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Review Article

Exploring the patterns of thrombocytopenia in pregnancy: unravelling implications and outcomes

Manju Mathesan[1]*, **Shanthi Ethirajan**[1]

[1]*Dept. of Obstetrics and Gynaecology, Saveetha Medical College, Chennai, Tamil Nadu, India*

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ABSTRACT

Background: Thrombocytopenia, characterized by reduced platelet count, is a hematological disorder that can manifest during pregnancy. The intricate physiological changes of pregnancy and underlying medical conditions contribute to the complexity of thrombocytopenia, impacting both maternal health and fetal outcomes.

Materials and Methods: A prospective observational study conducted from March 2022 to November 2023 at Saveetha Medical College. Participants included pregnant women aged 18-40 got admitted and regular blood tests assessed platelet counts, with additional data collected on demographics, medical history, and lifestyle. Maternal outcomes and fetal/neonatal outcomes were monitored. Statistical analysis employed descriptive statistics and regression analysis.

Results: Out of 1980 deliveries, 88 patients (4.4%) had thrombocytopenia. Causes included gestational thrombocytopenia (42%), dengue (32%), severe pre-eclampsia (11%), eclampsia (6%), immune thrombocytopenia (4%), scrub typhus (2%), HELLP syndrome (2%), and partial HELLP syndrome (1%). Temporal distribution revealed 77% of diagnoses in the third trimester, emphasizing late pregnancy onset. Thrombocytopenia severity showed 69% mild, 30% moderate, and 1% severe cases. Primiparous women were more likely to present with severe thrombocytopenia (p=0.03). Perinatal outcomes depend upon the causes of thrombocytopenia in mother which includes fetal growth retardation (9%), neonatal thrombocytopenia (4%), birth asphyxia (3%), and intrauterine death (2%).

Conclusion: This study contributes comprehensive insights into thrombocytopenia during pregnancy, identifying diverse causes and highlighting the importance of monitoring. The findings inform clinical practice, enhance prenatal care, and emphasize the need for early detection and individualized interventions.

1. Introduction

Thrombocytopenia is a hematological disorder that can manifest during pregnancy, characterized by a reduction in platelet count. The intricate physiological changes associated with pregnancy, coupled with potential underlying medical conditions, contribute to the complexity of thrombocytopenia in this population. Thrombocytopenia poses a unique set of challenges in maternal health and fetal outcomes.[1] Understanding the spectrum of thrombocytopenia during pregnancy is crucial for optimizing antenatal care, managing associated risks, and ensuring favourable outcomes for both the mother and the newborn.

Various etiologies contribute to thrombocytopenia in pregnant women, ranging from gestational thrombocytopenia, and immune-mediated disorders, to more serious conditions such as pre-eclampsia, HELLP syndrome, and underlying hematologic disorders.[2]

* *Corresponding author*.
E-mail address: drmanjusmiley@gmail.com (M. Mathesan).

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Investigating the causes of thrombocytopenia in pregnancy will provide insights into the prevalence, causes, and severity of this condition, facilitating timely and targeted clinical interventions. Maternal complications related to thrombocytopenia, such as increased risk of bleeding and preeclampsia, warrant a focused examination.[3,4] By elucidating the spectrum of thrombocytopenia, this study aims to identify specific risk factors and patterns associated with adverse maternal health outcomes.

The various causes of thrombocytopenia can influence fetal and neonatal outcomes, including preterm birth, low birth weight, and neonatal thrombocytopenia. Investigating the spectrum of thrombocytopenia is essential for understanding its impact on fetal development and devising strategies to mitigate potential neonatal complications. A comprehensive understanding of the causes of thrombocytopenia will guide clinicians in making accurate and timely diagnoses, enabling tailored management strategies. This, in turn, will contribute to improved antenatal care and the overall well-being of both the pregnant woman and her unborn child.[5]

While literature exists on thrombocytopenia in pregnancy, a focused exploration of its spectrum is essential to fill gaps in current knowledge. This study seeks to contribute novel insights, providing a foundation for further research and potentially influencing clinical guidelines. In conclusion, a systematic investigation into the spectrum of thrombocytopenia during pregnancy is paramount for advancing our understanding of this complex condition. The outcomes of this study have the potential to inform clinical practice, enhance prenatal care, and ultimately improve maternal and fetal health. Aim was to study to pattern and causes of thrombocytopenia and its relation with maternal and fetal outcomes and perinatal outcomes.

