ORIGINAL ARTICLE   OBSTETRICS AND GYNECOLOGY

Thrombocytopenia in Pregnancy - A Study in Relation to Maternal and Fetal Outcome

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Abstract

Background: Thrombocytopenia is encountered in less than 10% of pregnancies however, it is the second most common hematological disorder in pregnancy. Gestational thrombocytopenia is associated with favorable outcomes but its association with (Hemolysis, Elevated Liver enzymes, and Low Platelets) HELLP syndrome is associated with high maternal and fetal morbidity and mortality. The present study aimed to determine the cause of thrombocytopenia in pregnancy along with maternal and fetal outcomes. *Methods*: Pregnant women with hematological profiling and showing platelet counts below 1,50,000/- were included in the study. The data was collected from the Department of Obstetrics and Gynecology, Rajiv Gandhi Institute of Medical Sciences (RIMS), Adilabad. *Results:* In the present study, among the n=28(25%) cases of < 37 weeks, n=15 (53.57%) mild thrombocytopenia, n=11(44%) had moderate thrombocytopenia and n=2 (8.0%) severe thrombocytopenia. N=75 cases were >37 weeks, of which n=60(80.0%) mild thrombocytopenia, n=15 (20.0%) moderate thrombocytopenia, and no case of severe thrombocytopenia. The mean platelet count was 126805.5 ± 20365.23/ μL. The mean neonatal platelet count was 185300.0 ± 35834.0/μL. The incidence of fetal thrombocytopenia was 3.5% (p values were not statistically significant). *Conclusion:* Gestational thrombocytopenia is the common cause of thrombocytopenia. It may be considered a benign condition since there is no correlation with adverse pregnancy outcomes. However, accurate clinical assessment is required for the patient presenting with thrombocytopenia to rule out serious conditions such as HELLP syndrome, severe pre-eclampsia, Thrombotic thrombocytopenic purpura (TTP), and Acute Fatty Liver of pregnancy. Therefore, routine monitoring of platelet counts of all pregnant females is necessary.
Keywords: Gestational Thrombocytopenia, Pre-Eclampsia, Fetal Thrombocytopenia

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Introduction

Thrombocytopenia is a condition in which the platelet count is less than 1.5 lakhs/cumm. [1] It is the second common disorder following anemia which is diagnosed in pregnant females. [2] It has been estimated that approximately 7-8% of all pregnancies are present with thrombocytopenia. [3] Pregnancy influences the platelet counts directly due to gestational thrombocytopenia, or pre-eclampsia, and hemolysis or indirectly through conditions such as Systemic lupus erythematosus (SLE), Immune thrombocytopenic purpura. The physiological cause of decreased platelet counts in pregnancy is attributed to hemodilution and increased consumption in peripheral tissues and

aggregation driven by increased levels of thromboxane A2. [4] The physiological thrombocytopenia is generally mild and does not affect the mother or fetus adversely. Platelet count reduces in pregnancy especially during the third trimester due to haemodilution, increased platelet activation, and accelerated clearance. The same is called gestational thrombocytopenia. [5] The thrombocytopenia however in these cases is asymptomatic, non-life-threatening, and not associated with fetal thrombocytopenia. Hypertensive disorders account for approximately 20% among which Hemolysis, Elevated Liver Enzymes, Low platelet count (HELLP) syndrome is associated with 20% of cases with a high degree of maternal and fetal morbidity and mortality due to abruption, preterm deliveries, and intrauterine growth retardation. The incidence of immune thrombocytopenic purpura is 3-4% and has the potential to cause thrombocytopenia in infants due to existing IgG antibodies that can cross the placenta. Other causes of thrombocytopenia are rare in pregnancy. Recent data suggest that endothelial dysfunction, vasoconstriction, placental ischemia, and enhanced coagulation are associated with abnormal placental development which may lead to inadequate feto-maternal circulation and decreased placental perfusion. [6] Acute fatty liver of pregnancy is rare but has a rate of mortality of 18%. Therefore, careful clinical assessment is important in the evaluation of pregnant patients with signs and symptoms of thrombocytopenia. Since it has a wide range of prognostic implications and may range from benign to life-threatening for mother and fetus. Based on the above considerations we in the current study tried to identify the causes and anticipate the possible outcome of thrombocytopenia in pregnancy so that early intervention can lead to better maternal and perinatal outcomes.

