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Original Research Article

Clinical profile and outcome of thrombocytopenia in pregnancy

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ABSTRACT

Aim and Objectives: To study the clinical profile and outcome of thrombocytopenia in pregnancy. To study the etiologies of thrombocytopenia in pregnancy. To study the maternal and perinatal outcome in thrombocytopenia in pregnancy.

Materials and Methods: This is an observational retrospective study in which 200 pregnant women who had thrombocytopenia were recruited from department of obstetrics and gynecology at Gandhi hospital.

Results: The present study gives information about the etiology of thrombocytopenia in pregnancy and fetomaternal outcome. Out of 200 cases, 88 cases belongs to pregnancy induced hypertension which is considered as the most common etiology followed by gestational thrombocytopenia. Incidence of abruption was significantly high mainly in pregnancy induced hypertensive cases. The maternal and perinatal complications were lower in gestational thrombocytopenia compared with other etiologies. High rates of preterm deliveries were observed among women with hypertensive disorders. Adverse perinatal outcome was mostly associated with hypertensive disorders especially HELLP syndrome.

Conclusion: The common cause of thrombocytopenia in pregnancy in this study is mainly hypertensive disorders. Patients with gestational thrombocytopenia have favorable maternal and perinatal outcome. On the other hand, preeclampsia and HELLP syndrome are associated with adverse perinatal outcome like IUGR and intrauterine fetal death.

1. Introduction

Platelets, non-nucleated cellular fragments of megakaryocytes, play a pivotal role in hemostasis. Thrombocytopenia, defined as a platelet count less than 150×10^9/L, ranks as the second most common hematologic abnormality encountered during pregnancy,[1] principally characterized by bleeding from small vessels. In non-pregnant women, the normal reference range of platelets is 150 to 400x10^9/L. However, during the third trimester, due to hemodilution of plasma volume, platelet count may decrease by approximately 6% to 7%, though it typically remains within the normal reference range. Thrombocytopenia can arise from various conditions, many of which are pregnancy-related. Changes in platelet count are attributed to hemodilution, increased platelet consumption, and heightened platelet aggregation driven by elevated levels of thromboxane A2.[2]

Thrombocytopenia can be classified as mild (150 x 10^9/L - 100 x 10^9/L), moderate (50 × 10^9/L – 100 x 10^9/L), or severe (≤ 50 x 10^9/L)[2].

Pregnancy-specific causes of thrombocytopenia include gestational thrombocytopenia (70%-80%), preeclampsia (15-20%), and acute fatty liver (<1%). Non-pregnancy-specific causes encompass immune thrombocytopenic purpura (ITP) (1-4%) and rarer conditions such as thrombotic thrombocytopenic purpura (TTP), hemolytic uremic syndrome (HUS), systemic lupus erythematosus

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(SLE), antiphospholipid antibody syndrome (APLA) (0.5%), and disseminated intravascular coagulation (DIC) (5%), along with viral infections, malaria, drug-induced reactions, and bone marrow disorders.

Gestational thrombocytopenia stands as the most common cause during pregnancy, followed by pregnancy-induced hypertension and idiopathic thrombocytopenic purpura. Thrombocytopenia serves as an independent and significant risk factor for maternal and perinatal complications. Obstetricians primarily manage cases of pregnancy-associated thrombocytopenia, highlighting the necessity for a comprehensive understanding of its clinical features and management in pregnant women.

2. Aim and Objectives

2.1. Aim

1. To study the clinical profile and outcome of thrombocytopenia in pregnancy.

2.2. Objectives

1. To study the etiologies of thrombocytopenia in pregnancy.
2. To study the maternal and perinatal outcomes in thrombocytopenia during pregnancy.

3. Materials and Methods

3.1. Sources of data

Data were collected from the records of pregnant women admitted to the Department of Obstetrics and Gynecology, Gandhi Hospital, Secunderabad.

3.2. Methodology

This observational retrospective study analyzed records of 200 pregnant women from November 2023 to April 2024, after approval from the institutional Ethical Clearance Committee. Data included detailed histories, high-risk factors, past obstetric history, complications during present and past pregnancies, and relevant examinations. Laboratory tests and imaging studies were performed, and maternal and perinatal outcomes were observed.

3.3. Laboratory analysis

Platelet count was performed using manual and automated haematology methods.

3.4. Inclusion criteria

Records of Antenatal women who were admitted to the hospital with thrombocytopenia.

3.5. Exclusion criteria

Records of Patients who were diagnosed with thrombocytopenia but on anticoagulants in diseases like thromboembolic disorders including antiphospholipid antibody syndrome, previous deep vein thrombosis and bad obstetric history, drug-induced thrombocytopenia, were excluded.

