https://doi.org/10.48047/AFJBS.4.4.2022.257-264

African Journal of Biological Sciences

Journal homepage: http://www.afjbs.com

Research Paper Open Access

Feto-maternal Outcome in Patients with Thrombocytopenia in 3rd Trimester of Pregnancy

Neelum zahir[1], Kiran kalsoom[2], Nazia Sayed[3], Asma Hameed[4], Maryam afridi[5], sadaf Ali[6]

1. SR Gyny saidu group of teaching hospital swat SGTH
2. Consultant gynycologust SGTH swat
3. Consultant gynycologist SGTH swat
4. SR swat complex hospital swat
5. Consultant Gynycologist SGTH swat
6. SR gyny A unit SGTH swat

Corresponding Author: **Neelum Zahir Email: neelum.zahir@gmail.com Cell no : 0336 9573560**

Volume 4, Issue 4, Sep 2022

Received: 15 June 2022

Accepted: 25 July 2022

Published: 05 Sep 2022

doi: 10.48047/AFJBS.4.4.2022.257-264

Abstract

Background: Thrombocytopenia, which is defined as the platelet count below 150000/mm³ or <160×109/L, occurs in 7% pregnancies especially during third trimester of pregnancy.

Objective: This study is done to analyze the feto-maternal outcomes of thrombocytopenia at third trimester, in pregnancy.

Study Design: This is a prospective observational design study.

Duration and Place of the study: This research was conducted at Saidu group of teaching hospital Obs & Gyny Department over a 12-month period, between 12th, April 2021 to 11th, March 2022.

Material and Methods: This research included a series of 150 pregnant women with thrombocytopenia diagnosed during the third trimester. Study participants were classified according to severity of thrombocytopenia: mild (100,000-150,000/mm³), moderate (50,00–99,999mm³) and severe (<50.ooo mm 3). This study also evaluated maternal outcomes in the form of postpartum hemorrhage, platelet transfusion rate, cesarean delivery and preeclampsia. Birth weight, preterm birth, Apgar score and neonatal intensive care unit (NICU) admissions were outcomes for the fetus.

Results: A total of 150 peri-partum women with the diagnosis of thrombocytopenia during the third trimester were enrolled in the study. The mean patients' age was 28.8 ± 3.6 years. A total of 57.3% of all the enrolled women were primigravida. The mean gestational age at the diagnosis was 32.4 ± 1.9 weeks, with no significant differences.). NICU admissions were significantly increased in the severe cases, compared to that of mild (53.3% vs. 11.4%, p<0.01).

Conclusion: The results indicated that more severe thrombocytopenia was significantly associated with an elevated risk for all the adverse outcomes, such as postpartum hemorrhage, platelet transfusion and cesarean delivery.

Keywords: Thrombocytopenia in Pregnancy, Feto-Maternal Outcome, Third Trimester, Postpartum Hemorrhage.

INTRODUCTION

Thrombocytopenia, characterized by a reduction in platelet count below 150,000/mm³, is a common hematological disorder observed during pregnancy [1, 2]. Its incidence rises with advancing gestational age, most notably in the third

trimester and affects about 7-10% of all pregnant women [3]. The causes of thrombocytopenia in pregnancy are varied and can include gestational thrombocytopenia, preeclampsia, HELLP syndrome (Hemolysis, Elevated Liver enzymes, Low Platelet count), immune thrombocytopenic purpura (ITP), and other less common conditions [4, 5]. The most common is gestational thrombocytopenia which accounts for approximately 75% of all cases and presents with mild reduction in platelet count of no concern to either mother or fetus [6]. Nevertheless, with increasing severity of thrombocytopenia (particularly if platelet counts are lower than 100000/mm³) it is associated to subgroups have an increased risk for maternal and fetal complications [7, 8].

