



## Original Research Article

## Thrombocytopenia during pregnancy and its outcome- A prospective study

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## ABSTRACT

**Introduction:** Thrombocytopenia is the second most common haematological finding in pregnancy after anaemia. Thrombocytopenia is defined as decrease in platelet count  $< 1,50,000/\mu\text{L}$ . The physiological thrombocytopenia of pregnancy is mild and has no adverse effects on mother and foetus whereas thrombocytopenia associated with medical conditions can have serious maternal-foetal consequences and needs specific monitoring and appropriate management.

**Aims & Objectives:** The aims of the study were to evaluate causes of thrombocytopenia in pregnancy and to study clinical profile, maternal and perinatal outcome in thrombocytopenic antenatal patients after 28 weeks.

**Materials and Methods:** A prospective study was conducted in department of Obstetrics and Gynaecology and department of Pathology at Government Medical College and Rajendra Hospital, Patiala. 100 antenatal females were included in the study with platelet count  $< 1,50,000/\mu\text{L}$  and period of gestation more than 28 weeks. The subjects were investigated after detailed history and examination. Maternal and foetal outcomes were observed in all cases.

**Results:** Out of 100 subjects with thrombocytopenia, 33% had gestational thrombocytopenia, which was the most common cause; followed by preeclampsia/eclampsia (24%). 18% subjects had severe thrombocytopenia. Complications were seen in the form of HELLP (6%), ICU admission (3%), PPH (3%), Puerperal sepsis (1%).

**Conclusions:** Maternal thrombocytopenia due to medical causes needs strict observation and timely intervention for favourable maternal and perinatal outcomes.

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## 1. Introduction

Thrombocytopenia is defined as a platelet count of less than  $1,50,000/\mu\text{L}$ . It is the second most common haematological abnormality in pregnancy after anaemia.<sup>1</sup> It is caused either due to increased platelet destruction or decreased production. In pregnancy, most cases are due to increased platelet destruction, which can be caused by an immunologic destruction, abnormal platelet activation, or platelet consumption that is a result of excessive bleeding or exposure to abnormal vessels. A decrease in the production of platelets is less common in pregnancy

and is generally associated with bone marrow disorders or nutritional deficiencies.<sup>2</sup>

Thrombocytopenia can be classified as:<sup>3</sup>

Mild –  $1,00,000 - 1,50,000/\mu\text{L}$

Moderate –  $50,000 - 1,00,000/\mu\text{L}$

Severe – less than  $50,000/\mu\text{L}$

The causes of thrombocytopenia in pregnancy are:<sup>4</sup>

1. Gestational thrombocytopenia (80%)
2. Hypertension in pregnancy
  - a: Preeclampsia
  - b: HELLP (Haemolysis, Elevated Liver Enzymes, Low Platelets) Syndrome

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3. Primary immune thrombocytopenia
  - a: Secondary immune thrombocytopenia
  - b: Antiphospholipid syndrome
  - c: Secondary lupus erythematosus
  - d: Infection (such as human immunodeficiency virus, hepatitis C, cytomegalovirus, Pylori)
  - e: Drug-induced thrombocytopenia (such as heparins, antimicrobials, anticonvulsants, analgesic agents)
4. Association with systemic conditions
  - a: Disseminated intravascular coagulation
  - b: Thrombotic thrombocytopenia/haemolytic uremic syndrome
  - c: Splenic sequestration
  - d: Bone marrow disorders
  - e: Nutritional deficiencies thrombocytopenia.
5. Congenital thrombocytopenia.

## 2. Aims and Objectives

The present study was conducted to evaluate the causes of thrombocytopenia and to study the effects of thrombocytopenia on maternal and foetal outcome.

## 3. Materials and Methods

The present study was conducted in the Department of Obstetrics and Gynaecology and Department of Pathology at Government Medical College and Rajendra Hospital, Patiala after approval by the institutional ethics committee.

### 3.1. Study design

Prospective observational study.

### 3.2. Study period

January 2018 to June 2019.

### 3.3. Study population

In the study 100 antenatal women with thrombocytopenia visiting the OPD or admitted in labour room were included after taking written informed consent.

### 3.4. Inclusion criteria

1. Platelet count less than 150,000/ $\mu$ L.
2. Period of gestation more than 28 weeks.
3. Willingness to participate in the study.

### 3.5. Exclusion criteria

1. Multiple gestations.
2. Malignancy with thrombocytopenia.
3. Thrombocytopenia due to cancer chemotherapy.

Present history was obtained in detail and high-risk factors in mother were noted. History of previous conceptions

was also taken in detail. Medical history such as liver disorders, anaemia, dengue, malaria, bleeding problems, family history of bleeding, history of transfusion and drug history were noted.

