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Original Research Article

THROMBOCYTOPENIA IN PREGNANCY-ETIOLOGY, MATERNAL AND FETAL OUTCOME

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Abstract

Background: Thrombocytopenia, defined as a platelet count less than 150,000 μl^{-1}, is a common haematological disorder. It is second only to anaemia, which is the most common haematological abnormality in pregnancy. **Aim:** This study aimed to estimate the prevalence of thrombocytopenia during pregnancy and determine the causative factors of maternal thrombocytopenia and maternal and foetal outcomes of thrombocytopenia in pregnancy. **Material and Methods:** This prospective observational study included 143 patients with platelet counts below the thrombocytopenic range at the tertiary care centre, Tirunelveli Government Medical College and Hospital, from January 2021 to June 2022. A detailed workup of all thrombocytopenia cases was performed to ascertain the cause of thrombocytopenia. Platelet counts were repeated 48 h after delivery and 6 weeks postpartum, and maternal outcomes were evaluated. **Results:** Approximately 60% of the patients were aged 20–29 years, and most were primi gravida. A history of thrombocytopenia in a previous pregnancy was present in only 2% of the patients. Gestational thrombocytopenia was the most common cause of thrombocytopenia. GHTN was a common association in patients with thrombocytopenia. Most patients had mild thrombocytopenia, and bleeding manifestations were found in only 2% of cases. Approximately 6.9% of patients required steroid therapy. Approximately 72% of patients had only mild thrombocytopenia in the postpartum period. Only 1.4% of babies born to mothers with thrombocytopenia had neonatal thrombocytopenia. **Conclusion:** This study found a high incidence of mild thrombocytopenia in pregnant women with hypertensive disorders primarily due to vascular endothelial ischaemia and hypoxia. Early treatment can reduce adverse pregnancy and foetal outcomes.

INTRODUCTION

Pregnancy-induced thrombocytopenia can result from multiple aetiologies, some of which are specific to pregnancy and others which may occur in non-pregnant settings. Pregnancy-specific causes of thrombocytopenia include gestational thrombocytopenia, preeclampsia, eclampsia, hypertensive pregnancy disorders such as HELLP syndrome, and liver diseases such as acute fatty liver during pregnancy. Non-pregnancy-specific causes include immune thrombocytopenia; autoimmune diseases such as SLE and APLA; viral infections such as HIV, CMV, and EBV; drug-induced thrombocytopenia; thrombotic microangiopathy; and hereditary thrombocytopenia. Knowing these causes facilitates correct diagnosis and treatment of thrombocytopenia in pregnant women.

Normal pregnancy is associated with a physiological drop in the blood platelet count. The reason for this decline remains unknown. Decreased platelet production or increased platelet turnover occurs during pregnancy. Thrombocytopenia in some pregnant women results in platelet counts in the thrombocytopenia range. Thrombocytopenia is conventionally defined as a platelet count < 150 × 10 × 9/L. Values between 100 and 150 × 10 × 9/l were considered mild thrombocytopenia, 50 and 100 × 10 × 9/l were considered moderate thrombocytopenia, and values below 50 × 10 × 9/l were considered severe thrombocytopenia. Thrombocytopenia is the second most common haematologic abnormality after anaemia. The overall incidence of thrombocytopenia during pregnancy is 6% to 10%.

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The most common cause is gestational thrombocytopenia, which accounts for approximately 70% of cases. Hypertensive diseases, such as preeclampsia, eclampsia, and HELLP syndrome, account for 21% of all cases. Immune-mediated thrombocytopenia, including idiopathic thrombocytopenic purpura, accounts for 4.1% of cases and is relatively rare. However, these conditions can lead to significant morbidity and mortality. Thrombocytopenia can have a wide range of prognoses, from completely benign to life-threatening. This study focuses on the aetiology and maternal and neonatal outcomes of thrombocytopenia in pregnant women admitted to our tertiary care hospital.

Aim

This study aimed to estimate the prevalence of thrombocytopenia during pregnancy and determine the causative factors of maternal thrombocytopenia and the maternal and foetal outcomes of thrombocytopenia in pregnancy.

MATERIALS AND METHODS

This prospective observational study was conducted on 143 patients with platelet counts below the thrombocytopenic range at the tertiary care centre, Tirunelveli Government Medical College and Hospital, from January 2021 to June 2022. The study was approved by the institutional ethics committee before initiation, and informed consent was obtained from all patients.