The objective of the study was to,

1. Identify the various etiologies contributing to thrombocytopenia during pregnancy.
2. Determine the severity of thrombocytopenia in pregnant women leading to post partum haemorrhage and need for platelet transfusion.
3. Investigate the relationship between thrombocytopenia and maternal outcomes.
4. Examine the impact of thrombocytopenia on fetal outcomes such as fetal growth restriction and neonatal outcomes such as allo immune thrombocytopenia.

2. Materials and Methods

2.1. Study design

This prospective observational study on the spectrum of thrombocytopenia in pregnancy and its outcomes was conducted to comprehensively understand this hematological disorder's manifestations and impact on maternal and fetal well-being. The study took place from March 2022 to November 2023, at Saveetha Medical College in department of obstetrics and gynaecology. Participants, were pregnant women aged 18-40 years who were admitted as in patients in department of obstetrics and gynaecology. Ethical approval was obtained, and informed consent was secured from willing participants by explaining the purpose of the study before starting the study.

Procedure: Routine investigation such as complete blood count were performed throughout each trimester to assess platelet counts, and other investigation including urine complete, coagulation profile, electro cardio gram, blood grouping and Rh typing, glucose challenge test, serology were done, with additional data collected on demographic information, medical history, and lifestyle factors were collected in a structured proforma. Platelet count less than 1.5 lakhs were considered to have thrombocytopenia. Maternal outcomes, including bleeding manifestation, need for platelet transfusion, mode of delivery were monitored alongside fetal and neonatal outcomes such as birth weight, and gestational age at delivery, platelet count.

Statistical analysis, employing descriptive statistics and regression analysis, characterized the spectrum of thrombocytopenia and explored its associations with various outcomes.

3. Results

During this prospective study, a total of 1980 deliveries took place. Out of the conducted deliveries, 88 patients were found to have thrombocytopenia. Figure 1 shows the causes of thrombocytopenia in the study participants. 42% had gestational thrombocytopenia, 32% had dengue, 11% of the patients had severe pre-eclampsia, followed by eclampsia in 6%, 4% had immune thrombocytopenia, 2% each had scrub typhus and HELLP syndrome respectively and 1% had partial HELLP syndrome.

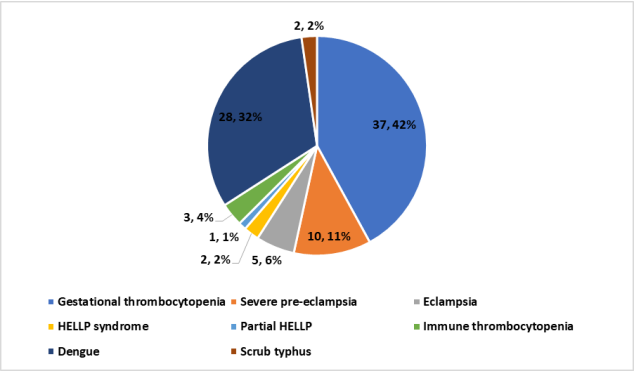

Figure 1: Causes of thrombocytopenia in the study participants

Figure 2 shows that 23% of patients were in the second trimester and the majority 77% were in their third trimester

at the time of diagnosis of thrombocytopenia.

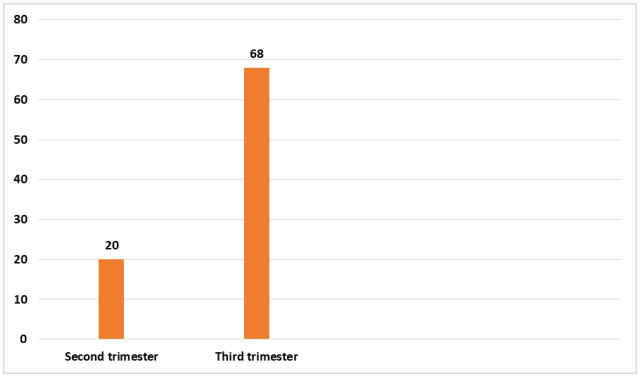

Figure 2: Time of diagnosis of thrombocytopenia

69% of the patients had mild thrombocytopenia based on the platelet count, 30% had moderate thrombocytopenia and a minority of 1% had severe thrombocytopenia as shown in Figure 3.