Patients were thoroughly investigated after informed consent. Platelet count was done at time of enrolment by three-part autoanalyzer and confirmed on peripheral blood film. Viral markers for dengue, chikungunya was done in all suspected cases. Special investigations like FDPs, fibrinogen levels were done in cases where required. Counts were repeated after transfusions and at the time of delivery.

### 3.6. Follow-up

All the cases were followed up till delivery and any complications that developed due to decreased platelet counts were noted. Interventions were done according to the cause of thrombocytopenia and blood products transfused wherever needed. Maternal and foetal outcome was then noted.

The data was entered in Microsoft Excel and was analysed by IBM SPSS Software version 22. For this data was presented as frequency and percentage. Further we used mean, standard deviation and median and analysed with Pearson's Chi Square test. A p-value <0.05 was considered as statistically significant.

## 4. Results

In our study, mean age was 25.08 $\pm$ 3.67 years and range were 19–38 years. Maximum patients presented between 33 – 37<sup>+6</sup> weeks of gestation with mean gestation of 36.37 $\pm$ 3.03 weeks. Maximum number of patients were primigravida (46%). Mostly patients were referred because of thrombocytopenia (44%) and had no complaint as such. Majority (93%) of patients presented with no specific symptoms related to thrombocytopenia. 58% of patients had no significant past history, 16% had a previous history of blood/platelet transfusion. Majority (59%) of subjects had moderate thrombocytopenia with platelet count between 50,000 – 1,00,000 per microlitre, 23% had mild thrombocytopenia with platelets between 1,00,000 – 1,50,000 per microlitre and 18% had severe thrombocytopenia with count < 50,000 per microlitre. (Figure 1)

32% patients had mild, 18% had moderate and 20% had severe anaemia at the time of admission. In patients with severe anaemia, platelet counts were also severely reduced.

Most common cause of thrombocytopenia seen in the study was gestational thrombocytopenia (33%) followed by preeclampsia/eclampsia (24%), nutritional anaemia (23%), Dengue fever (12%), Hepatic disorders (5%), Typhoid fever (2%) and drug induced in 1%. (Figure 2)

The highest platelet count (1,45,000/ $\mu$ L) was recorded in gestational thrombocytopenia where as the lowest

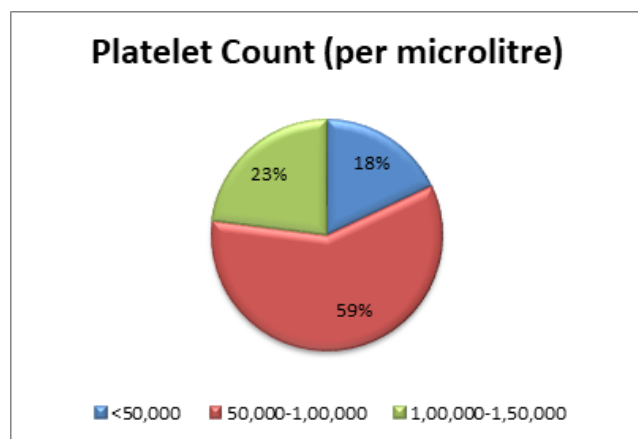


Fig. 1: Platelet count in subjects at time of enrolment into study

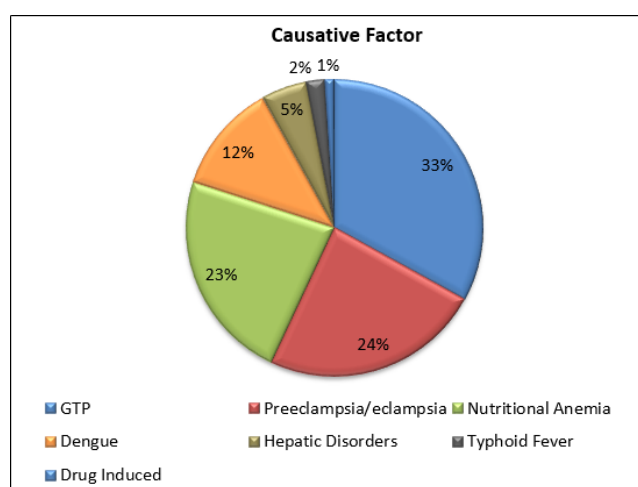


Fig. 2: Showing various causative factors

platelet count (13,000/ $\mu$ L) was seen in nutritional anaemia. (Figure 3)