Inclusion Criteria

All antenatal and postnatal women with a platelet count < 1,50,000/µL during the study period were included.

Exclusion Criteria

Patients with sampling errors in whom repeat blood counts were normal were excluded.

After obtaining informed consent, antenatal and postnatal women admitted to TVMCH with thrombocytopenia were further evaluated and followed up for analysis of aetiology and maternal and neonatal outcomes until 6 weeks postpartum. A detailed workup of all thrombocytopenia cases was performed to ascertain the cause of thrombocytopenia. A History of petechiae, bruising, drug use, viral infection, and thrombocytopenia in a previous pregnancy was recorded. General, systemic, and obstetric examinations were performed to identify signs of thrombocytopenia.

All women underwent blood tests for Hb, TLC, DLC, bleeding time, clotting time, RFT, LFT, HBsAg, and HIV. Coagulation tests (PT, APTT, FDP, and fibrinogen levels) were performed in patients with signs or symptoms of DIC. Platelet transfusions were administered as indicated. Platelet counts were repeated 48 h after delivery and 6 weeks postpartum, and maternal outcomes were evaluated. The babies of all mothers were tested for thrombocytopenia and followed up for any complications.

RESULTS

The age group of 20-29 years had 86 patients (60.14%), the second most common was the age group range 30-40 years with 50 patients (34.97%), and the least common was < 20 years with 7 patients only (4.90%). Most of the mothers were primi gravida (86 patients (60.14%), the second most common being G2P1L1 with 35 patients (24.48%), while G3A2 was present in three patients (2.10%) and G3P2L2 (four patients, 2.80%), and the least common obstetric code was G4A3 (one patient (0.70%).

Only 4 patients in the entire study group had thrombocytopenia in a previous pregnancy (2.80%). The most prevalent comorbidity was gestational hypertension in four patients, heart disease (mild AR), GDM on insulin, and seizure disorder in two patients. Only the least common incidence of solitary patient count was seen in cases of DCLD/portal hypertension/moderate splenomegaly, protein C and S deficiency, GDM, Overt DM, SLE, and TB cervical lymphadenopathy.

Most of the patients were diagnosed with thrombocytopenia after 28 weeks (100 patients - 69.93%). Splenomegaly was observed in ten patients. Viral infection and immune factors (ANA positivity) were found in six cases each. GHTN and DIC were found in 4 cases and ITP in 3 cases. HELLP, Abruptio Placenta, and Liver disorders were each present in one case. Drug/transfusion-induced and congenital causes were not found in any case. Most patients had normal ultrasound findings. As an indicator of thrombocytopenia, few (10) patients had splenomegaly, four had mild splenomegaly (2.80%), four had moderate splenomegaly (2.80%), and two had massive splenomegaly (1.40%). [Table 1]

Most of the patients had no specific complaints; when few patients with specific complaints were considered, fever was present in 13 patients, four patients had bleeding gums, and other non-specific complaints were seen in only four patients. 22 patients had anaemia and six had pancytopenia. Most of the patients had a platelet count of > 1 lakh (61 patients, 42.66%), while the second most common was the range of 0.5-1 lakh (49 patients, 34.27%), and the least common range was < 0.5, with 33 patients (23.08%). Only 22 patients had haemoglobin levels < 10 (15.38%), while the remaining 131 patients had a haemoglobin level > 10 gm/ dl. [Table 2]

Only 10 patients were treated with steroids (6.99%) while the remaining patients did not. Nineteen patients required platelet transfusion (13.29%), whereas the remaining patients had no such instances. Most of the patients gave birth by normal delivery (93 patients, 65.03%), followed by LSCS

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(32 patients, 22.38%) and the next common being spontaneous expulsion (11 patients, 7.69%). The least common outcomes were hysterotomy, VBAC, and outlet forceps in four (2.80%), two (1.40%), and one patient (0.70%), respectively.

