

Original research article

**To Evaluate The Effect Of Pre-Eclampsia On Platelet Count In The Pregnant Women:
Case-Control Study.****Dr. Vandana¹, Dr. Kannu Priya², Dr. Pallavi Mehra³, Dr. N.K.Bariar⁴****¹ PG Student, Department of Pathology, Patna Medical College and Hospital, Patna, Bihar, India.****² Senior Resident, Department of Pathology, Patna Medical College and Hospital, Patna, Bihar, India.****³ Assistant Professor, Department of Pathology, Patna Medical College and Hospital, Patna, Bihar, India.****⁴ HOD, Department of Pathology, Patna Medical College and Hospital, Patna, Bihar, India.****Corresponding Author: Dr. Vandana****Abstract****Aim:** To evaluate the effect of Pre-eclampsia on platelet count in the pregnant Women.**Material and methods:** This case control study was carried out in the Department of Pathology, Patna Medical College and Hospital Patna, Bihar, India from December 2018 to November 2019. Total 200 patients were divided in two groups as Cases and Control. Cases study group includes 100 females with the thrombocytopenia and Control includes 100 females without thrombocytopenia.**Results:** The Most affected age group in which thrombocytopenia seen was between 20 to 25 years. In women with thrombocytopenia with mild Pre-eclampsia Platelet Count ($\times 10^9/L$) was 65-288, thrombocytopenia with Severe Pre eclampsia Platelet Count ($\times 10^9/L$) was 27-259 and women without thrombocytopenia had normal Platelet Count.**Conclusion:** 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. Platelet count is a simple, low cost, and rapid routine screening test.**Keywords:** Eclampsia, platelets, Pre-eclampsia, Pregnancy**Introduction**

Thrombocytopenia is defined as subnormal number of platelets in the circulating blood.¹ In pregnancy, it results from a variety of causes ranging from benign disorders such as gestational thrombocytopenia to severe complicated life threatening conditions such as HELLP syndrome. Thrombocytopenia resulting from pregnancy induced hypertension is responsible for approximately 20% of all cases of thrombocytopenia during pregnancy. Most of the studies observed significant decrease in platelet count during normal pregnancy. There is a significant decrease in platelet count especially during second and third trimesters. Thrombocytopenia can result from decrease in platelet production or accelerated platelet destruction.²

Gestational (incidental) 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 / μL to a count lower than 150,000 / ML .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 / μL 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. Generally, there is a decrease in platelet count in pregnant women and it will be due to many reasons.^{4,5} 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 or store the platelets. In both cases, the overactive spleen would cause a decrease in the circulation of the platelets.^{6,8} 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. Hence this study was done to evaluate the effect of Pre-eclampsia on platelet count in the pregnant Women.

Material and Methods

This Case-control study was carried out in the Department of Pathology, Patna Medical College and Hospital Patna, Bihar, India from December 2018 to November 2019, after taking the approval of the protocol review committee and institutional ethics committee. After taking informed consent detailed history was taken from the patient or the relatives if the patient was not in good condition.

The study includes the Inclusion and Exclusion criteria as follows:

Inclusion criteria

- All pregnant women with pregnancy induced hypertension.
- Gestational age above 20 weeks.

Exclusion criteria

- Established coagulation and haematological disorders.
- Gestational age below 20 weeks or chronic hypertension.
- Pre-existing renal or vascular diseases, seizure disorders, severe anaemia, and liver diseases

Methodology

After taking informed consent detailed history was taken from the patient or the relatives if the patient was not in good condition. Total 200 patients were divided in two groups as Cases and Control.

Groups

Cases study group includes 100 females with the thrombocytopenia

Control includes 100 females without thrombocytopenia and Gestation age matched normal pregnant women in 3rd trimester

Investigation

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.

Statistical analysis

The recorded data was compiled entered in a spreadsheet computer program (Microsoft Excel 2010) and then exported to data editor page of SPSS version 20 (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics included computation of percentages, means and standard deviations

Results

Table 1: Demographic profile of patients

Variables	Cases: with thrombocytopenia N=100	Control: without thrombocytopenia N=100	Total N=200
Age			
Below 20 years	30	25	55
20-25 years	52	50	102
25-30 years	10	20	30
>30 years	8	5	13
Parity			
Primi	80	70	150
Multi	20	30	50

Table 2: Distribution of cases and controls in relation to gestational age

Variables	No. Of Cases	Gestational Age
Cases		
Thrombocytopenia with Mild Pre-eclampsia	45	29-37
Thrombocytopenia with Severe Pre-eclampsia	55	30-38
Controls	100	28-37
Total	200	