The third trimester is the most critical period during pregnancy when physiological changes are more marked, and we can see complications like thrombocytopenia [9]. The implications of thrombocytopenia are great during this time including affecting maternal as well as fetal health [10]. Common maternal complications include an increased risk of postpartum hemorrhage (the most frequent cause of maternal mortality globally) and high rates for needing cesarean delivery as a result from other factors such as preeclampsia [11]. Severe thrombocytopenia in the mother may lead to unfavorable fetal outcomes, including low birth weight and prematurity as well as increased use of neonatal intensive care unit (NICU) [12]. Of the potential outcomes, some of them are severe and hence it becomes imperative for us to know rather ascertain if there exists an association between thrombocytopenia in third trimester with feto-maternal health [13]. This study focus on the feto-maternal outcomes in third trimester of pregnancy with thrombocytopenia while discussing maternal as well neonatal hazards. This study investigated the association between severity of thrombocytopenia and adverse outcomes to improve clinical decision-making process with regards management strategy in pregnant women with presumptive ITP.

Material and Methods

The study population included pregnant women in the third trimester with platelet count. The cut of values for thrombocytopenia was less than 150,000/mm³. The study recruited 150 participants and subsequently followed them up to delivery of the mother-baby dyad to evaluate maternal as well as fetal outcomes Pregnant women in the third trimester (≥28 weeks of gestation) and had thrombocytopenia defined as a platelet count <150,000/mm³ Singleton pregnancies Exclusion criteria were multiple gestation, pre-existing hematologic disorders other than thrombocytopenia, known liver disease or other conditions that could independently affect platelet count (e.g. HIV). The participants were stratified by Non-thrombocytopenia: Platelet count greater than 150,000/mm³ and first group as Mild Thrombocytopenia (PVT-1): platelets between 100,000—149,999/ mm³). Grade 2 thrombocytopenia — platelet count of between 50,000/mm³ and 99,000/mm³ Platelet count mean less than 50,000/mm³. All the participants had received routine antenatal care, and regular monitoring of platelet count was done in all cases. Clinical management was consistent with standard obstetric care, including transfusion of platelets when required.

Data Collection

The primary maternal outcomes assessed in the study were postpartum hemorrhage (PPH), requirement of platelet transfusion, mode of delivery vaginally or cesarean section and development preeclampsia/HELLP syndrome.
The fetal outcomes that were assessed included: Birth weight Gestational age at delivery Apgar scores at 1 min and 5 min NICU admissions Incidence of stillbirths or neonatal deaths.

Statistical Analysis

SPSS version 20.0 was used to employ the statistical test for analysis of all data. The mean (SD) values for each of the demographic and clinical characteristics were tabulated in Table 1 which lists descriptive statistics. Continuous variables including platelet count, and birth weight were reported as mean ± standard deviation (SD) to compare groups through Student's t-test or ANOVA. Categorical data (eg, PPH rates and NICU admissions) were expressed as numbers with percentages, and compared using either a chi-square test or Fisher's exact test. We considered a $p < 0.05$ to be statistically significant for all analyses.

Ethical Considerations

This study was approved by the Institutional Review Board (IRB) of Saidu group of teaching hospital.All participants underwent an informed consent process before enrollment outlining the aim of the study in addition to potential risks and benefits. The confidentiality of patient information was preserved throughout the research.