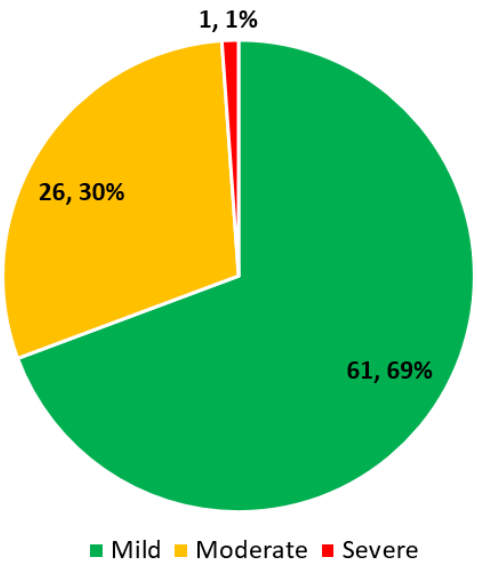

Figure 3: Thrombocytopenia status at the time of diagnosis

Table 1 reveals a significant association between thrombocytopenia severity and gravida status (p=0.03). Among participants with Mild Thrombocytopenia, 62% were primiparous, while 38% were multiparous. In the Moderate Thrombocytopenia group, a higher proportion (62%) were multiparous compared to 38% primiparous. Interestingly, all participants with Severe Thrombocytopenia were multiparous (100%). The statistically significant p-value suggests a correlation between thrombocytopenia severity and the number of pregnancies. he distribution of thrombocytopenia across trimesters did not show a significant association (p=0.26). For both Mild and Moderate Thrombocytopenia, a higher percentage of participants were in the third trimester compared to the second trimester. Notably, in the Severe Thrombocytopenia group, all cases occurred in the third trimester. The lack of significance suggests that the severity of thrombocytopenia does not vary significantly between the second and third trimesters.

Among the study participants, 14% required blood transfusion for their thrombocytopenia and the majority 86% did not require blood transfusion as seen in Figure 4.

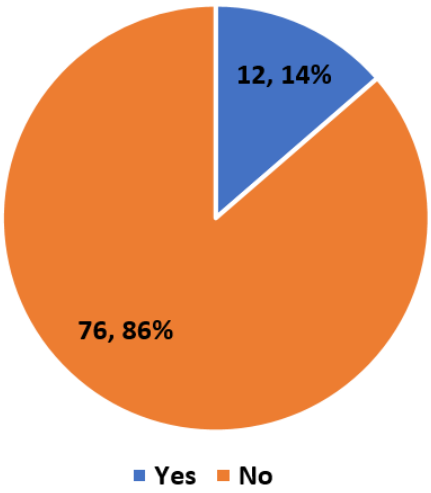

Figure 4: Transfusion requirement in the study participants

Figure 5 depicts that 84% of the study participants had term delivery and 16% had pre-term delivery.

4. Discussion

The findings from this prospective study shed light on the causes, and outcomes of thrombocytopenia in a cohort of 1980 deliveries. Among them, 88 patients were identified with thrombocytopenia, The causes of thrombocytopenia varied, with gestational thrombocytopenia being the most common (42%), followed by dengue (32%), severe pre-eclampsia (11%), eclampsia (6%), immune thrombocytopenia (4%), scrub typhus (2%), HELLP syndrome (2%), and partial HELLP syndrome (1%).