Table 3: Mean platelet count in cases and controls

Variables	No. of Cases	Platelet Count (x 10 ⁹ /L)
Cases		
Thrombocytopenia with Mild Pre eclampsia	45	65-288
Thrombocytopenia with Severe Pre eclampsia	55	27-259
Controls	100	79-447

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 pre eclampsia 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 (45%) group followed by cases with severe preeclampsia (55%). 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

Clinically platelet indices can be a useful screening test for early identification of pre-eclampsia 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. Platelet count is a simple, low cost, and rapid routine screening test. Hence the data generated from the present study concludes that platelet count can be used as

a simple and cost effective tool to monitor the progression of preeclampsia, thereby preventing complications to develop during the gestational period.

Reference

1. McCrae KR. Pregnancy induced thrombocytopenia: pathogenesis and management. *Blood*. 1992;80;2697-714
2. Shaper AG, Kear J, Macintosh DM, Kyobe J, Njama D. The platelet count, platelet adhesiveness and aggregation and the mechanism of fibrinolytic inhibition in pregnancy and the puerperium. *J ObstetGynaecol Br Commonw*. 1968; 75(4):433-41.
3. Perepu U, Rosenstein L. Maternal thrombocytopenia in pregnancy. *ProcObstet Gynecol*. 2013; 3(1):6:15.
4. Mccrae Keith R. Thrombocytopenia in Pregnancy. *Platelets*. 2013, 909-28.
5. Clinical. Practice Guide on. Thrombocytopenia in Pregnancy. Presented by the American. Society of Hematology. Anita Rajasekhar, MD, MS, 2013.
6. "Thrombocytopenia (low platelet count) Symptoms - Mayo Clinic". www.mayoclinic.org. Retrieved 2017.
7. Low Platelet Count (Thrombocytopenia). *Healthline*. Retrieved, 2017.
8. Hypersplenism: *Medline Plus Medical Encyclopedia*. www.nlm.nih.gov. Retrieved, 2015
9. Sibai B, Dekker G, Kupferminc M. Preeclampsia. *Lancet*, 365, 2005, 785-99.
10. Stekkinger E, Zandstra M, Peeters LL, Spaandern ME. Early-onset preeclampsia and the prevalence of postpartum metabolic syndrome. *Obstet Gynaecol*, 114(5), 2009, 1076-84.
11. Semenovakaya Z and Erogul M. Pregnancy, Preeclampsia. *eMedicine – Medical Reference*, 2010.
12. Khan KS, Wojdyla D, Say L, Gülmezoglu AM, Van Look P. WHO analysis of causes of maternal death: a systemic review. *Lancet*, 367(9516), 2006,1066-74.
13. Duley L. The global impact of pre-eclampsia and eclampsia. *Semin Perinatol*, 33, 2009, 130-37.
14. Jaleel A, Baseer A. Thrombocytopenia in preeclampsia: an earlier detector of HELLP syndrome. *JPMA. J Pak Med Assoc*. 1997; 47(9):230-2.
15. Kumar PL, Nirmala T, Vani BR, Murthy Srinivasa V, Geetha RL. Study of coagulation profile in pregnancy induced hypertension (PIH). *Indian J Pathol Oncol*. 2015;2(1):1-6.
16. Redman CW. Early platelet consumption in preeclampsia. *Br J med*. 1978; 70:334-8.
17. Galton M. Coagulation studies on the peripheral circulation of patients with toxemia of pregnancy. *JReprod med*. 1971; 6:89-100.
18. Romero R. Clinical significance, prevalence and natural history of thrombocytopenia in pregnancy induced hypertension. *Am J perinatal?* 1989; 6:32-8.
19. Robert JM, Cooper DW. Pathogenesis and genetic of preeclampsia. *Lancet* 2001; 357 (9249): 53-6.
20. Dadhich S, Agrawal S, Soni M, Choudhary R, Jain R, Sharma S et al. Predictive value of platelet indices in development of preeclampsia. *J SAFOG*. 2012; 4(1):17-21
21. Anand S, Kirshnanand. Perinatal outcome in growth retarded babies born to normotensive and hypertensive mothers: A prospective study. *People's J Sci Res* 2012;5:24-8.
22. Wolde Z, Segni H, Woldie M. Hypertensive disorders of pregnancy in Jimma University specialized hospital. *Ethiop J Health Sci* 2011;21:147-54.