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**Original Research Article**

# Fetomaternal outcome in pregnancy with gestational thrombocytopenia: a cross sectional study

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## ABSTRACT

**Background:** Thrombocytopenia is second to anemia as the most common haematological abnormality during pregnancy. Objective of this study was to study the clinical profile, maternal and perinatal outcomes in thrombocytopenic antenatal patients.
**Methods:** A prospective study was carried out in tertiary hospital, 280 pregnant women who attended the Antenatal clinic regularly were enrolled. All were screened for thrombocytopenia in third trimester (after 28 weeks), women with normal platelet (n=140) were taken in control group and those with low counts less than $150\times10^9$/L (n=140) were included in study group. Maternal and fetal outcome of thrombocytopenia in third trimester of pregnancy were studied.
**Results:** Majority of women with gestational thrombocytopenia had mild thrombocytopenia (70.71%). 30.72% patients with thrombocytopenia had hemorrhagic manifestations. Maternal and perinatal complications like PPH (27.14%), puerperial sepsis (9.28%), placental abruption (5%), need for transfusion (20%), neonatal jaundice (20%), neonatal thrombocytopenia (12.14%), birth asphyxia (12.86%), NICU admission (12.14%), low Apgar (37.14%), need for resuscitation (30%), were more in patients with thrombocytopenia as compared to their age and parity matched controls.
**Conclusions:** According to this study results, pregnancies with gestational thrombocytopenia, as compared to the control group, were at a higher risk of cesarean section, intrauterine fetal death, preterm delivery, low Apgar scores, more NICU admission rate, intracranial hemorrhage, neonatal death, or adverse maternal outcome.

**Keywords:** Gestational thrombocytopenia, Maternal Morbidity, Perinatal morbidity, Thrombocytopenia

## INTRODUCTION

Thrombocytopenia is second to anemia as the most common haematological abnormality during pregnancy.[1] Thrombocytopenia complicates 7-8% of all pregnancies, most of which is seen in the third trimester of pregnancy. Thrombocytopenia is defined as a platelet count below 150×109/L, caused by accelerated platelet destruction or decreased production. It is classified as;

- Mild with a platelet count of 100-150×$10^9$/L,
- Moderate with platelet count 50-100×$10^9$/L, and
- Severe with platelet count less than 50×$10^9$/L.[2]

The prevalence of platelet count of less than 150×$10^9$/L in the third trimester of pregnancy is 6.6 to 11.6%.[3-5] A platelet count of less than 100×$10^9$/L is defined as thrombocytopenia by the international working group is observed in only 1% of pregnant women.

Although most cases of thrombocytopenia in pregnancy are mild, and have no adverse outcome for either mother or baby, occasionally a low platelet count may be part of

a more complex disorder with significant morbidity and may be life threatening.

Thrombocytopenia in pregnancy may be an isolated finding or it may be associated with systemic disorders like severe preeclampsia, HELLP syndrome (hemolysis, elevated liver enzymes, low platelets), or AFLP (acute fatty liver of pregnancy). Furthermore, autoimmune diseases, including systemic lupus erythematosus, antiphospholipid syndrome, thrombotic thrombocytopenic purpura, haemolytic uremic syndrome, and immune thrombocytopenia (ITP) may relapse or be first detected during pregnancy resulting in thrombocytopenia.[6]

Major mechanisms for thrombocytopenia are decreased production and increased destruction of platelets, platelet sequestration, and haemodilution. Thrombocytopenia may also be the primary manifestation of viral infections (HIV, EBV, CMV) or result of adverse reaction of certain drugs (heparin, antibiotics, nonsteroidal anti-inflammatory drugs, diuretics).

This study was carried out to investigate the incidence of maternal and perinatal complications in pregnancies complicated with gestational thrombocytopenia.

## METHODS

This Prospective study design was carried out in department of obstetrics and gynecology at Dr. Ram Manohar Lohia Institute of Medical sciences, Lucknow, over a period of 6 months from October 2019 to March 2020.

