

A Case Control Study to Assess the Role of Platelet Count in the Early Identification of Preeclampsia and Eclampsia

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Abstract

Aim: The study aimed to evaluate the platelet count in the pregnant Women.

Methods: This cross-sectional study was carried out in the Department of Pathology, Government Medical College and Hospital, Bettiah, West Champaran, Bihar, India, for 8 months. Total 100 patients were divided in two groups as Cases and Control. Cases study group includes 50 females with the thrombocytopenia and Control includes 50 females without thrombocytopenia.

Results: The data from the 100 pregnant females were collected and presented as below. The study population was divided in two groups as Cases and Control. Cases study group includes 50 females with the thrombocytopenia and Control includes 50 females without thrombocytopenia. The Most effective age group in which thrombocytopenia seen was between 20 to 25 years. Out of 100 patients with thrombocytopenia, mild preeclampsia was present in 22 cases (44%) and while the rest 28 (56%) had Severe Pre-eclampsia with thrombocytopenia. In women with Mild Pre-eclampsia Platelet Count (x 10⁹/L) was 65-277, Severe Pre-eclampsia Platelet Count (x10⁹/L) was 27-249 and women without thrombocytopenia had normal Platelet Count.

Conclusion: The clinically platelet indices can be a useful screening test for early identification of preeclampsia and eclampsia. Also, platelet indices can assess the prognosis of this disease in pregnant women and can be used as an effective prognostic marker because it correlates with severity of the disease.

Keywords: Eclampsia, platelets, Pre-eclampsia, Pregnancy.

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Introduction

Beginning in 1993, three large studies documented that 5 to 10% of women who had uncomplicated pregnancies had a platelet count of less than 150,000 per cubic millimetre at the time of delivery [1], which

was described as gestational thrombocytopenia. The normal distribution of platelet counts at the time of delivery and the absence of health problems in the mother and infant suggested that gestational thrombocytopenia was the result of lower

platelet counts that occur in all women during pregnancy [2]. Gestational thrombocytopenia is a condition that commonly affects pregnant women. Thrombocytopenia is defined as the drop in platelet count from the normal range of 150,000 –400,000 / μ L to a count lower than 150,000 / μ L [3]. There is still ongoing research to determine the reason for the lowering of platelet count in women with a normal pregnancy. Some researchers speculate the cause to be dependent on dilution, decreased production of platelets, or an increased turnover event. Although women with normal pregnancy experience a low platelet count, women experiencing a continuous drop in platelet will be diagnosed with thrombocytopenia and women with levels greater than 70,000 / μ L will be diagnosed with gestational thrombocytopenia [4]. Thrombocytopenia affects approximately 7-10% of pregnant women and of the 7-10%, within that population; approximately 70-80% have gestational thrombocytopenia. Gestational Thrombocytopenia is a disorder similar to immune thrombocytopenia (ITP) and is difficult to differentiate between the two disorders. Therefore, a medical history is conducted to because a diagnostic test is unavailable [4]. Generally, there is a decrease in platelet count in pregnant women and it will be due to many reasons [5]. The two main causes of thrombocytopenia are a decrease in the production of platelets in the bone marrow and an increase in the destruction of the platelets [6]. Platelets, along with other components of the blood, are produced in the spongy tissue found in the bone, known as bone marrow. Low platelet count maybe due to the decreased production of platelets in the bone marrow. A decreased production would be due to vitamin B12 deficiency, iron deficiency, aplastic anemia, viral infections, chemotherapy, alcohol consumption, leukemia, myelodysplasia, and cirrhosis [7]. During pregnancy, the fetus' waste products

diffuse into the mother's sinuses (blood stream) and cause the mother's spleen to become overactive and enlarged. Normally, the spleen filters and removes the waste products and with the overload of unwanted substances in the bloodstream, the spleen will remove blood cells too quickly [8] or store the platelets. In both cases, the overactive spleen would cause a decrease in the circulation of the platelets [6]. Pre-eclampsia (PE) is a serious multi-systemic pregnancy complication affecting between (5-8 %) worldwide [9,10]. Generally the diagnosis depends mainly on finding of hypertension and proteinuria after 20 weeks of pregnancy [11]. It considered as one of the major health problems associated with pregnancy and one of the causes of maternal mortality [12,13]. Thrombocytopenia carries a risk for both the mother and her fetus, associated with substantial maternal or neonatal morbidity & mortality. Therefore it is of utmost importance to institute specific therapies promptly and improve the maternal and neonatal outcome.

Material and methods

This case-control study was carried out in the Department of Pathology, Government Medical College and Hospital, Bettiah, West Champaran, Bihar, India, for 8 months.

Methodology

Total 100 patients were divided in two groups as Cases and Control. Cases study group includes 50 females with the thrombocytopenia and Control includes 50 females without thrombocytopenia. All the subjects were undergone blood investigations, i.e. complete blood cell count for Platelet count using EDTA anticoagulant blood and analysed on Automated Haematology Analyser. The test was conducted within 1 hour of sample collection maintaining at room temperature to minimize variation due to sample aging. All pregnant women with pregnancy

induced hypertension and Gestational age above 20 weeks were included in this study. patients with established coagulation and haematological disorders, Gestational age below 20 weeks or chronic hypertension and Pre-existing renal or vascular diseases, seizure disorders, severe anaemia, and liver diseases were excluded from the study.