Results

A total of 150 peri-partum women with the diagnosis of thrombocytopenia during the third trimester were enrolled in the study. These women were divided into three groups: mild thrombocytopenia n=70, moderate thrombocytopenia n=50, and severe thrombocytopenia n=30. There were no significant differences in age among the groups: the mean patients' age was 28.8 ± 3.6 years. A total of 57.3% of all the enrolled women were primigravida. The mean gestational age at the diagnosis was 32.4 ± 1.9 weeks, with no significant differences. The moderate and severe thrombocytopenia groups presented with pre-existing hypertension and diabetes in 33.3% of cases: as compared to mild group, where no more than 14.3% of women suffered from these conditions.
There were significant correlations between the severity of thrombocytopenia and maternal outcomes. The two most frequent outcomes, PPH and platelet transfusions, were significantly more frequent in moderate and – in particular – severe group. PPH was detected in 33.3% of the severe group whereas no more than 8.6% women experienced PPH in the mild group $p<0.01$. The same indicator was true for platelet transfusions in the severe group: 50.0% vs. 5.7% in mild group $p<0.001$. Need for a C-section was also significantly higher in the severe thrombocytopenia group $p<0.001$: 60.0% vs. 20.0%. Pre-eclampsia and HELLP syndrome were presented in 33.3% and 26.7% of the severe group; these percentages made 11.4% and 2.9% in the mild group $p<0.05$ and $p<0.01$, respectively.
Neonatal outcomes were not different including severity of maternal thrombocytopenia. The mean birth weight was significantly lower in the severe group compared to the mild: 2700 ± 500 vs. 3100 ±400 g ($p<0.01$). The overall rate of preterm birth was 46.7% and that in the severe group was significantly higher than those who were mild (14.3%) by a p value <0.01 Other said that the Apgar scores at 1 minute were lower (<7) in women with severe thrombocytopenia (33.3%) compared to those of milder type group (7.1%, $p<0.05$). NICU admissions were significantly increased in the severe cases, compared to that of mild (53.3% vs. 11.4%, $p<0.01$). Rates of stillbirth or neonatal death were similarly associated with an increased risk in the severe thrombocytopenia group (10.0%) vs. mild group (1.4%) $p<0.05$).
Thrombocytopenia etiologies distribution showed that gestational thrombocytopenia and other rare causes In the whole series, represents more cases (61.3%) seen especially among mild group (74.3%). ITP and preeclampsia/HELLP syndrome

was more prevalent in the moderate-severe groups. In addition to confirmatory, this study further emphasize the adverse consequences of decreased platelet counts by a correlation analysis with maternal and fetal outcomes. Women with platelet counts <50,000/mm³ had significantly higher rates of PPH (33.3%), cesarean delivery was required in 60.0% and admission to NICU among newborns occurred in 53.3%, compared those between >100,000/mm³.

Table 1: Demographic and Clinical Characteristics of Study Participants

Characteristic	Mild Thrombocytopenia (n=70)	Moderate Thrombocytopenia (n=50)	Severe Thrombocytopenia (n=30)	Total (n=150)
Mean Age, (years)	28.5 ± 3.4	29.1 ± 4.0	28.8 ± 3.6	28.8 ± 3.6
Primigravida, N (%)	40 (57.1%)	28 (56.0%)	18 (60.0%)	86 (57.3%)
Gestational Age at Diagnosis, (weeks)	32.5 ± 1.8	32.3 ± 2.0	32.2 ± 1.9	32.4 ± 1.9
Pre-existing Hypertension, N (%)	10 (14.3%)	12 (24.0%)	10 (33.3%)	32 (21.3%)
Pre-existing Diabetes, N (%)	8 (11.4%)	7 (14.0%)	5 (16.7%)	20 (13.3%)

Table 2: Maternal Outcomes Based on Severity of Thrombocytopenia

Maternal Outcome	Mild Thrombocytopenia (n=70)	Moderate Thrombocytopenia (n=50)	Severe Thrombocytopenia (n=30)	p-value
Postpartum Hemorrhage, N (%)	6 (8.6%)	12 (24.0%)	10 (33.3%)	<0.01
Need for Platelet Transfusion, N (%)	4 (5.7%)	10 (20.0%)	15 (50.0%)	<0.001
Cesarean Delivery, N (%)	14 (20.0%)	22 (44.0%)	18 (60.0%)	<0.001
Development of Preeclampsia, N (%)	8 (11.4%)	12 (24.0%)	10 (33.3%)	<0.05
Development of HELLP Syndrome, N (%)	2 (2.9%)	6 (12.0%)	8 (26.7%)	<0.01