3.6. Study design

Observational retrospective study.

4. Results and Analysis

Table 1: Etiology of thrombocytopenia

Etiology	No. of Pregnant Women	Percentage (%)
Pregnancy induced hypertension	88	44
Gestational Thrombocytopenia	60	30
ITP	28	14
Dengue	20	10
SLE	04	02

Out of 200 cases analyzed, pregnancy-induced hypertension was the most common etiology, accounting for 88 cases (44%). Gestational thrombocytopenia followed closely behind, with 60 cases (30%). Other etiologies included immune thrombocytopenic purpura (ITP) with 28 cases (14%), dengue with 20 cases (10%), and systemic lupus erythematosus (SLE) with 4 cases (2%).(Table 2)

Table 2 the distribution of cases based on the degree of thrombocytopenia across different etiologies. Moderate thrombocytopenia was the most common across all etiologies, comprising 52% of cases, followed by severe thrombocytopenia at 24% and mild thrombocytopenia at 24%.

Table 3 displays the distribution of co-morbidities among different etiologies of thrombocytopenia in pregnancy. Anaemia was the most prevalent co-morbidity, affecting 21.5% of cases, followed by gestational diabetes mellitus at 22%, and hypothyroidism at 11.5%.

Table 4 presents the distribution of mode of delivery among different etiologies of thrombocytopenia in pregnancy. Vaginal delivery was the most common mode of delivery overall, representing 57% of cases, while cesarean section was performed in 43% of cases.

Table 5 summarizes the maternal complications observed across different etiologies of thrombocytopenia in pregnancy. Abruptio placentae, postpartum hemorrhage, and blood transfusions were among the complications noted, with varying frequencies among the different conditions. Fortunately, there were no cases of maternal mortality reported in this study.

Table 2: Degree of thrombocytopenia

Degree of Thrombocytopenia	PIH	Gestational Thrombocytopenia	ITP	Others	Total
Mild	14 (7%)	32 (16%)	0	2 (1%)	48 (24%)
Moderate	59 (29.5%)	28 (14%)	8 (4%)	9 (4.5%)	104 (52%)
Severe	15 (7.5%)	0	20 (10%)	13 (6.5%)	48 (24%)

Table 3: Co-morbidity distribution

Co-Morbidity	PIH	Gestational Thrombocytopenia	ITP	Others	Total
Anaemia	36 (18%)	0	4 (2%)	3 (1.5%)	43 (21.5%)
Gestational Diabetes Mellitus	9 (4.5%)	16 (8%)	8 (4%)	11 (5.5%)	44 (22%)
Hypothyroidism	15 (7.5%)	0	8 (4%)	0	23 (11.5%)

Table 4: Mode of delivery distribution

Mode of Delivery	PIH	Gestational Thrombocytopenia	ITP	Others	Total
Vaginal Delivery	55 (27.5%)	18 (9%)	19 (9.5%)	22 (11%)	114 (57%)
Caesarean	33 (16.5%)	42 (21%)	9 (4.5%)	2 (1%)	86 (43%)

Table 5: Maternal complications

Complication	PIH	Gestational Thrombocytopenia	ITP	Others	Total
Abruptio Placentae	12 (6%)	0	0	0	12 (6%)
Postpartum Hemorrhage	3 (1.5%)	1 (0.5%)	0	1 (0.5%)	8 (4%)
Blood Transfusions	21 (10.5%)	8 (4%)	20 (10%)	20 (10%)	69 (34.5%)
Maternal Mortality	0	0	0	0	0

Table 6: Perinatal complications

Complication	PIH	Gestational Thrombocytopenia	ITP	Others	Total
Prematurity	23 (11.5%)	5 (2.5%)	0	5 (2.5%)	33 (16.5%)
Intrauterine Growth Restriction (IUGR)	9 (4.5%)	0	0	1 (0.5%)	10 (5%)
Neonatal Thrombocytopenia	0	0	8 (4%)	0	8 (4%)
NICU Admissions	6 (3%)	0	12 (6%)	4 (2%)	22 (11%)
Intrauterine Fetal Death	3 (1.5%)	1 (0.5%)	0	4 (2%)	8 (4%)
Neonatal Death	4 (2%)	0	0	0	4 (2%)

Table 6 illustrates the perinatal complications associated with different etiologies of thrombocytopenia in pregnancy. Prematurity, intrauterine growth restriction (IUGR), neonatal thrombocytopenia, NICU admissions, intrauterine fetal death, and neonatal death were among the complications observed, with varying frequencies across the different conditions.