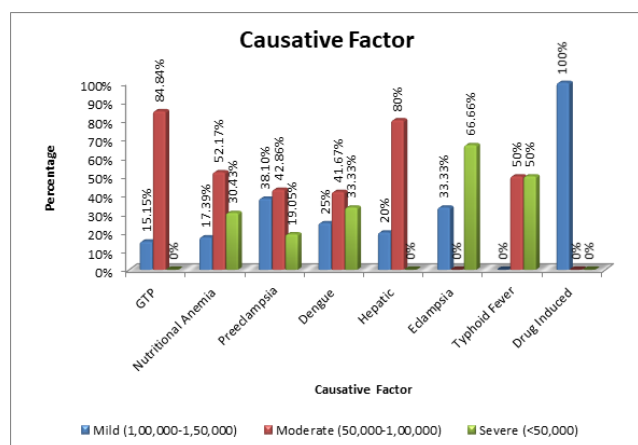


Fig. 3: Showing range of thrombocytopenia in different aetiological factors

37% patients delivered by Caesarean section which were done for obstetric conditions and not because of thrombocytopenia. And the rest 63% patients delivered vaginally. Maternal complications occurred in 12% patients, in the form of HELLP, ICU admission, PPH and P. sepsis. We observed in our study that subjects with severe thrombocytopenia (<50,000/ $\mu$ L), experienced more maternal complications (44.44%). (Figure 4)

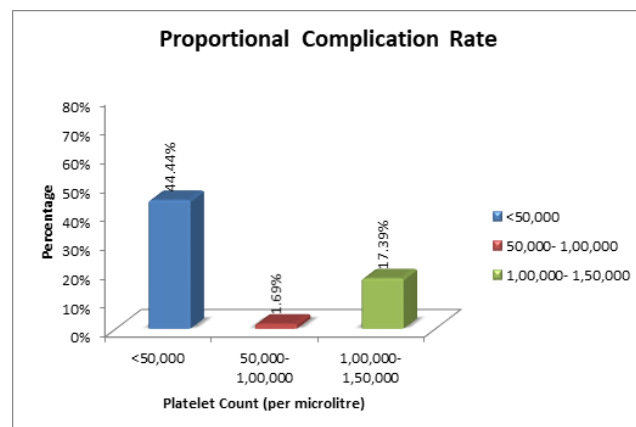


Fig. 4: Proportional complication rate in study subjects as per platelet count

33 subjects required platelet transfusion before delivery, out of which maximum subjects were of nutritional anaemia as a cause of thrombocytopenia and the least were of gestational thrombocytopenia.

Foetal complications were seen in the form of low Apgar score, NICU admissions and Intra Uterine death (IUD). No direct relationship was found between foetal complications and maternal thrombocytopenia. (Table No. 1)

### 5. Discussion

The present study was a prospective study conducted on 100 antenatal women with thrombocytopenia.

In the present study gestational thrombocytopenia was the most common cause followed by preeclampsia/eclampsia. This was in accordance to the studies done by Nisha S et al.,<sup>3</sup> Somani S et al,<sup>5</sup> Anita H et al.<sup>6</sup> and Vishwekar PS et al.<sup>7</sup> Nutritional anaemia as a cause of thrombocytopenia was there in 21% of subjects in the present study making it the third most common cause. This was more as compared to other study groups, maybe due to the fact that our hospital caters mostly to the lower- and middle-income groups of society where nutritional anaemia is more prevalent. 12% subjects had dengue related thrombocytopenia as dengue is endemic in our region.

In our study subjects with gestational thrombocytopenia had mild to moderate thrombocytopenia with platelet counts ranging between 50,000- 1,45,000 per microlitre. The lower limit of this range is lower than the one

**Table 1:** Showing foetal complications

Foetal Complication	No of subjects	<50,000 (N=18)	50,000-1,00,000 (N=59)	1,00,000-1,50,000 (N=23)	X <sup>2</sup>	p value
Low Apgar at 1 min	13	04 (22.22%)	04 (6.78%)	05 (21.74%)	3.61	0.057 (NS)
NICU Admission	12	03 (16.67%)	05 (8.47%)	04 (17.39%)	3.06	0.080 (NS)
IUD	03	02 (11.11%)	01 (1.69%)	00 (0%)	2.00	0.157 (NS)

**Table 2:** Causes of thrombocytopenia in various studies

Causative Factor	Nisha S et al 2012 <sup>3</sup>	Somani S et al 2015 <sup>5</sup>	Anita H et al 2016 <sup>6</sup>	Vishwekar PS et al 2017 <sup>7</sup>	Present study
GTP	64.21%	53.97%	29%	68.46%	33%
Nutritional Anaemia	1.05%	6.35%	12%	1.53%	21%
Preeclampsia/Eclampsia	21.05%	20.63%	37%	18.46%	24%
Dengue	-	7.94%	0.5%	7.69%	12%
Hepatic	3.17%	3.17%	5%	0.76%	5%
Typhoid fever	-	1.58%	-	-	2%
Drug induced	-	-	-	-	1%
ITP	5.26%	1.58%	0.5%	0.76%	-
Malaria	2.11%	14.28%	0.5%	-	-