Materials and Methods

This cross-sectional study was done in the Department of Obstetrics and Gynecology, Rajiv Gandhi Institute of Medical Sciences (RIMS), Adilabad. Institutional Ethical Committee permission was obtained for the study. The data was collected from Dec 2018 to Jan 2019. Written consent was obtained from all the participants of the study. The sample size was calculated based on approximately 10000 females in and around Adilabad maybe with pregnancy and at the rate of 10% thrombocytopenia with a confidence interval of 95% and margin of error of 5% the sample size calculated was n=112.

Inclusion Criteria
1. Pregnant women who have given informed written consent.
2. Pregnant women with a platelet count equal to or below 1,50,000 per micro-liter were included in the study.

Exclusion Criteria
1. Patients with chronic liver disease.
2. Patients with drug-induced thrombocytopenia (Heparin, sulfonamides, NSAIDs).

Antenatal women were enrolled in the study at the first visit, irrespective of gestational age. Details were entered in the proforma regarding the detailed history of the period of gestation, high-risk factors, past history, complications during the present and past pregnancy, history of petechiae, bruising, drug usage, viral infection, thrombocytopenia in a previous pregnancy were taken. General, systemic and obstetric examinations were done. All women had a platelet count estimation at the time of enrollment. Women with normal platelet count before 28 weeks had a repeat platelet count in the third trimester to detect gestational thrombocytopenia. Platelet count assessment was done through an automated blood count analyzer with the routine antenatal hematological evaluation of the patient. All women were subjected to the blood test for Hb, TLC, bleeding time, clotting time, Renal Function Test (RFT), Liver Function Test (LFT) HBsAg & HIV. Ultrasonography for gestational age, liquor, and fetal wellbeing and scan with Doppler whenever indicated. Women with fever were tested for Dengue NS1Ag, IgM. Coagulation tests (PT, APTT, INR) were done in those with signs or symptoms of DIC. Women with normal platelet count before 28 weeks had a repeat platelet count in the third trimester to detect gestational thrombocytopenia. All the thrombocytopenic cases were followed up throughout the antenatal period till delivery to record any complications that developed due to low platelet counts. The

maternal outcome was assessed as gestational age of delivery, mode of delivery, and post-partum complications. The perinatal outcome was assessed as birth weight, APGAR score at 5 minutes and any NICU admissions. Statistical analysis was done for continuous variables and summary statistics mean and standard deviations were used. For categorical data, the number and percentages were used. The Chi-square test was used for the association between two categorical variables. The data was uploaded on an MS Excel spreadsheet and analyzed by SPSS version 22 in windows format.

Results

In the present study, 8.90% were less than 20 years, 45.53% were between the age group of 20 -25 years, 34.82% of cases were between the age group of 26-30 years and 10.71% were of the age >30 years. Mean age of distribution in our study with a range from 18-35 years was 23.5 years with an SD of 3.1

Table 1: Distribution of cases according to age group

Age (yrs)	N	%
<20	10	8.90
21-25	51	45.53
26-30	39	34.82
31-35	12	10.71
Total	112	100

In the present study, 42.86% of the patients were primigravida. The 33.03% of women were of gravida 2 and 19.64 % of the patients were gravida 3 and 3.5% of the patients where gravida 4 histories of 4 abortions were seen in 2% cases. In the present study, 42.85% of the patients were parity 0 and 33.03% of the women had parity 1 and 19.6% of the patients were with parity 2. In the present study, 84.8% of the patients had no history of abortions. 8.93% of the women had 1 abortion. 3.5% had 2 abortions and 2.6 % cases had a history of 3 abortions.

