

PROSPECTIVE STUDY OF THROMBOCYTOPENIA IN PREGNANCY AND ITS EFFECT ON MATERNAL AND FOETAL OUTCOME

Usha Suresh¹, P. Renuka², P. Vandana³

¹Professor & HOD, Department of Obstetrics and Gynaecology, MGMH, Osmania Medical College, Petlaburz, Hyderabad.

²Assistant Professor, Department of Obstetrics and Gynaecology, MGMH, Osmania Medical College, Petlaburz, Hyderabad.

³Senior Resident, Department of Obstetrics and Gynaecology, MGMH, Osmania Medical College, Petlaburz, Hyderabad.

ABSTRACT

BACKGROUND

Thrombocytopenia is the second most common haematological finding in pregnancy after anaemia. The aim of the study is to study the various aetiological factors associated with thrombocytopenia and its management in pregnancy.

MATERIALS AND METHODS

It is a prospective study carried out in 160 cases, which were identified to have moderate-to-severe thrombocytopenia during over a period of 2 years. History taken regarding preeclampsia, ITP, drug usage, viral infection, thrombocytopenia in previous pregnancy. General, systemic and obstetric examination were done.

RESULTS

The highest incidence of thrombocytopenia was found in the age group of 21-25 years, i.e. 83 cases (51.8%). Out of total 160 cases, 90 (56.25%) cases are multigravida while 61 (38.1%) are primigravida. Out of total 160 cases, 128 i.e. 80% are unbooked while 32 i.e. 20% are booked. Of 68 cases delivered by LSCS, spinal anaesthesia was given in 45 cases, i.e. 66.1% general anaesthesia in 22 cases (32.3%), epidural was given in 1 case (1.47%). Gestational thrombocytopenia has highest aetiology of 21.25%, i.e. 34 cases. Severe preeclampsia were 30 cases (18.75%). Dengue, SLE and chronic liver disease are least with incidence of 1.25%, i.e. 2 cases each. Partial HELLP are 25 cases (15.6%) and HELLP are 24 cases (15%). Severe preeclampsia with abruption 21 cases (13.1%). DIC are 9 (5.6%). Pancytopenia are 4 (2.5%). Platelet transfusions were required in 69 patients out of 160, i.e. in 43.1% of cases. All the cases of IUGR belonged to preeclampsia and associated disorders group. 26 out of 109 cases of preeclampsia were associated with IUGR. In preeclampsia and associated disorders group, 49 out of 109 cases were IUD, stillborn, nonviable. Chi-square test, p value is 0.0001, which is highly statistically significant, implying there is an association between IUD, stillborn and thrombocytopenia due to severe preeclampsia group when compared to other group including ITP, gestational thrombocytopenia and SLE, dengue, pancytopenia. Chi-square test p value is 0.0001, which is highly statistically significant, implying there is an association between IUD, stillborn and thrombocytopenia due to severe preeclampsia group when compared to other group including ITP, Gestational thrombocytopenia and SLE, Dengue, Pancytopenia.

CONCLUSION

Careful surveillance is required in these high-risk patients in order to ensure early detection and treatment of the complications so as to decrease the foetomaternal morbidities.

KEYWORDS

Severe Preeclampsia, Gestational Thrombocytopenia, Fetomaternal Morbidities.

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BACKGROUND

Platelets, also called thrombocytes, are a component of blood whose function is to stop bleeding by clumping and clotting blood vessel injuries.¹

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Corresponding Author:

Dr. M. Usha Suresh,

HOD, Department of Obstetrics and Gynaecology, Care Hospitals, Hyderabad.

E-mail: ushasuresh.mudragada@gmail.com

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Thrombocytopenia is the second most common haematological finding in pregnancy after anaemia. Thrombocytopenia defined as platelet count $<1,50,000/\mu\text{L}$ occurs in 6-15 percent of pregnant women and 75 percent of these cases stem from gestational thrombocytopenia. Its prevalence at the end of pregnancy is between 6.6% and 11.6%. It is classified as mild with a platelet count of $100-150 \times 10^9/\text{L}$, moderate at $50-100 \times 10^9/\text{L}$ and severe with less than $50 \times 10^9/\text{L}$.² In pregnancy, most cases are due to gestational thrombocytopenia, idiopathic thrombocytopenic purpura or preeclampsia. Other causes include such as malaria, folate deficiency, leukaemia and aplastic anaemia.