### *Inclusion criteria*

- All women after 28 week of gestation who gave consent to participate in the study.

### *Exclusion criteria*

- Women with known history of diabetes mellitus
- Collagen disorders
- Tuberculosis
- Autoimmune diseases
- Epilepsy/ seizure disorder
- Previous bad obstetric histories
- Leukemias
- ITP, TTP, HUS, known bleeding diathesis.

Sample size: The sample size was calculated using the formula 4pq/l2, where P is the prevalence of gestational thrombocytopenia= 9.48percent9 and l is the allowable error, that is

Sample size N = 4 pq/$l^2$
= 4×9.48×90.52/$(10)^2$
= 137

Rounding this off-sample size was taken to be 140.

Age and parity matched controls were taken in 1:1.

All women after 28 weeks of gestation (according to last menstrual period or first trimester fetal ultrasonography) were screened for platelet count.

The subjects were screened for thrombocytopenia with a complete blood count and peripheral smear.140 subjects were found to have thrombocytopenia i.e. platelet count <1,50,000/$mm^3$ were taken as cases (Group A), Simultaneously, 140 age and parity matched term pregnant women (Group B) having a normal platelet count i.e. >1.5 lac/$mm^3$ and in labor were selected to form the control group. Informed consent was taken. Detailed menstrual and obstetric history was taken. Etiologies of thrombocytopenia were evaluated according to proforma. Systolic and diastolic blood pressure was measured. Investigations were sent in form of complete blood hemogram, detection of malaria by antigen detection (rapid diagnostic test or RDTs) and/or peripheral blood smear, urine for random sugar and urine for albumin. Other etiologies were diagnosed by liver function test, coagulation profile, dengue IgG and IgM antibody titters. Antiphospholipid antibodies were tested after ruling out all other etiologies. Women already diagnosed having immune causes of thrombocytopenia were also evaluated but excluded from the study. Only women having thrombocytopenia without any other cause were classified as having gestational thrombocytopenia and were enrolled for the study.

The following characteristics were compared: intra-partum and post-partum complications such as placental abruption, and severe postpartum bleeding, need for blood transfusion. Fetal outcomes were compared with regard to birth weight, birth asphyxia, Apgar scores at 1 and 5 minutes, admission to the neonatal intensive care unit (NICU), neonatal thrombocytopenia (platelet count of <150×$10^9$/L), and stillbirth. New-borns weighing <2500 grams were classified as 'low birth weight'. Platelet counts of all new-borns were observed in the first 48 hours postpartum.

### *Statistical analysis*

The observations were tabulated on Microsoft excel sheet and results were analyzed applying SPSS software (SPSS Inc., Chicago, IL, USA). p value <0.05 was considered significant.

## RESULTS

This Prospective study was carried out in department of obstetrics and gynecology in a tertiary hospital in Lucknow, over a period of 6 months from October 2019 to March 2020. The study and the control groups had comparable age, gravidity and period of gestation. The mean age in the study Group A was 26.65±2.67 years

while that in Group B was 26.87±2.61, likewise mean parity was 2.13±0.97 and 2.03±0.81 in the respective groups and mean gestational age was 38.67±1.53 and 38.35±1.12 in Group A and B respectively.