In the present study, 22.32% of the study population were of <37 weeks and 78.57% were of >37 weeks. The Period of gestation ranged from 32-41 weeks, with a mean of 36.5 weeks and SD 1.6 The platelet count on admission ranged from 35,000 to 1.5 lakh, the mean platelet was 1.09 lakh with an SD 0.5 The platelet count at discharge ranged from 1 lakh to 2.8 lakh with the mean count being 1.8 lakh

with an SD 0.4 Majority of the patients with thrombocytopenia following delivery had improvement in the platelet count. In the present study n=110 of the cases had normal renal parameters of blood urea and serum creatinine.

Graph 1: Distribution of cases according to gravida
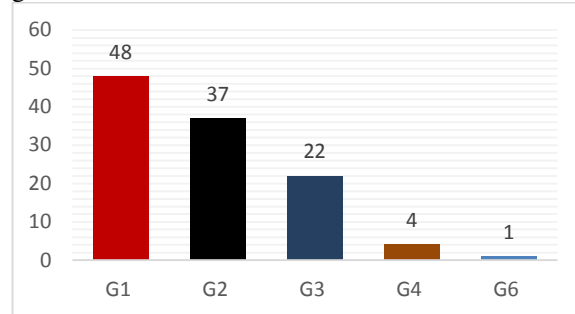
Only n=2 cases were with raised serum creatinine levels. In the present study, n=108 cases had normal AST, ALP, and LDH levels. N=3 cases had raised AST and ALP with normal LDH levels. N=1 of the patients had raised AST, ALP, and LDH levels. In the present study, 67.86% were gestational thrombocytopenia (GTP), 16.07% cases were Pre-eclampsia, 5.35% were gestational hypertension (GHTN), 3.5% cases were partial HELLP syndrome. The distribution of cases according to the causes is depicted in table 2

Table 2: Distribution of cases according to Causes

CAUSES	N	%
GTP	76	67.86
Pre-Eclampsia	18	16.07
GHTN	6	5.35
Partial HELLP	4	3.5
Dengue	2	1.8
DIC	2	1.8
ITP	1	0.9
Eclampsia	1	09
Abruptio Placenta	1	0.9
Typhoid	1	0.9
Total	112	100

In the present study, 79.46% had mild thrombocytopenia, 18.75% had moderate thrombocytopenia and 1.78% had severe thrombocytopenia.

In the present study, among the n=28(25%) cases of < 37 weeks, n=15 (53.57%) mild thrombocytopenia, n=11(44%) had moderate thrombocytopenia and n=2 (8.0%) severe

thrombocytopenia. N=75 cases were >37 weeks, of which n=60(80.0%) mild thrombocytopenia, n=15 (20.0%) moderate thrombocytopenia, and no case of severe thrombocytopenia. The mean platelet count was 126805.5 ± 20365.23/ µL

Table 3: Distribution of cases according to the severity

Severity	N	%
Mild (1- 1.5 lakh)	89	79.46
Moderate (50,000 – 1 lakh)	21	18.75
Severe (<50,000)	2	1.78
Total	100	100

Table 4: Distribution of cases according to fetal outcome

FOETAL OUTCOME	N	%
NIL (No complication)	95	84.82
NICU ADMISSION	16	14.28
IUD	1	0.89
Total	100	100

The mean neonatal platelet count was 185300.0+35834.0/µL. In the present study incidence of fetal thrombocytopenia was 3.5% (p values were not statistically significant). In the present study among n=112 deliveries, 84.82% of babies had no complications, 14.28% babies had NICU admissions, and all recovered. 0.89% was a case of IUD. N=69 cases out of 112 had a birth weight of > 2.5 kg and 35 had a birth weight of < 2.5. Birth weights range from 1.4-3.5 kg, with a mean of 2.4 kg and SD of 0.8. Out of n=16 cases with babies shifted to NICU, n=9(56.25%) GTP, 2(12.5%) partial HELLP, n=2(12.5%) gestational hypertension, n=1(6.25%) eclampsia, n=1(6.25%) preeclampsia and n=1(6.25%) DIC. N=1 had IUD with abruption of the placenta.