The time of onset of these disorders during pregnancy and their clinical manifestations often overlap making the

diagnosis of specific disorders difficult.^{2,3} Thrombocytopenia is the principal contributor to the occurrence of abdominal pain, liver dysfunction, the presence of schistocytes in peripheral smear, proteinuria, postpartum haemorrhage, requirement of blood transfusions.⁴ Thrombocytopenia is associated with high incidence of preterm deliveries, foetal distress and intrauterine growth restriction. During pregnancy, there is a general downward drift in platelet count particularly during the last trimester.¹ Pregnancy is associated with a physiological fall in the platelet count with a leftward shift in the platelet count distribution. The cause for the physiologic decrease in platelet count is multifactorial and is related to haemodilution, increased platelet consumption and increased platelet aggregation driven by increased levels of thromboxane A₂.⁴ Platelet count may also be lower in women with twins as compared with singleton pregnancies perhaps due to a greater increase in thrombin generation.⁵ Pregnancy is associated with numerous metabolic, immunologic and other homeostatic changes that require careful consideration when attempting to define the cause of thrombocytopenia in a particular individual. Most existing studies have addressed a specific aetiology of thrombocytopenia in pregnant women, but only a few have compared different aetiologies all using a platelet count of $150 \times 10^9/L$ as the reference value. Since, it is acceptable that the prognosis of mild thrombocytopenia (platelet count above $1,00,000/\mu L$ generally caused by GT) is good with no major complications, we decided to focus on moderate-to-severe thrombocytopenia. The present study was aimed at investigating obstetric risk factors, complications and outcomes of pregnancies complicated by moderate-to-severe thrombocytopenia.

MATERIALS AND METHODS

It is a prospective study carried out in MGMH, Petlaburz, over a period of 2 years from November 2013–October 2015 who were admitted in Department of Obstetrics and Gynaecology. 160 cases were identified to have moderate-to-severe thrombocytopenia over a period of 2 years and all were included in the study.

Inclusion Criteria

All pregnant women who gave the informed consent and detailed history. Pregnant women with moderate-to-severe thrombocytopenia, i.e. counts $<1,00,000/mm^3$.³ Patients from all trimesters of pregnancy were included.

Exclusion Criteria

Cases with mild thrombocytopenia with counts between 1 Lakh–1.5 Lakhs. Written informed consent was taken from all women recruited. Details will be entered in the proforma regarding the detailed history of period of gestation, high risk factors, past history, complications during present and past pregnancy like pregnancy-induced hypertension, diabetes mellitus, APLA, intrauterine death, abruptio placenta, hepatitis, history of petechiae, bruising, drug usage, viral infection, thrombocytopenia in previous pregnancy were taken.

General, systemic and obstetric examination were done. Bi-weekly platelet count was carried out in patients of GT, ITP. Daily platelet count was done in cases of preeclampsia, HELLP syndrome and dengue. In all cases, platelet count was carried out during labour and 48 hours after delivery. Investigations were done as haemoglobin, total white blood cell count, differential white blood cell count, platelet count, detection of malaria by several antigen detection (rapid diagnostic test or RDTs) and/or peripheral smear, urine for random sugar and urine for albumin. Blood pressure $>160/110$ mm of Hg with urine albumin $\geq +1$ for $>$ were defined as having severe preeclampsia. Other aetiologies were diagnosed by liver function test, coagulation profile, dengue IgG and IgM antibody titers in cases of fever. Antiphospholipid antibodies were tested after ruling out all other aetiologies. Women already diagnosed having immune causes of thrombocytopenia were also evaluated. Women with moderate thrombocytopenia without any other aetiology were classified as having gestational thrombocytopenia.

Maternal outcome regarding mode of delivery, complications occurring during delivery, postpartum period are observed. In all cases, foetal outcome was observed in form of maturity, birth weight and stillbirths. Newborn <2.5 kilograms were classified as low birth weight. Premature delivery was considered before 37 weeks of gestation, both spontaneous and iatrogenic and low birth weight less than 2500 g. Platelet counts of all newborns born to ITP mothers were observed in first 48 hours.

Blood specimen was withdrawn with minimal stasis from the antecubital vein using a dry sterile disposable syringe and needle. 3 mm of blood is dispensed into EDTA anticoagulant tubes. The specimens were labelled with subject's age, sex and identification number. The EDTA samples were kept at room temperature until processed within 4 hrs. of collection. Platelet count was performed using manual method and automated haematology method. All the quantitative variables like age, platelet count, etc. will be expressed in terms of descriptive statics like mean and standard deviation. All the qualitative variables will be expressed in terms of proportion. Chi-square test of significance will be used to study the association between thrombocytopenia of pregnancy and pregnancy complications and to compare the proportion of thrombocytopenia among pregnant women. For testing the equality of means among the groups, Student's 't' test is carried out for those characteristics of continuous nature. In all the cases, the p value is noted. If p value is <0.05 , it is concluded that the two groups are not homogenous and the difference is significant.