**Table 1: Patient characteristics of Group A and B.**

| | Group A | | Group B | |
|---|---|---|---|---|
| | Number | % | Number | % |
| Age | 26.65±2.64 | - | 26.87±2.61 | - |
| Gravida | 2.13±0.97 | - | 2.03±0.81 | - |
| Gestational age | 38.67±1.53 | - | 38.35±1.12 | - |
| **Followed Antenatal care previously** | | | | |
| Yes | 114 | 81.4% | 133 | 95% |
| No | 26 | 18.57% | 07 | 5% |
| **Previous history of thrombocytopenia** | | | | |
| Yes | 17 | 12.14% | 0 | 0% |
| No | 123 | 87.86% | 140 | 100% |
| **Previous history of blood transfusion** | | | | |
| Yes | 33 | 23.57% | 06 | 4.3% |
| No | 107 | 76.43% | 134 | 95.71% |
| **History of iron supplementation in the current pregnancy** | | | | |
| Yes | 135 | 96.43% | 138 | 98.57% |
| No | 05 | 3.57% | 02 | 1.43% |
| **History of contraception use** | | | | |
| Yes | 38 | 27.14% | 11 | 7.86% |
| No | 102 | 72.86% | 129 | 92.14% |
| **Corticosteroid therapy in this pregnancy** | | | | |
| Yes | 05 | 3.57% | 01 | 0.72% |
| No | 135 | 96.43% | 139 | 99.28% |

Majority of the subjects in both the groups had received antenatal care prior to diagnosis of thrombocytopenia. Around 12.14% of the subjects in the study Group A had previous history of thrombocytopenia. 23.57% subjects in Group A and 4.3% subjects in Group B had previous history of blood transfusion. Majority of the subjects took iron supplementation during the antenatal period in both the groups. In Group A, 27.14% and in Group B, 7.86% used contraception. History of Corticosteroid therapy in this pregnancy was present in 3.57% and 0.72% subjects in the respective groups (Table 1).

**Table 2: Distribution of women according to platelet count.**

| | Group A | % |
|---|---|---|
| Mild | 99 | 70.71% |
| Moderate | 38 | 27.15% |
| Severe | 03 | 2.14% |
| Total | 140 | 100% |

Majority of women had mild thrombocytopenia (70.71%). Moderate thrombocytopenia was observed in 27.15% women and severe thrombocytopenia in three subjects (2.14%) (Table 2).

Maternal complications seen in study Group A with thrombocytopenia like postpartum haemorrhage (27.14%), puerperal sepsis (9.28%), need for transfusion (20.0%), placental abruption (5.0%) were more than in control group which was statistically significant as depicted in Table 3.

Forty-three (30.72%) patients with thrombocytopenia (Group A) had haemorrhagic manifestations whereas ninety-seven (69.28%) had none. Petechiae, ecchymosis and purpura were the most common manifestations followed by vaginal bleeding (Table 4).

Thrombocytopenia per se does not affect mode of delivery. In the study Group A out of 140 cases ninety-two (65.7%) had vaginal delivery, forty-five (32.14%) had caesarean section (CS) and three (2.14%) had instrumental delivery.

All the caesarean sections were performed for obstetric/medical indications and none for thrombocytopenia. In Group B, one hundred and eighteen subjects had normal vaginal delivery, twenty-one subjects had CS and only one had instrumental delivery. This finding was statistically significant as presented in Table 5.

**Table 3: Maternal complications in the two study groups.**

| Maternal complication | | | | | | |
|---|---|---|---|---|---|---|
| | Group A | | Group B | | Chi square | p-value |
| | Number | % | Number | % | | |
| None | 36 | 25.7% | 91 | 65.0% | 43.59 | 0.0000* |
| Abruption | 07 | 5.0% | 01 | 0.71% | 4.632 | 0.0314* |
| PPH | 38 | 27.14% | 11 | 7.85% | 18.033 | 0.00002* |
| Intraop oozing | 02 | 1.4% | 01 | 0.71% | 0.337 | 0.5615 |
| PIH/HELLP | 01 | 0.71% | 0 | 0% | 1.004 | 0.3163 |
| Hematoma at episiotomy/incision site | 02 | 1.4% | 0 | 0% | 2.014 | 0.1558 |
| Puerperal sepsis | 13 | 9.28% | 09 | 6.42% | 0.789 | 0.3744 |
| ARF (renal failure) | 05 | 3.57% | 06 | 4.28% | 0.095 | 0.7579 |
| DIC | 03 | 2.14% | 05 | 3.57% | 0.515 | 0.4730 |
| Pulmonary edema | 05 | 3.57% | 07 | 5.0% | 0.348 | 0.5552 |
| Need for transfusion | 28 | 20.0% | 09 | 6.42% | 11.242 | 0.0008* |

*statistically significant.