Gestational thrombocytopenia emerged as the most prevalent cause, accounting for 42% of cases. This finding aligns with existing literature, highlighting gestational thrombocytopenia as a common and generally benign condition during pregnancy. The etiology is thought to be related to increased plasma volume and hemodilution, contributing to lower platelet counts, and it often resolves postpartum.[6]

Table 1: Categorisation of thrombocytopenia status and other parameters

Variable	Mild Thrombocytopenia n=61 (%)	Moderate Thrombocytopenia n=26 (%)	Severe Thrombocytopenia n=1 (%)	p-value
Gravida				
Primi	38 (62)	10 (38)	0	**0.03***
Multi	23 (38)	16 (62)	1 (100)	**0.03***
Trimester				
II	12 (20)	8 (31)	0	0.26
III	49 (80)	18 (69)	1 (100)	0.26

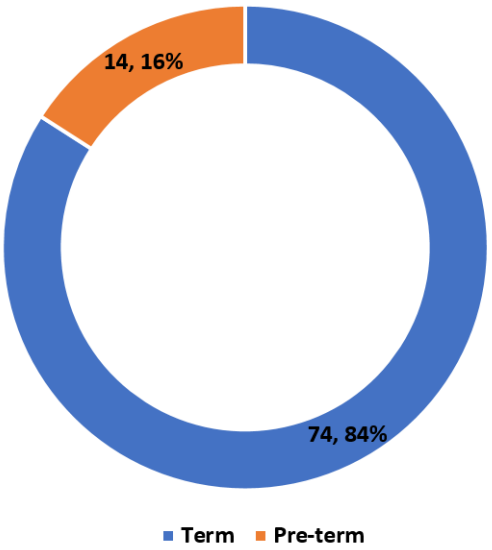

Figure 5: Time of delivery in the study participants

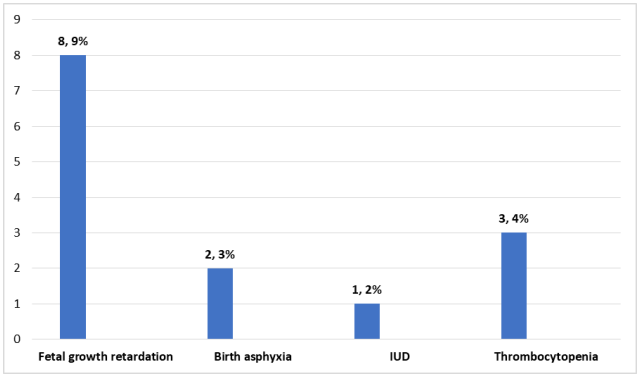

Figure 6: Perinatal outcome in the study participants

The study identified dengue as a substantial contributor, constituting 32% of cases. Dengue-associated thrombocytopenia is well-documented and can be particularly challenging during pregnancy due to potential complications. The causes highlights the significance of monitoring for vector-borne diseases in regions where dengue is endemic. Hypertensive disorders, including severe pre-eclampsia, eclampsia, HELLP syndrome, and partial HELLP syndrome, collectively contributed to 20% of thrombocytopenia cases. The association between hypertensive disorders and thrombocytopenia is well-established, reflecting the impact of severity of disease on endothelial damage and leading to reduction in platelet counts.[7]

Immune thrombocytopenia, accounting for 4%, suggests an autoimmune etiology contributing to thrombocytopenia in some cases. Immune-mediated platelet destruction can lead to a significant drop in platelet counts, necessitating careful management during pregnancy. Infections, represented by scrub typhus in 2% of cases, highlight the importance of considering infectious etiologies in the differential diagnosis of thrombocytopenia during pregnancy. Timely identification and treatment of infectious causes are crucial for both maternal and fetal well-being.[8]

Figure 2 highlights the temporal distribution of thrombocytopenia diagnoses, revealing that the majority of cases (77%) were identified during the third trimester, indicating a potential trend toward late pregnancy onset. Figure 3 illustrates the severity of thrombocytopenia, with 69% having mild, 30% moderate, and a minority of 1% having severe thrombocytopenia at the time of diagnosis. The predominance of diagnoses in the third trimester emphasizes the importance of heightened vigilance during this critical period. Clinicians should be particularly attentive to platelet counts in routine antenatal care, enabling early detection and appropriate management of thrombocytopenia-related complications. The temporal association may also prompt consideration of routine platelet monitoring protocols tailored to the specific needs of pregnant individuals during the latter stages of gestation.[9]