When the pregnancy outcome concerned with the fate of the fetus is concerned, most of the deliveries were term pregnancies with 107 patients (74.83%), 21 patients with preterm pregnancy (14.69%), abortion in 8 patients (5.59%), and least common Intrauterine death in 7 patients (4.90%). Two of the total cases had neonates born with thrombocytopenia, while the others had no such neonates with thrombocytopenia. Of the two cases of neonatal thrombocytopenia, one neonate required platelet transfusion and the same neonate also had sepsis. [Table 3]

Table 1: Demographic data of the study

		Number of patients (%)
Age	<20	7 (4.90%)
	20-29	86 (60.14%)
	30-40	50 (34.97%)
Obstetric Code	Primi	86 (60.14%)
	G2A1	2 (1.40%)
	G3A2	3 (2.10%)
	G4A3	1(0.70%)
	G2P1L1	35 (24.48%)
	G3P2L2	4 (2.80%)
	Postnatal	12 (8.39%)
H/O Thrombocytopenia in Previous Pregnancy	Yes	4 (2.80%)
	No	139 (97.20%)
Co-morbidities	GDM	2
	Overt DM	1
	GHTN	4
	Heart disease (mild MR)	2
	DCLD/ portal hypertension/ moderate splenomegaly	1
	Protein C and S deficiency	1
	Seizure disorder	2
	SLE	1
	TB cervical lymphadenopathy	1
	Nil	128
Time of Diagnosis	<14 weeks	4 (2.80%)
	14-28 weeks	24 (16.78%)
	>28 weeks	100 (69.93%)
	Post-natal	15 (10.49%)
Causative factors	GHTN	4 (2.80%)
	HELLP	1 (0.70%)
	ITP	3 (2.10%)
	Immune (ANA +ve)	6 (4.20%)
	Abruptio Placenta	1 (0.70%)
	Viral	6 (4.20%)
	DIC	4 (2.80%)
	Splenomegaly	10 (6.99%)
	Liver Disorder	1 (0.70%)
Ultrasound	Normal	133 (93.01%)
	Mild splenomegaly	4 (2.80%)
	Moderate Splenomegaly	4 (2.80%)
	Massive splenomegaly	2 (1.40%)

Table 2: Clinical, haematological, and laboratory profile of the study

			Number of patients (%)
Clinical profile	Complaints	Bleeding gums	4 (2.80%)
		Fever	13 (9.09%)
		Non-Specific	4 (2.80%)
Haematological profile		Anaemia	22 (15.38%)
		Pancytopenia	6 (4.20%)
Laboratory profile	Platelet at diagnosis (In Lakhs)	<0.5	33 (23.08%)
		0.5-1	49 (34.27%)
		>1	61 (42.66%)
	Haemoglobin (g/dl)	<10	22 (15.38%)
		≥10	121 (84.62%)
	INR	0.8-1.1	140 (97.90%)
		>1.1	3 (2.10%)
	Peripheral smear	Microcytic hypochromic anaemia	14 (9.79%)
		Dimorphic anaemia	8 (5.59%)
		MPC < 50,000	30 (20.98%)
		Hemolysis	0

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		Morphologically abnormal platelet	0
		Elevated Liver Enzymes	6 (4.20%)
		Abnormal renal parameters	0

Table 3: Comparison of treatment with steroid/ IVIG, platelet transfusion, pregnancy outcomes, platelets in the postpartum period, and neonatal thrombocytopenia

		Number of patients (%)
Treatment with steroid/ IVIG	Yes	10 (6.99%)
	No	133 (93.01%)
Platelet transfusion	Yes	19 (13.29%)
	No	124 (86.71%)
Pregnancy Outcome: 1	Hysterotomy	4 (2.80%)
	LN	93 (65.03%)
	LSCS	32 (22.38%)
	Outlet forceps	1 (0.70%)
	Spontaneous expulsion	11 (7.69%)
	VBAC	2 (1.40%)
Pregnancy Outcome: 2	Abortion	8 (5.59%)
	IUD	7 (4.90%)
	Preterm live deliveries (28 -37 weeks)	21 (14.69%)
	Term live deliveries (>37 weeks)	107 (74.83%)
Platelets in the postpartum period (In lakhs)	<0.5	7 (4.90%)
	0.5-1	33 (23.08%)
	>1	103 (72.03%)
Neonatal thrombocytopenia	Yes	2 (1.40%)
	No	141 (98.60%)

DISCUSSION

Platelets are non-nucleated cellular fragments of megakaryocytes that play a critical role in haemostasis. Thrombocytopenia was defined as a blood platelet count of < 1,50,000/µL. It is the second leading cause of blood disorders during pregnancy after anaemia. It complicates 7%–10% of pregnancies. Owing to haemodilution secondary to the expansion of plasma volume, the platelet count in normal pregnancy may decrease by approximately 10%. Most of the decreases occurred during the third trimester. Thrombocytopenia can be classified as mild (platelet count 100,000 – 150,000 × 10*9/l), moderate (platelet count 50,000 – 100,000 × 10*9/l), or severe (platelet count less than 50,000 × 10*9/l).