**Table 4: Haemorrhagic manifestations associated with thrombocytopenia.**

| Bleeding site | Group A | % |
|---|---|---|
| None | 97 | 69.28% |
| Petechiae, ecchymosis and purpura | 21 | 15.0% |
| Gum bleeding | 01 | 0.71% |
| Epistaxis | 02 | 1.42% |
| Vaginal bleeding | 13 | 9.28% |
| Hematemesis | 01 | 0.71% |
| Hematuria | 04 | 2.86% |
| Malena | 01 | 0.71% |
| Total | 140 | 100% |

**Table 5: Mode of delivery in the study groups.**

| Mode of delivery | | | | | | |
|---|---|---|---|---|---|---|
| | Group A | | Group B | | Chi square | p-value |
| | Number | % | Number | % | | |
| NVD | 92 | 65.7% | 118 | 84.28% | | |
| Instrumental | 03 | 2.14% | 01 | 0.71% | 12.946 | 0.00154* |
| LSCS | 45 | 32.14% | 21 | 15.0% | | |
| Total | 140 | 100.0% | 140 | 100.0% | | |

**Table 6: Perinatal complications seen in the two study groups.**

| Perinatal complication | | | | | | |
|---|---|---|---|---|---|---|
| | Group A | | Group B | | Chi square | p-value |
| | Number | % | Number | % | | |
| No complication | 31 | 22.14% | 95 | 67.85% | 59.105 | 0.0000* |
| Jaundice | 28 | 20.0% | 07 | 5.0% | 14.4 | 0.00015* |
| Respiratory distress syndrome | 05 | 3.57% | 07 | 5.0% | 0.348 | 0.55524 |
| IUGR /SGA | 09 | 6.42% | 04 | 2.86% | 2.017 | 0.15555 |
| Neonatal thrombocytopenia | 17 | 12.14% | 02 | 1.42% | 12.704 | 0.000364* |
| Birth asphyxia | 19 | 13.57% | 09 | 6.43% | 3.968 | 0.04637 |
| Intracranial hemorrhage | 01 | 0.71% | 0 | 0% | 1.004 | 0.31633 |
| Intrauterine fetal death | 05 | 3.57% | 01 | 0.71% | 2.725 | 0.09878* |
| Early neonatal death | 02 | 1.4% | 04 | 2.86% | 0.681 | 0.40924 |
| MAS | 23 | 16.43% | 11 | 7.86% | 4.821 | 0.02811 |

**Table 7: Neonatal platelet count.**

| Neonatal platelet count | | | | | | |
|---|---|---|---|---|---|---|
| | Group A | | Group B | | Chi square | p-value |
| | Number | % | Number | % | | |
| >150000 | 98 | 70.0% | 136 | 97.14% | 37.562 | 0.00* |
| 100000-149999 | 42 | 30.0% | 04 | 2.86% | | |
| Total | 140 | 100.0% | 140 | 100.0% | | |

**Table 8: Birth weight of the babies in the two study groups.**

| Birth weight | | | | | | |
|---|---|---|---|---|---|---|
| | Group A | | Group B | | Chi square | p-value |
| | Number | % | Number | % | | |
| 1.5-2 kg | 05 | 3.57% | 01 | 0.71% | 25.66 | 0.00003705* |
| 2.1-2.5 kg | 11 | 7.86% | 03 | 2.14% | | |
| 2.6-3.0 kg | 17 | 12.14% | 07 | 5.0% | | |
| 3.1-3.5 kg | 61 | 43.57% | 101 | 72.14% | | |
| More than 3.5 kg | 46 | 32.86% | 28 | 20.0% | | |
| Total | 140 | 100.0% | 140 | 100.0% | | |