Table 1 provides further insights into the association between thrombocytopenia severity and gravida status. A statistically significant correlation was observed (p=0.03), suggesting that multiparous women were more likely to present with severe thrombocytopenia compared toprimiparous women. No significant association was found between the trimester of pregnancy and thrombocytopenia severity, emphasizing the need for continued monitoring throughout gestation. All participants identified with severe thrombocytopenia were primiparous, highlighting

a potential vulnerability in these patients. This finding suggests that multiparous women may be at a higher risk of developing severe thrombocytopenia compared to primiparous counterparts.[10] This intriguing pattern could imply that primiparous women may exhibit mild form of thrombocytopenia. The association observed could be attributed to various factors, including differences in immune responses, placental changes, or genetic predispositions between primiparous and multiparous women. Primiparous women may undergo unique physiological adaptations during their first pregnancy, potentially influencing the thrombocytopenia.[11]

Notably, a subset of participants (14%) required blood transfusion for thrombocytopenia, indicating the clinical significance of the condition. The majority (86%), however, did not require transfusion. Individuals with very low platelet counts or those experiencing active bleeding episodes may be candidates for platelet transfusion. While platelet transfusion can be life-saving, it is not without risks. Transfusion reactions, infections, and immunological complications are potential concerns.[12]

Figure 5 provides insights into the timing of deliveries, with 84% of participants experiencing term deliveries and 16% delivering pre-term. Figure 6 outlines perinatal outcomes, revealing that 9% had fetal growth retardation, 4% had neonatal thrombocytopenia, 3% experienced birth asphyxia, and 2% suffered intrauterine death. While the study did not explicitly explore associations with preterm birth, the temporal association of thrombocytopenia diagnosis is relevant to discussions on preterm births. Preterm deliveries, depicted in Figure 5 (16% of cases), may be influenced by thrombocytopenia-related complications. The study's findings suggest that addressing thrombocytopenia during the third trimester could contribute to strategies aimed at preventing preterm births associated with this hematological condition.[13] Thrombocytopenia-related compromise in blood flow or placental function may contribute to fetal growth restriction, necessitating careful monitoring and intervention to optimize fetal well-being.[14] While the direct link between thrombocytopenia and birth asphyxia may be multifactorial, it emphasizes the need for vigilant monitoring during labor, particularly in cases of severe thrombocytopenia where the risk of bleeding complications may be heightened.[15]

The management of thrombocytopenia during pregnancy requires a delicate balance between the risks associated with the condition and the potential benefits of interventions. This includes considerations such as the use of platelet transfusions, close monitoring during labor, and the timing of delivery. The decision-making process should be guided by the severity of thrombocytopenia, underlying causes, and individual patient factors. The study's findings underscore the importance of early detection, monitoring, and interventions to optimize maternal and perinatal outcomes in the context of thrombocytopenia during pregnancy.

5. Conclusion

This prospective observational study on the spectrum of thrombocytopenia during pregnancy has provided comprehensive insights into the prevalence, causes, and outcomes of this hematological disorder. The study identified gestational thrombocytopenia as the most prevalent cause, aligning with existing literature and highlighting its generally benign nature during pregnancy. Dengue, severe hypertensive disorders, immune thrombocytopenia, and infectious etiologies also emerged as significant contributors, emphasizing the diverse spectrum of conditions associated with thrombocytopenia in pregnant women. The temporal distribution of thrombocytopenia diagnoses, predominantly in the third trimester, underscores the importance of heightened vigilance during this critical period and prompts considerations for monitoring protocols. This study provides valuable insights into the multifaceted nature of thrombocytopenia during pregnancy, and perinatal outcomes and the need for followup in newborn babies. The findings have the potential to inform clinical practice, enhance prenatal care protocols, and ultimately improve the health outcomes of both the pregnant woman and her unborn child. Future research endeavors can build upon these insights to refine risk assessment, diagnostic approaches, and therapeutic strategies, advancing our collective efforts in managing thrombocytopenia during pregnancy.

6. Source of Funding

None.

7. Conflict of Interest

None.

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Author's biography

Manju Mathesan, Post Graduate https://orcid.org/0009-0004-0103-1359

Shanthi Ethirajan, Professor https://orcid.org/0000-0003-2179-8632

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