Discussion

Expansion of plasma volume in pregnancy occurs by 10-15% at 6-12 weeks of gestation. [7] During pregnancy, plasma renin activity tends to increase, and atrial natriuretic peptide levels tend to reduce mildly. This suggests that, in a pregnant state, the elevation in plasma volume is in response to an under-filled vascular system resulting from systemic vasodilatation and an increase in vascular capacitance, rather than actual blood volume expansion. Platelet count reduces in pregnancy especially during the third trimester due to haemodilution, increased platelet activation, and accelerated clearance. The same is called gestational thrombocytopenia. [5] Recent data suggest that endothelial dysfunction, vasoconstriction, placental ischemia, and enhanced coagulation are associated with abnormal placental development which may lead to inadequate fetomaternal circulation and decreased placental perfusion. 18 In the current study we tried to evaluate the etiology and outcomes of thrombocytopenia in pregnancy. In the current study, we found Gestational Thrombocytopenia (GTP) in 67.86% of cases. Pandey A et al., [8] in their study found 44% of cases of thrombocytopenia were due to GTP. The incidence of Pre-eclampsia in this study was 16.07% it agreed with the findings of Pandey A et al., [8] where they found 13% of cases with Pre-eclampsia. We found gestational hypertension as the third common cause at 5.35% Chauhan V et al., [9] in their study in Himachal Pradesh found a higher incidence of gestational hypertension at 16%. The mean age of the cases of this study was 23.5±3.1 years. Chauhan V et al., [9] found the mean age of the patients at 25.74 ±3.86. Suri et al., [10] found a mean age of 27 years. Other studies by Borna et al., [11] found a mean age of 28 years. Turgot et al., [12] found 27.6±5.7 Jaleel et al., [13] found the mean age of 28.43 years. The probable cause of the lesser mean age in our study is due to the predominantly tribal population of Adilabad district and the tendency of people to marry females at an early age. The mean platelet count in the present study was 126805.5 ± 20365.23/ µL. Pourrat et al., [14] found the mean platelet count of 131000/ µL and Jaleel et al., [13] found the mean platelet count 122960+28146.5/µL whereas Chauhan V et al., [9] found the mean platelet count to be lower at 106907.7±30136.52/µL. In this study the mean neonatal platelet counts were 185300.0+35834.0/µL. Pourrat et al., [14] found the mean counts of 122100/µL, and Yuce T et al., [15] found the man neonatal platelet counts were 203000±12101.2/µL. In this study, the birth weights range from 1.4-3.5 kg, with a mean of 2.4 ± 0.8 Kg. Onisai et al., [16] found the mean neonatal weight was 2.9±0.23 kg. Bouzari Z et al., [17] found the mean neonatal weight of 2.58 ± 0.23 Kg. In our study, 14.28% of

neonates required NICU admission. Vyas et al.,[18] in their study found 13.20% of neonates were admitted to NICU. Lin et al., [19] found only 0.30% of neonates requiring NICU admission. In our study, 14.28% of neonates had a mean APGAR score of less than 7 at 5 minutes. Parnas et al., found 2.4% of neonates had lower APGAR scores. Lin et al., [20] found 0.3% neonates with APGAR scores < 7 at 5 minutes. In this study 8.9% of neonates were small for gestational age which is comparable with the results of Chauhan V et al., [9] they found 8% of neonates were small for gestational age.

Conclusion

Gestational thrombocytopenia is the common cause of thrombocytopenia. It may be considered a benign condition since there is no correlation with adverse pregnancy outcomes. However, accurate clinical assessment is required for the patient presenting with thrombocytopenia to rule out serious conditions such as HELLP syndrome, severe pre-eclampsia, Thrombotic thrombocytopenic purpura (TTP), and acute fatty liver of pregnancy. Therefore, routine monitoring of platelet counts of all pregnant females is necessary.

Conflict of Interest: **None**
Source of support: **Nil**
Ethical Permission: **Obtained**

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