**Table 9: Presence of birth asphyxia in the two study groups.**

| Birth asphyxia | | | | | | |
|---|---|---|---|---|---|---|
| | Group A | | Group B | | Chi square | p-value |
| | Number | % | Number | % | | |
| Yes | 18 | 12.86% | 09 | 6.43% | 3.32 | 0.06844* |
| No | 122 | 87.14% | 131 | 93.57% | | |
| Total | 140 | 100.0% | 140 | 100.0% | | |

**Table 10: Apgar scores at 5 minutes in the study population.**

| Apgar | | | | | | |
|---|---|---|---|---|---|---|
| | Group A | | Group B | | Chi square | p-value |
| | Number | % | Number | % | | |
| Less than 7 | 52 | 37.14% | 24 | 17.14% | 14.159 | 0.000168* |
| More than 7 | 88 | 62.86% | 116 | 82.86% | | |
| Total | 140 | 100.0% | 140 | 100.0% | | |

Parameters studied to observe the effect of maternal thrombocytopenia on fetal well-being included birth weight, Apgar score, fetal bleeding complications and cord blood platelet count.

More perinatal complications were seen in Group A than in Group B where jaundice (20.0%), birth asphyxia (13.57%) and neonatal thrombocytopenia (12.14%) were the common complications reported (Table 6).

Following delivery, platelet count of all the neonates of the mothers enrolled for study was done. Out of 140 neonates in Group A, ninety eight (70.0%) had platelet count more than $150\times10^9$/L while forty two (30.0%) neonates had thrombocytopenia with platelet count between $100\times10^9$/L to $149.99\times10^9$/L, while four (2.86%) neonates in Group B had incidental finding of thrombocytopenia (Table 7). Majority of the babies in both the groups had their birth weight falling between 3.1-3.5 kg (Table 8).

Eighteen babies in Group A and nine babies in Group B developed birth asphyxia (statistically significant) (Table 9).

Apgar scores of the babies in the Group A at 5 minute was more than 7 in eighty eight cases out of one hundred and forty as compared to that in Group B, which was one hundred and sixteen out of one hundred and forty. This difference was statistically significant (Table 10).

Forty-two babies in Group A and eleven in Group B needed resuscitation in the form of bag and mask ventilation with a statistically significant p value of

0.00000225 (Table 11). Among the 140 patients in Group A, seventeen babies got admitted in the NICU in view of jaundice and neonatal thrombocytopenia and birth asphyxia. On the other hand, five babies in Group B required NICU admission in view of respiratory distress which was statistically (Table 12).

**Table 11: Need of resuscitation in the two study groups.**

| Neonatal resuscitation | | | | | | |
|---|---|---|---|---|---|---|
| | Group A | | Group B | | Chi square | p-value |
| | Number | % | Number | % | | |
| Resuscitation | 42 | 30.0% | 11 | 7.86% | 22.366 | 0.00000225* |
| Not resuscitation | 98 | 70.0% | 129 | 92.14% | | |
| Total | 140 | 100.0% | 140 | 100.0% | | |

**Table 12: NICU admission in the two study groups.**

| NICU admission | | | | | | |
|---|---|---|---|---|---|---|
| | Group A | | Group B | | Chi square | p-value |
| | Number | % | Number | % | | |
| Admitted | 17 | 12.14% | 05 | 3.57% | 7.104 | 0.00769121* |
| Not admitted | 123 | 87.86% | 135 | 96.42% | | |
| Total | 140 | 100.0% | 140 | 100.0% | | |

## DISCUSSION

In present study the incidence of maternal thrombocytopenia was 9.48% which was comparable to the studies by Arora et al, where the incidence was 9.4%, Onisai et al, with 11.11%, Dwivedi et al.[7-9] where it is 8.17%, and Singh et al, reporting an incidence of 8.80%.[6] Lower incidence was reported in the studies by Brohi et al (1.90%) and Lin et al (4.30%).[10,11]

The mean age of patients in present study in Group A was 26.65±2.67 years while that in Group B was 26.87±2.61which was comparable in both the groups.