5. Discussion

This study sheds light on the significant impact thrombocytopenia has on pregnancy, corroborating its status as the second most common hematological disorder during this period. By analyzing data from your obstetric unit, provided valuable insights into the various co morbidities, etiologies, and outcomes associated with thrombocytopenia in pregnancy. This comparative analysis is essential for understanding how the findings align with previous studies and observations, thereby contributing to the existing body of knowledge on this topic. It's through such rigorous examination and comparison that we advance our understanding and approach to managing thrombocytopenia in pregnant individuals.

5.1. Etiology

Here's a comparison of the etiology of thrombocytopenia during pregnancy across different studies:

Table 7: Comparison of etiology with other studies

Studies	PIH	Gestational Thrombocytopenia	ITP
Azeredo EL et al[3]	20.3%	76.6%	3.1%
Parnas et al[4]	22.1%	59.3%	11.05%
McCrae et al[5]	-	75%	5%
This study	44%	30%	14%

This comparison highlights variations in the distribution of etiological factors contributing to thrombocytopenia in pregnancy across different research studies.(Table 7)

The higher rates of hypertensive disorders and ITP causing thrombocytopenia in pregnancy observed in this study could be attributed to the fact that it was conducted in a tertiary care hospital. Such hospitals often receive referrals for complex cases, including those involving hypertensive disorders and ITP. As a result, these conditions may be overrepresented in the study population compared to the general population of pregnant women.

Additionally, the observation of women with dengue fever during the monsoon season is noteworthy. Dengue fever is known to cause thrombocytopenia due to platelet destruction and decreased production. The presentation of fever, myalgia, and joint pains, along with epistaxis in severe cases, aligns with typical symptoms of dengue fever(9%). These findings highlight the importance of considering infectious diseases like dengue as potential causes of thrombocytopenia during pregnancy, especially in regions where such diseases are endemic.

5.2. Degree of thrombocytopenia

Here's the comparison of the degree of thrombocytopenia across different studies:

1. Mild
   (a) Nisha S et al:[6] 74.7%
   (b) Azeredo EL et al:[3] 43.7%
   (c) Present study: 24%
2. Moderate:
   (a) Nisha S et al:[6] 17.9%
   (b) Azeredo EL et al:[3] 50%
   (c) Present study: 52%
3. Severe:
   (a) Nisha S et al:[6] 7.4%
   (b) Azeredo EL et al:[3] 6.25%
   (c) Present study: 24%

5.3. Comorbidities

1. Anemia:
   (a) Azeredo EL et al:[3] 23.43%
   (b) Parnas M et al:[4] 3%
   (c) Present study: 21.5%
2. Gestational diabetes:
   (a) Azeredo EL et al:[3] 3%
   (b) Parnas M et al:[4] 8%
   (c) Present study: 22%
3. Hypothyroidism:
   (a) Azeredo EL et al:[3] Not specified
   (b) Parnas M et al:[4] Not specified
   (c) Present study: 11.5%

This comparison highlights the prevalence of different co morbidities among pregnant women with thrombocytopenia across various studies.

5.4. Mode of delivery

It's notable that 57% of cases in the present study were delivered vaginally, while 43% were delivered via caesarean section. Among these, 21% of cases with gestational thrombocytopenia underwent caesarean section, potentially influenced by previous caesarean sections.

5.5. Maternal complications

Here's the comparison of maternal complications between different studies:(Table 8)

Table 8: Comparision of maternal complications

Complication	Parnas M et al[4]	Nisha S et al[6]	Vyas R et al[7]	Present study
Placental abruption	8.5%	2.11%	4.23%	6%
PPH	-	9.89%	2.11%	4%
DIC	2%	-	-	4%
Maternal mortality	0	5.26%	-	0
Blood transfusions	16.6%	-	-	34.5%

In the present study, the incidence of placental abruption was 6%, warranting preparedness with preventive and therapeutic measures. Gestational thrombocytopenia was not associated with increased complications compared to other etiologies.[3,7,8] Major bleeding requiring transfusion occurred in patients with DIC and ITP with severe thrombocytopenia. Women with hypertensive disorders without DIC had less significant bleeding, likely due to careful surveillance and treatment. However, 10.5% of women with hypertensive disorders received blood or blood products, similar to findings by M. Parnas et al.[4]

5.6. Neonatal outcome

5.6.1. Prematurity

1. Higher rates of preterm deliveries were observed among women with hypertensive disorders (n=23, 11.5%), ITP (n=0), and other rarer causes (2.5%) compared to the gestational thrombocytopenia group (2.5%).
2. The management of hypertensive disorders often involves early delivery of the fetus, which could be a confounding factor contributing to this association.
3. Preterm:
   (a) Parnas et al:[4] 25.6%
   (b) Azeredo EL et al:[3] 29.6%
   (c) Borhany M et al:[9] 2.6%
   (d) resent study: 16.5%

5.6.2. APGAR scores

1. Vyas R et al:[7]
   (a) Birth Asphyxia (%) at 1 min: Not provided
   (b) Birth Asphyxia (%) at 5 min: 8.99%
2. Present study:
   (a) Birth Asphyxia (%) at 1 min: Not provided
   (b) Birth Asphyxia (%) at 5 min: 7.2%

This shows the incidence of birth asphyxia at 1 minute and 5 minutes in the Vyas R et al.[7] study and the present study.

