table II: Distribution of the study patients according to gravida (n=70).

Gravida	Group I (n=30)		Group II (n=20)		Group III (n=20)		t value	P value
	n	%	n	%	n	%		
Primi	15	50.0	7	35.0	12	60.0	1.264	0.289 ^{ns}
Multi	15	50.0	13	65.0	8	40.0		

ns=not significant

P value reached from Chi square test

Table III: Mean blood pressure of the study patients (n=70).

Blood pressure	Group I (n=30)	Group II (n=20)	Group III (n=20)	F value	P value
	Mean± SD	Mean± SD	Mean± SD		
SBP (mmHg)	104.5±7.92	144.0±8.83	164.5±7.59	355.646	0.001 ^s
Range (min-max)	(90-120)	(120-160)	(160-180)		
DBP (mmHg)	66.33±6.01	94.25±.06	112.75±.52	373.002	0.001 ^s
Range (min-max)	(60 - 80)	(90 - 100)	(95-120)		

s=significant

P value reached from ANOVA test.

Table IV: Mean hemoglobin (g/dl) of the study patients. (n=70)

Hemoglobin (g/dl)	Group I (n=30)	Group II (n=20)	Group III (n=20)	F value	P value
	Mean± SD	Mean± SD	Mean± SD		
Hemoglobin (g/dl)	10.28±0.98	11.41±1.25	11.73±1.75	8.555	0.001 ^s
Range (min-max)	(8.2-12.1)	(10.0-12.9)	(10.2-14.5)		

s=significant

P value reached from ANOVA test.

Table V: Mean distribution of the study patients according to Platelet Count (n=70)

	Group I (n=30)	Group II (n=20)	Group III (n=20)	F value	P value
	Mean± SD	Mean± SD	Mean± SD		
Platelet 10 ⁹ /L	301.67±93.92	223.5±69.45	206.0±67.31	3.666	0.015 ^s
Range (min-max)	(180-600)	(150-400)	(140-420)		

s=significant

P value reached from ANOVA test.

Discussion

In spite of improvement of antenatal checkup, pre-eclampsia is still a major obstetrics problem in developing countries like Bangladesh and also in developed countries. It is the most important cause of maternal death and perinatal mortality. The etiology of pre-eclampsia is still unknown. Several studies are going on in this field. The present study shows that there is increase concentration of serum ferritin in patients with pre-eclampsia. It is a marker of maternal iron status, and its high level is associated with pre-eclampsia. Total 70 patients were enrolled in this study, out of which 20 mild pre-eclamptic women and 20 severe pre-eclamptic women were considered as case and 30 normal pregnant women were taken as control.

In this study no significant differences was found between the cases and controls with respect to age, socioeconomic status, education, parity, gravidity, gestational age and antenatal checkup. In our study we found the mean age of normal pregnant women was 24.6±3.79 years, the mean age of mild pre-eclamptic group was 26.85±4.46 years and severe pre-eclamptic group was 25.2±4.32 years. The mean age difference was not statistically significant among three groups. These findings are consistent with other study^{12,13,14}

In our study we found that, percentage of primigravida and multigravida were same in group I. In group II nearly two-third (65%) 13 patients were multi gravida and one third (35%) 7 patients were primigravida. In group III, 12 patients (40%) were multi gravida and 8 patients nearly two-third (60%) were primigravida. The difference was not statistically significant among the three groups. Our study results are consistent with the result of Samuel et al.¹²

In this study we found the mean (±SD) systolic blood pressure (SBP) were 104.5±7.92 mm Hg, 144.0±8.83 mm Hg, 164.5±7.59 mm Hg for group I, group II and group III respectively. The mean diastolic blood pressure (DBP) were 66.33±6.01mm Hg in group I, 94.25±.06 mm Hg in group II, and 112.75±.52 mm Hg in group III. The mean differences were statistically significant among the three groups.

Considering the complete blood count, we found significant differences between the three studied groups regarding hemoglobin. The mean (±SD) value of hemoglobin was significantly higher and platelet count was significantly lower in group II and group III than group I. Han et al⁸ and Zafar and Iqbal⁹ measured hemoglobin level and found that hemoglobin was significantly higher in pre-eclamptic group than normal pregnant

control group. In our study haemoglobin level (gm/dl) mean \pm SD were 10.28 \pm 0.98 in group I, 11.41 \pm 1.25 in group II and 11.73 \pm 1.75 in group III ($p < 0.001$) which are consistent with other study.

Onisai et al¹⁰ and Engin et al¹¹ found thrombocytopenia in pre-eclampsia and a relationship between platelet levels and severity of pre-eclampsia. In our study platelet count ($\times 10^9/L$) mean \pm SD were 301.67 \pm 93.92 in group I, 223.5 \pm 69.45 in group II and 206.0 \pm 67.31 in group III ($p < 0.015$) which are consistent with other study.

Conclusion

In conclusion, our findings indicate that higher hemoglobin level (gm/dl), total count of WBC and percentage of neutrophil and lower platelet count were significantly associated with mild and severe pre-eclampsia than those of uncomplicated normal pregnancy.

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