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Evaluation of platelet count and its significance in toxemia of pregnancy

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Abstract
Toxemia of pregnancy is a scantily understood condition of human pregnancy, which can influence multiple organs and is a foremost reason of maternal mortality worldwide. There is also indication that preeclampsia is usually related with placental hypoxia and endothelial dysfunction. Many researchers gave their efforts to recognize the exclusive screening test that would predict the risk of developing preeclampsia before the typical symptoms appear. There are number of studies which suggest platelet may play a chief role in the etiopathogenesis of preeclampsia. The present study done in 170 pregnant mothers divided into four groups.40 cases of mild preeclampsia, 40 cases of severe preeclampsia,40 cases of Eclampsia and 50 cases of control (Normotensive) pregnant women admitted in Department of Obs and Gynae, Rama Medical College, hospital and research centre. There was significant difference between platelet counts of eclampsia (<0.0001), severe preeclampsia (0.0002), mild preeclampsia (P=0.0004) when compared to control group. Platelet count may be considered as an early, economical and quick method to estimate the severity of PIH cases. It can also be a useful screening test for early recognition and to assess the prognosis of the disease and outcome in pregnant women.

Keywords: pregnancy induced hypertension (PIH), preeclampsia, eclampsia, platelet count, hematological marker

1. Introduction
Hypertensive disorders complicating pregnancy (Toxaemia of pregnancy) are common and forming a deadly triad along with haemorrhage and infection [1]. Pre-eclampsia (PE) is considered severe if one or more of the following criteria are present: Blood pressure140 mm Hg or higher systolic or 90 mm Hg or higher diastolic after 20 weeks of gestation in a woman with previously normal blood pressure. Proteinuria: 0.3g or more of protein in a 24-hour urine collection (usually correspond with 1+ or greater on a urine dipstick test) known as mild preeclampsia [1]. When systolic blood pressure of 160 mmHg or higher or 110mmHg or higher diastolic on two occasions at least six hours apart in a woman on bed rest, the condition is known as severe preeclampsia. It is associated with proteinuria and oliguria, Cerebral or visual disturbances, seizures, Pulmonary oedema, cyanosis, Epigastric pain or right upper quadrant pain, Impaired liver function, Thrombocytopenia and Foetal growth restriction known as eclampsia [1].

Maternal hypertension (toxaemia of pregnancy) is diagnosed in 6-10% of all deliveries; is associated with 22% of all perinatal foetal deaths and 30% of all maternal deaths [2].

Preeclampsia is a scantily understood condition of human pregnancy, which can influence multiple organs and is a foremost reason of maternal mortality worldwide [3]. The exact pathophysiology of preeclampsia is not yet fully understood. However abnormal placentation is one of the initial events [4]. There is also indication that preeclampsia is usually related with placental hypoxia and endothelial dysfunction [5]. Many researchers gave their efforts to recognize the exclusive screening test that would predict the risk of developing preeclampsia before the typical symptoms appear. There are number of studies which suggest platelet may play a chief role in the etiopathogenesis of preeclampsia. Changes in coagulation system in established PIH are well known [6]. Out of all haematological changes that occur in preeclampsia, thrombocytopenia is the most familiar. Thrombocytopenia is typically defined as a platelet count less than 1,50,000/cu mm [7]. The level of thrombocytopenia increases with the severity of disease. Lower the platelet count, greater in maternal and foetal mortality and morbidity [8]. Thrombocytopenia may be one of the contributory factors in the etiopathogenesis of preeclampsia. Low platelet count in preeclampsia are related with abnormal activation of coagulation system and accelerated platelet consumption [9]. Thrombocytopenia is a well-documented procedure in preeclampsia, there by maternal mortality might be reduced through serial monitoring of platelet count as a part of antenatal check-up. But very few studies are present on this ground in our country. Therefore the present study is designed to evaluate the relationship of platelet count with toxemia of pregnancy.

2. Materials and Methodology
The present study has done in 170 pregnant mothers, divided into four groups 40 cases of mild preeclampsia, 40 cases of severe preeclampsia, 40 cases of Eclampsia,50 cases of control (Normotensive) pregnant women admitted in Department of Obs and Gynae, Rama Medical College, hospital and research centre. Inclusion criteria: Antenatal mothers who did not have hypertension at the time of pregnancy without any other abnormalities taken in to control group. Antenatal mothers diagnosed with toxaemia of pregnancy with their blood pressure of 140/90mmHg or more after 20th week of pregnancy in to test group. Exclusion criteria: Antenatal mothers with the history of renal, liver

failure, seizures hypertensive disorder before the pregnancy and other medical problems. Before the conduction of this study, permission has taken from the institution ethical committee and written consent of cases and controls. 1.5 ml of blood was drawn from ante-cubital vein and collected in an EDTA containing tube for counting platelet. Platelet count was done by Sysmex 800i fully automated hematology analyzer.