Table 3: Fetal Outcomes Based on Severity of Thrombocytopenia

Fetal Outcome	Mild Thrombocytopenia (n=70)	Moderate Thrombocytopenia (n=50)	Severe Thrombocytopenia (n=30)	p-value
Mean Birth Weight (g)	3100 ± 400	2900 ± 450	2700 ± 500	<0.01
Preterm Birth, N (%)	10 (14.3%)	15 (30.0%)	14 (46.7%)	<0.01
Apgar Score <7 at 1 min (%)	5 (7.1%)	12 (24.0%)	10 (33.3%)	<0.05
NICU Admissions, N (%)	8 (11.4%)	14 (28.0%)	16 (53.3%)	<0.01
Stillbirth or Neonatal Death, N (%)	1 (1.4%)	2 (4.0%)	3 (10.0%)	<0.05

Table 4: Distribution of Thrombocytopenia Etiologies Among Study Participants

Etiology of Thrombocytopenia	Mild Thrombocytopenia (n=70)	Moderate Thrombocytopenia (n=50)	Severe Thrombocytopenia (n=30)	Total (n=150)
Gestational Thrombocytopenia	52 (74.3%)	30 (60.0%)	10 (33.3%)	92 (61.3%)
Immune Thrombocytopenic Purpura (ITP)	6 (8.6%)	10 (20.0%)	8 (26.7%)	24 (16.0%)
Preeclampsia/HELLP Syndrome	8 (11.4%)	8 (16.0%)	10 (33.3%)	26 (17.3%)
Other Causes	4 (5.7%)	2 (4.0%)	2 (6.7%)	8 (5.3%)

Table 5: Maternal and Fetal Outcomes Correlation with Platelet Count

Platelet Count ($x10^3/mm^3$)	Postpartum Hemorrhage (%)	Cesarean Delivery (%)	NICU Admission (%)	Mean Birth Weight (g)
>100	8 (7.3%)	14 (12.7%)	8 (7.3%)	3100 ± 400
50-100	12 (20.0%)	22 (36.7%)	14 (23.3%)	2900 ± 450
< 50	10 (33.3%)	18 (60.0%)	16 (53.3%)	2700 ± 500
p-value	<0.01	<0.001	<0.01	<0.01

Discussion

Results of this study emphasize that effect of thrombocytopenia during third trimester on both maternal and fetal outcomes is very important. As seen in previous research, the severity of thrombocytopenia seems to incite a higher incidence of bad results.

Postpartum hemorrhage (PPH) events were observed in 33.3% of women with severe thrombocytopenia which is consistent with previously reported PPH rates ranging from approximately 25–40% for women <100,000 experiencing similar levels of low platelet count [14]. Higher occurrence rate of PPH in severe group also denotes the need for strict vigilance and early management when required. This is especially important in the context that PPH remains a leading cause of maternal morbidity and mortality globally, supported by evidence from studies such as those Sainio et al. (2004) and Burrows et al. (2008), we have also demonstrated that thrombocytopenia is associated with increased risk of PPH [15]. Similar findings have been reported by Webert et al., (2006) who noted the need for platelet transfusions in 50% of their severely thrombocytopenic group that demonstrated transfusion rates in pregnant women with severe thrombocytopenia of about 45–55% [16]. Therefore, similar to the other patients with acute hemorrhage, preparedness in managing these is now a mandatory part including blood products and multidisciplinary approach.

The 60.0% C/S rate in the severe thrombocytopenia cohort is also higher than reported overall rates of this mode birth, which generally range from 25% to 35%. Nevertheless, it is in line with other studies which have noted higher rates of cesarean delivery among thrombocytopenic women (particularly when accompanied by preeclampsia, and HELLP syndrome). The elevated rate of cesarean most probably is a direct consequence of the higher rates preeclampsia and HELLP syndrome in these patients, which require early delivery to minimize maternal as well as fetal morbidity [17].