In our study, most of the patients belonged to the age group of 20-29 years with 86 patients (60.14%), the second most common being the age group of range 30-40 years with 50 patients (34.97%), and the least common was < 20 years with 7 patients only (4.90%). Because the difference was not significant, age was not a risk factor for thrombocytopenia. Of the cases, 60.14% were primipara and the remaining 39.36% were multigravida. Because the difference was not significant, parity was not proven to be a risk factor for thrombocytopenia in our study.

In our study, most deliveries were term pregnancies in 107 patients (74.83%), preterm pregnancies in 21 patients (14.69%), abortions in 8 patients (5.59%), and intrauterine deaths in 7 patients (4.90%). As the difference was not significant, gestational age was not a risk factor for thrombocytopenia.

In our study, 125 patients had no significant medical histories. A significantly more prevalent diagnosis was gestational hypertension in 4 patients. Heart disease (mild AR), GDM on insulin, and Seizure Disorder were seen in two patients only by least common incidence of solitary patient count seen in cases of DCLD/portal hypertension/moderate splenomegaly, liver disease, Protein C and S Deficiency, GHTN partial HELLP, GDM, Overt DM/ imminent eclampsia, SLE, and TB cervical lymphadenopathy, respectively. As hypertensive disorders of pregnancy are on a rising trend, more patients with gestational hypertension in our study belong to this category.

In a study by Thanoon and Jalal, the overall incidence of thrombocytopenia during pregnancy was 8.6%. Gestational thrombocytopenia was the most common cause, accounting for 76.9% of the cases.[1] The results of this study were consistent with our findings. Burrows and Kelton conducted a prospective study for one year on a group of women who delivered at McMaster University and demonstrated that gestational thrombocytopenia appears to have no adverse effects on the mother or foetus. Also, obstetrical interventions like caesarean sections because of thrombocytopenia are not justified in these mothers.[2]

In a prospective study by Ruggeri et al., vaginal delivery was performed in of 33/41(80%) patients, and of 8/41 (20%) underwent caesarean section for obstetrical reasons. Two patients underwent blood transfusions for postpartum haemorrhage. Neonatal bleeding did not occur during any delivery.[3] The results of these studies were consistent with our findings. After delivery, platelet counts (34% moderate thrombocytopenia to 23% and 23% severe thrombocytopenia to 4%) improved compared to platelet levels before delivery, and this improvement in the platelet count of the study sample was statistically significant. This finding is consistent with Parnas et al. study where the platelet count

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normalizes within 2–12 weeks after delivery. 9% of moderate thrombocytopenia after delivery in our study is found to be in ITP patients.[4]

The platelet count of the infants after delivery was determined using cord blood samples. Invariably, all infants had platelet counts within the normal range. There was no statistically significant correlation between the foetal platelet count and maternal count in our study. However, the mean platelet count was higher in babies born to mothers with moderate thrombocytopenia. Jenson et al. reported a link between maternal platelet counts and foetal platelet counts and found no significant correlation between the two.[5] Thus, this feature is consistent with our study. Gestational thrombocytopenia had no adverse maternal or foetal outcomes. The platelet count was normal within 12 weeks of delivery. Even babies born to mothers had no adverse effects. There was no significant correlation between maternal and foetal platelet counts in the present study. This lack of association was by research by Hachisuga et al.[6]

CONCLUSION

Our study revealed a high incidence of mild thrombocytopenia. Thrombocytopenia in hypertensive disorders of pregnancy is primarily due to vascular endothelial ischaemia and hypoxia caused by vascular vasospasm. Vascular viscosity increases with damaged endothelial cells, thereby increasing permeability, and accelerating platelet aggregation and consumption. This variety of thrombocytopenia is usually closely related to the underlying disease. Most of the women were primi gravid and younger, and a few were more than 30 years old. Most pregnant women require timely termination of their pregnancy according to the obstetric situation, and this situation results in a high proportion of preterm births and caesarean sections. In conclusion, fewer patients required blood transfusions during antenatal and intrapartum periods. Therefore, timely treatment of the primary disease and its complications can effectively reduce adverse pregnancy and foetal outcomes. Careful blood pressure measurements and a complete haemogram would suffice for the early detection of patients.

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