Results

The data from the 100 pregnant females were collected and presented as below. The

study population was divided in two groups as Cases and Control. Cases study group includes 50 females with the thrombocytopenia and Control includes 50 females without thrombocytopenia.

The Most effective age group in which thrombocytopenia seen was between 20 to 25 years. Table 1 shows that age was an important criterion and there was difference in the occurrence of thrombocytopenia in different age groups.

Table 1: Demographic profile of patients

Age	Cases: with thrombocytopenia N=50	Control: without thrombocytopenia N=50	Total N=100
Below 20 years	16	11	27
20-25 years	26	24	50
25-30 years	5	11	16
>30 years	3	4	7
Parity			
Primi	39	35	74
Multi	11	15	26

Out of 100 patients with thrombocytopenia, mild preeclampsia was present in 22 cases (44%) and while the rest 28(56%) had Severe Pre-eclampsia with thrombocytopenia.

Table 2: Distribution of Mild Pre-eclampsia and Severe Pre-eclampsia with thrombocytopenia

Conditions	Mild Pre-eclampsia	%	Severe Pre-eclampsia	%
Thrombocytopenia	22	44	28	56

Table 3: Distribution of cases and controls in relation to gestational age

Condition	No. of Cases	Gestational Age
Thrombocytopenia with Mild Pre-eclampsia	22	29-37
Thrombocytopenia with Severe Pre-eclampsia	28	30-38
Controls	50	28-37
Total	100	

In women with Mild Pre-eclampsia Platelet Count (x 10⁹/L) was 65-277, Severe Pre-eclampsia Platelet Count (x 10⁹/L) was 27-249 and women without thrombocytopenia had normal Platelet Count .

Table 4: Mean platelet count in cases and controls

Conditions	No. of Cases	Platelet Count (x 10 ⁹ /L)
Thrombocytopenia with Mild Pre-eclampsia	22	65-277
Thrombocytopenia with Severe Pre-eclampsia	28	27-249
Controls	50	79-437

Discussion

It appears that as far as age is concerned, there is no or little difference between normal healthy pregnant women and patients with different degrees of severity of pregnancy induced hypertension. But it was clear that most patients in normal pregnant control group and patients with pregnancy induced hypertension were in age ranging between 20 to 30 years.

Jaleel *et al* and Kumar *et al* also found maximum cases between 21-30 years of age, similar to the present findings [14,15]. Younger age of occurrence of preeclampsia testifies the early age of marriage and pregnancy in our country as compared to western countries.

The comparison of platelet count amongst the subgroups of cases showed the decrease in platelet count in severer eclampsia was significant when compared with that in mild preeclampsia. The comparison of platelet count amongst the subgroups of cases showed the decrease in platelet count in severer eclampsia was significant when compared with that in mild preeclampsia. This high incidence may be explained due to hospital admission of only those patients who are willing for admission and are ill enough to seek for hospital care. The use of thrombocytopenia as a screening test for severity of pregnancy induced hypertension has not been well documented in the literature. Redman *et al* reported decreased platelet count in women who developed preeclampsia and stated that increased platelet consumption is an early feature of this disorder [16]. Galton *et al* claimed that the severity of thrombocytopenia correlates with severity of hypertension [17]. Romero *et al* reported that women with preeclampsia and thrombocytopenia have higher incidence of maternal and neonatal complications [18]. Preeclampsia is one of the commonest medical disorders during pregnancy and affects approximately 5–10% of all pregnancies mostly affecting the primigravida. It continues to be major

causes of maternal and perinatal morbidity and mortality [19]. It is a multisystem disease, and many theories are proposed for pathophysiology. So, there is a constant search for better prognostic factors to predict the progression and severity of disease. Activation of coagulation, fibrinolysis, platelet and vascular endothelial function are believed to play an important role in pathogenesis of preeclampsia. The fall in platelet count is most frequently found in preeclampsia and is probably due to consumption during low grade intravascular coagulation [20]. In a study from Bhopal by Anand and Kirshnanand *et al* [21], majority of the cases had preeclampsia (66.36%) and the rest eclampsia (33.64%). Wolde *et al* [22], study showed preeclampsia as the most common hypertensive disorder of pregnancy (51.9%); followed by eclampsia (23.4%), HELLP syndrome (8.9%), mild preeclampsia (7.6%), and simple gestational HTN (5.1%). In our study, most cases belonged to the mild preeclampsia (44%) group followed by cases with severe preeclampsia (56%). Because thrombocytopenia can be induced acutely by pre-eclampsia – eclampsia, the platelet count is routinely measured in hypertensive pregnant women. The frequency and intensity of maternal thrombocytopenia varies and likely is dependent on the intensity of the disease process, duration of pre-eclampsia, and the frequency with which platelet count are performed. Overt thrombocytopenia, defined by a platelet count less than 100,000/mm³ indicates severe disease. In most cases, delivery is indicated because the platelet count continues to decrease. After delivery, the platelet count increases progressively reach a normal level within 3 to 5 days.

Conclusion

Present study concluded that the clinically platelet indices can be a useful screening test for early identification of preeclampsia and eclampsia. Also, platelet indices can

assess the prognosis of this disease in pregnant women and can be used as an effective prognostic marker because it correlates with severity of the disease.

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