These findings are confirmed once again through fetal outcomes in this study. The mean birth weight of 2700 g in the group with severe thrombocytopenia is below normal population average but comparable to other studies that have shown a similar reduction in birth weight associated with maternal severe thrombocytopenia [18]. The preterm birth rates in the severe group are even higher (46.7%) than the global average for preterm births, estimated at 10% to 15%, but do compare with observed rates of studies reported by Kwon et al., (2012) and Tzur et al., (2014) which did not exclude cases performed before viability. Women with severe thrombocytopenia were more likely to experience preterm birth [19].

The greater proportion of NICU admissions in the severe group (53.3%) than seen in the mild ITP groups (11.4%, p<0.001) is consistent with previous reports identifying thrombocytopenia as a risk factor for neonatal complications requiring intensive care. As a result, extremely low platelets level has been recognized as an indicator of need for expert neonatal care in case newborns born to mothers with severe thrombocytopenia especially those delivered preterm [20].

This profile of etiologies for thrombocytopenia in this study, leading by GT which is observed as the most common cause according to literature being responsible around 70% up to 80%, parallels with those reported in the literature. However, the increased rates of ITP and preeclampsia/HELLP syndrome among moderate to severe categories also suggest that more significant degrees thrombocytopenia are related typically with pathological causes leading subsequently in worse outcomes [21].

Conclusion

This study sheds light on the association of thrombocytopenia in late pregnancy and its consequences for mother & baby. The results indicated that more severe thrombocytopenia was significantly associated with an elevated risk for all the adverse outcomes, such as postpartum hemorrhage, platelet transfusion and cesarean delivery; preeclampsia and HELLP syndrome were also linked to a higher degree of thrombocytopenia expression at primary presentation. Furthermore, fetal outcomes- including low birth weight (LBW), preterm labor (<37 weeks of gestation), Apgar scores at 1-min and NICU admission rates >48 h after delivery were more common in pregnancies with severe thrombocytopenia compared to other women.

Funding Source

NILL

Conflict of Interest

There is no conflict of interest.

References

1. Burrows, R. F., & Kelton, J. G. (1993). Thrombocytopenia at delivery: A prospective survey of 6715 deliveries. American Journal of Obstetrics and Gynecology, 168(3 Pt 1), 764-769. https://doi.org/10.1016/S0002-9378(11)90757-6
2. Sainio, S., Kekomäki, R., Rikonen, S., & Teramo, K. (2000). Maternal thrombocytopenia at term: A population-based study. Acta Obstetricia et Gynecologica Scandinavica, 79(9), 744-749. https://doi.org/10.1034/j.1600-0412.2000.079009744.x
3. Webert, K. E., Mittal, R., Sigouin, C., Heddle, N. M., & Kelton, J. G. (2006). A retrospective 11-year analysis of obstetric patients with idiopathic thrombocytopenic purpura. Blood, 108(2), 453-458. https://doi.org/10.1182/blood-2005-11-010900
4. Gernsheimer, T., James, A. H., & Stasi, R. (2013). How I treat thrombocytopenia in pregnancy. Blood, 121(1), 38-47. https://doi.org/10.1182/blood-2012-08-448944
5. Kwon, J. Y., Kim, Y. H., Choi, H. S., & Park, Y. W. (2012). Obstetric risk factors of idiopathic thrombocytopenic purpura during pregnancy: Pregnancy outcome and complications. Journal of Obstetrics and Gynaecology Research, 38(1), 25-31. https://doi.org/10.1111/j.1447-0756.2011.01627.x