Here's the comparison of APGAR scores at 5 minutes:

1. APGAR at 5 mins
   (a) Parnas M et al:[4] 8.7%
   (b) Azeredo EL et al:[3] 3.1%
   (c) Present study: 7.2%

5.6.3. IUGR

In this study, the incidence of Intrauterine Growth Restriction (IUGR) was found to be 5%. Here's a breakdown of the incidence of IUGR in different groups:

1. Hypertensive disorders group: 4.5% of cases had IUGR.
2. ITP group: 6.7% of cases had IUGR.
3. Gestational thrombocytopenia group: 0.97% of cases had IUGR.
4. Other causes: A higher incidence of IUGR (11.65%) was observed, including cases related to dengue fever, vitamin B12 deficiency, APLA syndrome, hypersplenism, AFLP, aplastic anemia, and DIC.

It's noteworthy that previous studies have indicated associations between hypertensive disorders, HELLP syndrome, and increased severity of IUGR. McCrae's study concluded that hypertensive disorders are associated with more severe cases of IUGR, and Aslan et al.[10] found a significant difference in the incidence of IUGR in pregnant women with HELLP syndrome compared to those without HELLP syndrome.

Here's the comparison of the incidence of Intrauterine Growth Restriction (IUGR) across different studies:

1. IUGR (Intrauterine growth restriction):
   (a) Parnas M et al:[4] 20.5%
   (b) Azeredo EL et al:[4] 31.25%
   (c) Vyas R et al:[7] 11.64%
   (d) Present study: 5%

These percentages represent the incidence of IUGR observed in each respective study.

5.7. Neonatal thrombocytopenia

Neonates born to mothers with thrombocytopenia, particularly those with conditions like preeclampsia and HELLP syndrome, may face an increased risk of developing thrombocytopenia themselves. In a study by Burrows et al.,[11] it was observed that out of 216 cases of women with thrombocytopenia, some of whom had preeclampsia and HELLP syndrome, 4 neonates were born with severe thrombocytopenia. However, according to studies by McCrae[5] and Cook et al.[12] neonatal thrombocytopenia is rare and typically managed promptly without significant bleeding complications.

In the present study, 4% of neonates were found to be thrombocytopenic, with eight of them born to mothers diagnosed with ITP. Despite the presence of thrombocytopenia in these neonates, no major bleeding complications were reported.

5.7.1. Neonatal thrombocytopenia

1. Parnas M et al:[4] 7%
2. Azeredo EL et al:[3] 1.5%
3. Ohad H et al:[13] 0.28%
4. Present study: 4%

5.7.2. Perinatal mortality

1. IUFD (Intrauterine fetal demise)%
   (a) Parnas M et al:[4] 6.5%
   (b) Vyas R et al:[7] 2.91%
   (c) Rinku G et al:[14] 18%
   (d) Minal H et al:[15] 0.7%
   (e) Present study: 4%
2. Neonatal death:
   (a) Parnas M et al:[4] 1.5%
   (b) Vyas R et al:[7] Not provided
   (c) Present study: 2%

In the present study, there were three stillbirths in mothers with pregnancy-induced hypertension disorders, one stillbirth in mothers with gestational diabetes mellitus and gestational thrombocytopenia, and four intrauterine deaths in dengue cases. Additionally, two neonates of pregnancy-induced hypertension died in the postpartum period due to respiratory distress and sepsis.

6. Conclusion

Pregnancy-induced hypertensive disorders emerged as the most prevalent cause of thrombocytopenia in pregnancy in the present study, followed by gestational thrombocytopenia and ITP.

Patients with gestational thrombocytopenia generally experienced favorable maternal and perinatal outcomes. However, hypertensive disorders like preeclampsia and HELLP syndrome were associated with adverse perinatal outcomes such as IUGR and intrauterine fetal death.

More serious causes of thrombocytopenia, such as DIC, dengue fever, and SLE, were linked to adverse outcomes like postpartum hemorrhage, blood transfusions, and admissions to the medical intensive care unit (MICU).

7. Source of Funding

None.

8. Conflict of Interest

None.

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