2.1 Statistical Analysis

Statistical analysis was performed by using computer based software, Statistical Package for Social Science (SPSS)**.** Mean values of parameters were compared to determine the differences between two groups by using Student's unpaired't' test. For all statistical analysis, two tailed 'p' value < 0.05 was considered as a lowest level of significance.

3. Results

The study sample was 170, Distributed in to 40 samples of mild preeclampsia, 40 samples of severe preeclampsia,40 samples of eclampsia and 50 cases of normotensives mothers. For comparing the platelet count and to determine its increasing or decreasing trends, the mean value for each group was determined. There was significant difference between platelet counts of eclampsia(P<0.0001), severe preeclampsia(P=0.0002), mild preeclampsia (P=0.0004) when compared to control group.

Table 1: Comparison of platelet count in between control and case with sub groups.

Group	No of subjects	Mean+/- s.dev	P value compared with control group
Control	50	2.30+/_0.61	-------
Mild preeclampsia	40	1.76+/_0.55	=0.0004
Severe preeclampsia	40	1.69+/_0.64	=0.0002
Eclampsia	40	1.30+/_0.27	<0.0001

4. Discussion

Toxemia of pregnancy is one of the most common obstetric problems seen in pregnant women. The obstetrician relies gradually more upon laboratory tests for the management of pregnant women suffering from toxaemia of pregnancy. Estimation of platelet indices is a reliable and economical method. In this study tried to show the platelet count and its association with toxaemia of pregnancy. In Present Study Significant lower platelet count was observed among pregnant women with toxaemia of pregnancy compared to individuals from control group. A relationship between low platelet count and PIH is found in significant levels. Despite this, the etiology and pathogenesis of preeclampsia still remain poorly understood. It is often characterized by suboptimal uteroplacental perfusion associated with a maternal inflammatory response and maternal vascular endothelial dysfunction and platelet count falling to below 100 $x10^9$/L Jaremo P. *et al*., 2000 mentioned in their study [10]. Srivastava. *et al*., (1995) reported mean platelet count of 1.94 lakh/cumm in normal pregnant control, 1.79 lakh/cumm in mild preeclampsia, & significantly low platelet count in severe preeclampsia i.e. 1.64 lakh/cumm and in eclampsia i.e. 1.52 lakh/cumm [11]. Kulkarni and Sutaria, *et al*., 1983 in their study observed platelet count as follows, in mild Preeclampsia 1.84lacs/cumm, in severe preeclampsia 1.94lacs/cumm, in eclampsia 1.18 lacs/cumm and in control 2.5lacs/cu mm respectively with these results, mentioned platelet count reduces as the severity of disease increases with significant difference between each group [8]. Giles C and Inglis TC., 1981 also observed significant difference in between each group, platelet count reduces with severity of disease [12]. Agarwal and baradkar., 1978 and Dube *et al*., 1975 in their studies mentioned platelet count is reduced significantly and it is correlated with severity of disease [13, 14]. In the study of Vrunda *et al*., 2004 mentioned severity of disease and thrombocytopenia closely correlated, which indicates that thrombocytopenia is directly proportional to the severity of toxemia of pregnancy [15]. Mahapathra *et al*., 2007 study results also correlate with above mentioned study results, they have mentioned platelet count is good, economical prognostic hematological marker to assess the severity of disease and its outcome [16]. According to Missfelderlobos H *et al*., 2006 Transient mild thrombocytopenia is seen due to increased platelet consumption during pregnancy [17]. The lower platelet count is associated with abnormal activation of coagulation system and is believed to reflect increased platelet consumption Parnas M, *et al*., 2006 observed in their study [18].

In present study observations shows significant difference in between each group and also seen the platelet count reduces significantly as the severity of disease increases and coincides with above mentioned study results.

5. Conclusion

In present study we observed a specific pattern of disease and its related variation in coagulation status. Finally, with present study results and interpretation with previous worker's studies, came to a conclusion that estimation of platelet count may be considered as an early, economical and rapid method of assessment of severity of PIH cases. It can also be a useful screening test for early detection and to assess the prognosis of the disease and outcome of pregnancy in pregnant women.

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