



## Assessment of the platelet count in the pregnant Women

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### Abstract

Many haemostatic abnormalities have been reported in association with hypertensive disorder of pregnancy. Thrombocytopenia is most common of these abnormalities. The degrees of thrombocytopenia increases with severity of disease. However, early diagnosis of thrombocytopenia in pregnancy induced hypertension and immediate intervention can considerably improve the maternal and fetal outcome. Hence based on above findings the present study was planned to analyse the platelets count in the pregnant women's.

The study was conducted on 100 pregnant females in Department of Pathology, Indira Gandhi Institute of Medical Sciences. 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.

Hence from the above findings it can be concluded that frequency of thrombocytopenia was found to be directly related with the severity of disease, so 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.

**Keywords:** platelet count, pregnant women, thrombocytopenia

### Introduction

Pregnancy is a physiological process but can induce hypertension in normotensive women or aggravate already existing hypertension.

Many haemostatic abnormalities have been reported in association with hypertensive disorder of pregnancy. Thrombocytopenia is most common of these abnormalities. The degrees of thrombocytopenia increases with severity of disease. Thrombocytopenia in preeclampsia is attributed to various causes including increases platelet consumption due to disseminate intravascular coagulopathy and/or immune mechanism<sup>[1]</sup>.

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<sup>[2]</sup>.

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 /  $\mu\text{L}$  to a count lower than 150,000 /  $\text{MI}$ <sup>[3]</sup>. 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 /  $\mu\text{L}$  will be diagnosed with gestational thrombocytopenia<sup>[4]</sup>.

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<sup>[4]</sup>.

Generally, there is a decrease in platelet count in pregnant women and it will be due to many reasons<sup>[3]</sup>. 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<sup>[6]</sup>. 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<sup>[7]</sup>. 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<sup>[8]</sup> or store the platelets. In both cases, the overactive spleen would cause a decrease in the circulation of the platelets<sup>[6]</sup>.

Gestational thrombocytopenia will become evident during the mid-second trimester through the third trimester of pregnancy and it is diagnosed based on exclusion. For

example, women with a history of immune thrombocytopenia or thrombocytopenia, prior to pregnancy, will not be diagnosed with gestational thrombocytopenia [4].

Patients with low platelet counts, lower than 70,000 /  $\mu\text{L}$ , will be difficult to diagnose. The reason is because low platelet counts maybe due to gestational thrombocytopenia or immune thrombocytopenia. In such cases, a treatment of immune thrombocytopenia therapy (corticosteroids, or intravenous immunoglobulin) will be instructed.[9] If there is an improvement in the platelet levels, the patient will be diagnosed with immune thrombocytopenia, and if not the patient will be diagnosed with severe gestational thrombocytopenia [4].

In order for the physician to determine the underlying cause of the gestational thrombocytopenia, the following tests are conducted -

**Blood Test:** During routine prenatal checkups, the physician will conduct a complete blood count test to determine the components of blood. The complete blood count will provide further information about platelet levels along. The physician may conduct a blood test for platelet antibodies, which maybe produced as a result of a certain drug, such as quinine. The physician may also conduct blood clot test by adding chemicals to blood to determine how long it takes for the blood to clot [10].

**Ultrasound:** The physician may conduct an ultrasound around the spleen to determine if the spleen is enlarged due to an overactive spleen. The ultrasound will provide an image of the spleen and the doctor will compare it to a normal sized spleen [10].

**Bone Marrow Aspiration and/or Biopsy:** The physician may conduct a bone marrow aspiration and/or bone marrow biopsy, if they suspect there is a decreased production of platelets in the bone marrow. A bone marrow aspiration and bone marrow biopsy may be conducted at the same time [10].

Maternal and fetal outcome is adversely affected by abnormalities of platelets in pregnant women resulting from number of diverse etiologies. However, early diagnosis of thrombocytopenia in pregnancy induced hypertension and immediate intervention can considerably improve the maternal and fetal outcome. Hence based on above findings the present study was planned to analyse the platelets count in the pregnant women's.

**Methodology**

The study was conducted on 100 pregnant females in Department of Pathology, Indira Gandhi Institute of Medical Sciences. 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. Approval of the institutional ethical committee was taken the prior conduct of this study. 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 consenting Gestation age and gestation matched normal pregnant women in 3rd trimester would constitute the control.

The study includes the Inclusion and Exclusion criteria as follows:

**Inclusion criteria**

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

**Exclusion criteria**

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

**Results & Discussion**

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.

**Table 1:** Age groups and number of cases in two groups

Age	Cases: with thrombocytopenia	Control: without thrombocytopenia	Total
<20 years	17	12	29
21-25 years	23	24	47
26-30 years	5	10	15
>31 years	5	4	9
Total	50	50	100

The commonest age group in which thrombocytopenia seen was between 21 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 2:** Distribution of cases and controls in relation to gestational age.

Gestational Age	No. of Cases	Gestational Age
Cases	30	29-37
Mild Pre eclampsia	20	28-38
Severe Pre eclampsia	25	31-37
Controls	25	30-38

**Table 3:** Mean platelet count in cases and controls

Conditions	No. of Cases	Platelet Count ( $\times 10^9/\text{L}$ )
Cases	70	26-370
Mild Pre eclampsia	31	66-375
Severe Pre eclampsia	39	27-259
Controls	70	79-447

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 21 to 29 years. Jaleel *et al* and Kumar *et al* also found maximum cases between 21-30 years of age, similar to the present findings [11-12]. 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 severe 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<sup>[13]</sup>.

Galton *et al* claimed that the severity of thrombocytopenia correlates with severity of hypertension<sup>[14]</sup>. Romero *et al* reported that women with pre eclampsia and thrombocytopenia have higher incidence of maternal and neonatal complications<sup>[15]</sup>. The patients in our study are well defined group with diagnosed hypertensive disorder of pregnancy. All patients have been accurately randomized using the inclusion and exclusion criteria. Complete hemogram including platelet count has been done and documented. The cases have been followed up for maternal and perinatal outcome. Thrombocytopenia in hypertensive disorders of pregnancy carries a definite risk to the mother and fetus. There is a relation between thrombocytopenia and associated complications of pregnancy induced hypertension like abruptio, intrauterine fetal demise, septicemia and DIC. This is seen especially more in early onset hypertension and carries severe risk of morbidity and mortality to mother and fetus. Another dreaded complication of severe hypertension is HELLP syndrome, which causes a dilemma for obstetric health care providers because of nonspecific signs and symptoms early in the disease process which delays accurate diagnosis and early treatment. In cases of HELLP syndrome which receive early treatment, there has been good prognosis in terms of maternal and fetal outcome. Thrombocytopenia did not affect the mode of delivery.

### Conclusion

Hence from the above findings it can be concluded that frequency of thrombocytopenia was found to be directly related with the severity of disease, so 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.

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