**Table 3:** Platelet count in subjects of gestational thrombocytopenia

Author and year of study	Range of platelet count in subjects of gestational thrombocytopenia (per microlitre)
Nisha S et al <sup>3</sup> 2012	65,000-1,35,000
Kapadiya SN et al <sup>8</sup> 2018	65,000-135,000
Present study	50,000-1,45,000

described by Nisha S et al.<sup>3</sup> in which the platelet count of subjects with gestational thrombocytopenia ranged between 65,000- 1,35,000 per microlitre. Also, the study done by Kapadiya SN et al<sup>8</sup> reported the range of platelet count in subjects of gestational thrombocytopenia to be between 65,000- 1,35,000 per microlitre. (Table No. 3) According to ACOG,<sup>9</sup> majority of the cases have platelet count more than 75,000 per microlitre; nonetheless cases have been described with platelet count as low as 43,000 per microlitre.

In our study 37% subjects delivered by LSCS and 63% had vaginal delivery. LSCS was done for obstetric and medical conditions like foetal distress, failed induction, previous two LSCS and not for thrombocytopenia. Our findings are similar to those of Nisha S et al.,<sup>3</sup> Arora M et al,<sup>10</sup> Varghese S et al.<sup>11</sup> and Vishwekar PS et al.<sup>7</sup>

In our study, 6% subjects landed up in HELLP, 3% were admitted in the ICU, 3% had PPH and 1% had puerperal sepsis. In the study done by Somani S et al.,<sup>5</sup> 17.46% subjects had massive haemorrhage, 7.94% had P. sepsis. Likewise, Arora M et al<sup>10</sup> did a similar study wherein 4.37% subjects had postpartum haemorrhage.

We observed more complications in subjects with severe thrombocytopenia. 44.44% of patients with severe thrombocytopenia i.e., platelet count < 50,000 per microlitre

had complications. Our findings were in accordance to the study done by Vishwekar PS et al<sup>7</sup> who also noted increased complications in this group. Our findings were in contrast to those of Anita H et al.,<sup>6</sup> according to whom thrombocytopenia is not directly related to maternal outcome.

In our study, 52.17% subjects with nutritional cause of thrombocytopenia, 40% subjects with hepatic cause, 37.5% subjects of preeclampsia/eclampsia and only 15.15% of gestational thrombocytopenia required platelet transfusion before delivery. According to Varghese S et al,<sup>11</sup> in their study platelet transfusion was required in 7.7% subjects of preeclampsia/eclampsia and 2% subjects with gestational thrombocytopenia. In the study done by Nisha S et al,<sup>3</sup> 8 cases out of a total of 13 cases of thrombocytopenia due to various medical conditions (hypersplenism, hepatic diseases, malaria, megaloblastic anaemia and ITP), were given treatment in the form of steroids, blood and platelet transfusion. However, medical or surgical intervention was not needed in gestational thrombocytopenia cases.

In the present study Apgar score was <9 at 1 minute in 13% babies born to subjects with thrombocytopenia. Our findings were similar to those of Arora M et al,<sup>10</sup> wherein 9.5% babies had Apgar score of <9 at 1 minute.

In the present study 51% babies had birth weight between 1500- 2500gm (low birth weight) and 11% had birth weight <1500gm (very low birth weight). 12% of the babies were admitted to NICU. The number of IUDs were three. Out of these two were babies of mothers with HELLP and one with nutritional cause of thrombocytopenia. We did not find any significant relationship between foetal complications and the severity of thrombocytopenia in the mother. Our findings were consistent with those of Anita H et al.<sup>6</sup> In their study 49.3% of babies were low birth weight, 28% required NICU admission; and they further concluded that neonatal complications are not directly related to mother's platelet count. Our findings were in contrast to the study done by Varghese S et al<sup>11</sup> who measured foetal outcome in terms of low birth weight, IUGR and preterm deliveries; and suggested that severity of thrombocytopenia has a negative impact on foetal outcome as well.

## 6. Conclusion

We conclude from our study that early evaluation of thrombocytopenia in pregnancy is important for better maternal and foetal outcomes. The common causes of thrombocytopenia in pregnancy are gestational, preeclampsia/eclampsia, nutritional anaemia, dengue and hepatic disorders. It is essential to determine the aetiology of thrombocytopenia to enable timely management. Complications are higher in subjects with low platelet counts; hence adequate monitoring, support and treatment is required to lower complications and achieve better outcomes.

## 7. Source of Funding

None.

## 8. Conflict of Interest

The authors declare that there is no conflict of interest.

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