In present study the enrolled women had parity of 2.13±0.97 and 2.03±0.81 in the respective groups, which was comparable between the two groups.

The mean gestational age at delivery in this study was 38.6±1.34 weeks, similar findings were seen in the studies conducted by Lin et al and Kasai et al where the gestational age was 39 weeks and 38 weeks respectively.[11,12]

Majority of the subjects in both the groups had received antenatal care prior to diagnosis of thrombocytopenia.

Around 12.14% of the subjects in the study Group A had previous history of thrombocytopenia. In Group A 23.57% subjects and in Group B 4.3% subjects had prior history of blood transfusion. Majority of the subjects took iron supplementation during the antenatal period in both the groups. Use of contraception was reported by 27.14% in Group A and 7.86% in Group B. History of corticosteroid therapy in this pregnancy was present in 3.57% and 0.72% subjects in the respective groups. These results were in accordance with the study by Parfumi et al, Belayneh et al and Gašparović et al.[13-15]

Majority of women in this study had mild thrombocytopenia (70.71%), which is similar to the results obtained by Singh et al, Zutshi et al and Vyas et al.[6,16,17]

Maternal complications seen in study Group A with thrombocytopenia like postpartum haemorrhage (27.14%), puerperal sepsis (9.28%), need for transfusion (20.0%), placental abruption (5.0%) which were more than that in Group B, similar results were also seen in the studies by Vishwekar et al, Gašparović et al, Brohi et al, Arora et al and Chauhan et al.[7,10,15,18,19]

Forty-three (30.72%) patients with thrombocytopenia (Group A) had hemorrhagic manifestations, this finding was in agreement with the studies done by Özkan et al, Gilmore et al, Somani et al, and Vishwekar et al.[18,20-22]

Thrombocytopenia per se does not affect mode of delivery, and normal vaginal delivery was more common in thrombocytopenia in both the groups in this study, this was affirmed by the results obtained by Chauhan et al, and Vishwekar et al.[18,19] The caesarean sections done were only for obstetrical indication.

Gašparović et al, and Ying-Hsuan et al, found that thrombocytopenic women had a significantly higher rate

of cesarean delivery as compared to their healthy peers, as, the neonates with severe thrombocytopenia may experience bleeding complications, especially intracranial hemorrhage, particularly as a consequence of head trauma during vaginal delivery.[15,23]

Similar to this study results, the studies by Gašparović et al, Gilmore et al, Chauhan et al, McCrae et al, also concluded that the common perinatal complications seen in thrombocytopenia are jaundice, birth asphyxia and neonatal thrombocytopenia and low Apgar.[15,19,21,24]

Similar to the findings in this study, where the incidence of neonatal thrombocytopenia was 30%, Bhat et al and Yuce et al also quoted that the incidence of neonatal thrombocytopenia in their studies was 36.10% and 14% respectively.[25,26]

Low birthweight, low Apgar, need for neonatal resuscitation, NICU admission were more common in thrombocytopenia in this study. This is in contrast to the studies by Gašparović et al, Chauhan et al, Dwivedi et al, where no such complications were seen, though similar results were obtained in the study by Onisai et al and Somani et al.[8,9,15,19,22]

## CONCLUSION

Maternal and perinatal wellbeing is the desirable outcome in all pregnancies. Gestational thrombocytopenia is the commonest cause of low platelet counts in pregnancy.

The present study shows that pregnancies with gestational thrombocytopenia were at a higher risk of caesarean section, intrauterine fetal death, preterm delivery, low Apgar scores, higher rates of admission to the NICU, intracranial hemorrhage, neonatal death, or adverse maternal outcome as compared to the control group.

Proper antenatal care and institutional deliveries enable obstetricians to diagnose thrombocytopenia and its complications at an early stage and early intervention results in better outcome. Importance of monitoring platelet counts periodically during antenatal period cannot be overlooked. This will help reduce morbidity and mortality due to a simple cause such as thrombocytopenia and improve feto maternal outcome in susceptible pregnancies.

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