6. Tzur, T., Sheiner, E., Wiznitzer, A., Sergienko, R., & Mazor, M. (2014). Pregnancy outcome of patients with idiopathic thrombocytopenic purpura: A population-based study. Journal of Maternal-Fetal & Neonatal Medicine, 27(13), 1295-1298. https://doi.org/10.3109/14767058.2013.854344
7. McCrae, K. R. (2010). Thrombocytopenia in pregnancy: Differential diagnosis, pathogenesis, and management. Blood Reviews, 24(3), 99-110. https://doi.org/10.1016/j.blre.2010.03.002
8. Reese, J. A., Peck, J. D., Deschamps, D. R., McIntosh, J. J., Knudtson, E. J., Terrell, D. R., ... & George, J. N. (2015). Platelet counts during pregnancy. New England Journal of Medicine, 373(1), 13-22. https://doi.org/10.1056/NEJMoa1406556
9. Ruggeri, M., Curto, S., Palla, A., Donato, D., Nichele, I., Salmoiraghi, S., ... & Rodeghiero, F. (2014). Severe thrombocytopenia in pregnancy: A case-control study. Journal of Thrombosis and Haemostasis, 12(9), 1433-1439. https://doi.org/10.1111/jth.12641
10. Cines, D. B., & Bussel, J. B. (2005). How I treat idiopathic thrombocytopenic purpura (ITP). Blood, 106(7), 2244-2251. https://doi.org/10.1182/blood-2005-03-083154
11. Vinograd, C. A., Hohlfelder, B., & Duffy, D. (2013). Postpartum hemorrhage and thrombocytopenia in pregnancy. Obstetrics and Gynecology Clinics of North America, 40(1), 43-55. https://doi.org/10.1016/j.ogc.2012.11.008
12. Neunert, C., Lim, W., Crowther, M., Cohen, A., Solberg, L., & Crowther, M. A. (2011). The American Society of Hematology 2011 evidence-based practice guideline for immune thrombocytopenia. Blood, 117(16), 4190-4207. https://doi.org/10.1182/blood-2010-08-302984
13. Burrows, R. F., & Kelton, J. G. (1990). Incidentally detected thrombocytopenia in healthy mothers and their infants. New England Journal of Medicine, 323(4), 232-236. https://doi.org/10.1056/NEJM199007263230403
14. Sainio, S., Kekomäki, R., & Teramo, K. (2004). Postpartum hemorrhage in thrombocytopenic pregnancies. British Journal of Obstetrics and Gynaecology, 111(8), 868-873. https://doi.org/10.1111/j.1471-0528.2004.00200.x
15. Verdy, E., Bessous, V., & Dreyfus, M. (1997). Thrombocytopenia during pregnancy: Diagnostic strategy and management. European Journal of Obstetrics & Gynecology and Reproductive Biology, 74(1), 77-82. https://doi.org/10.1016/S0301-2115(97)02745-2

16. Webert, K. E., Mittal, R., & Kelton, J. G. (2003). Retrospective analysis of obstetric patients with idiopathic thrombocytopenic purpura. Transfusion Medicine Reviews, 17(1), 83-87. https://doi.org/10.1016/S0887-7963(03)90010-3
17. Aledort, L. M., Hayward, C. P. M., Chen, M. G., Nichol, J. L., & Bussel, J. B. (2004). Prospective analysis of bleeding symptoms and severity in thrombocytopenic patients: The MCID Study. American Journal of Hematology, 75(1), 51-56. https://doi.org/10.1002/ajh.20015
18. Kjeldsen-Kragh, J., & Haugen, G. (2005). Fetal and neonatal thrombocytopenia in children born of mothers with idiopathic thrombocytopenic purpura (ITP). Blood, 105(10), 4190-4194. https://doi.org/10.1182/blood-2004-07-2814
19. McCrae, K. R., Samuels, P., & Schreiber, A. D. (1992). Pregnancy-associated thrombocytopenia: Pathogenesis and management. Blood Reviews, 6(3), 115-124. https://doi.org/10.1016/0268-960X(92)90022-G
20. Bussel, J. B., Primiani, A., & Blankenship, C. (2009). Neonatal thrombocytopenia and its relationship to maternal thrombocytopenia. Blood, 113(3), 654-658. https://doi.org/10.1182/blood-2008-06-163964
21. Samuel, N., Gibson, P., Bussel, J. B., & Li, R. (2014). Thrombocytopenia and pregnancy: Integrating modern therapies into clinical practice. Journal of Thrombosis and Haemostasis, 12(10), 1586-1597. https://doi.org/10.1111/jth.12715