RESULTS

In this prospective study of over 2 years, all pregnant patients with thrombocytopenia with platelet count less than or equal to one lakh per mL were included. 160 cases of moderate and severe thrombocytopenia were studied.

Age in Years	No. of Mothers	%
18-20	21	13.12
21-25	83	51.8
26-30	45	28.1
31-35	10	6.25
>35	1	0.625
Total	160	100
Parity in Mothers		
Primi	61	38.1
G2, G3	90	56.25
>G4	9	5.625
Gestational Age		
<20 Weeks	2	1.25
21-28 Weeks	20	12.5
29-34 Weeks	38	23.75
35-42 Weeks	100	62.5
Booked or Unbooked Cases		
Booked	32	20
Unbooked	128	80
Mode of Delivery		
Vaginal	91	56.8
LSCS	68	42.5
Undelivered	1	0.625

Table 1. Demographic Details

Aetiology	No. of Mothers	%
Gestational Thrombocytopenia	34	21.25
Severe Preeclampsia	30	18.75
Partial HELLP	25	15.6
HELLP	24	15
Severe Preeclampsia with Abruption	21	13.1
DIC	9	5.6
ITP	7	4.37
Pancytopenia	4	2.5
Dengue Fever	2	1.25
SLE	2	1.25
Chronic Liver Disease	2	1.25

Table 2. Aetiology of Thrombocytopenia in Pregnancy

Gestational thrombocytopenia has highest aetiology of 21.25%, i.e. 34 cases. Severe preeclampsia were 30 cases (18.75%). Dengue, SLE and chronic liver disease are least with incidence of 1.25%, i.e. 2 cases each. Partial HELLP are 15.6%, i.e. 25 cases and HELLP are 15%, i.e. 24 cases. Severe preeclampsia with abruption 13.1%, i.e. 21 cases. DIC are 9, i.e. 5.6% pancytopenia are 4, i.e. 2.5%.

	Gestational Thrombocytopenia	Other than Gestational Thrombocytopenia	Total	P-Value
Preterm	6	81	87	P=0.0001
Term	28	45	73	
Total	34	126	160	

Table 3. Comparison of Preterm Deliveries in Study

Applying chi-square test p value is 0.0001. There is association between GT and preterm.

Treatment	No. of Patients	%
Only platelets	14	8.75
Blood+platelets	11	6.875
Blood+Platelets+FFP	33	20.625
Only blood	21	13.125
Blood+FFP	15	9.375
Platelets+FFP	11	6.875
Only FFP	2	1.25
No transfusion	53	33.125
Total	160	100

Table 4. Treatment Used in Different Types of Thrombocytopenia in Pregnancy

Alive	110	67.9
IUGR		
Yes	26	16
No	136	84

Table 5. Birth Weight of Newborn in Women with Thrombocytopenia

65 neonates (40.12%) out of 162 have a birth weight between 1.6-2.5 kg. 53 (32.71%) were between 2.6-3 kg. 23 (14.19%) were between 1.1-1.5 kg and 21 (12.96%) were <1 kg. Out of 162, 41 i.e. 25.3% were IUDs and stillborn, 11 (6.79%) were no viable (<28 weeks) 110 neonates (67.9%) were alive and healthy.

Birth Weight	No. of Newborn	%
<1 kg	21	12.96
1.1-1.5 kg	23	14.19
1.6-2.5 kg	65	40.12
2.6-3.5 kg	53	32.71
Total	162	100
Perinatal Mortality		
IUD, Stillborn	41	25.3
Nonviable	11	6.79

Morbidity	No. of Cases	%
PPH	18	12.4
Renal Failure	4	2.75
CVA	1	0.69
Hysterectomy	1	0.69
Vulval Haematoma	1	0.69
Bleeding from Surgical Site	4	2.75
Total	29	20

Table 6. Maternal Morbidity in Thrombocytopenic Mothers

Out of 160 cases, maternal morbidity was noted in 29 cases, i.e. 20% of cases. All the cases of acute renal failure, CVA, hysterectomy, vulval haematoma belonged to severe preeclampsia and associated disorders group, 7 patients died out of 160 cases. Mortality rate is 4.375%.

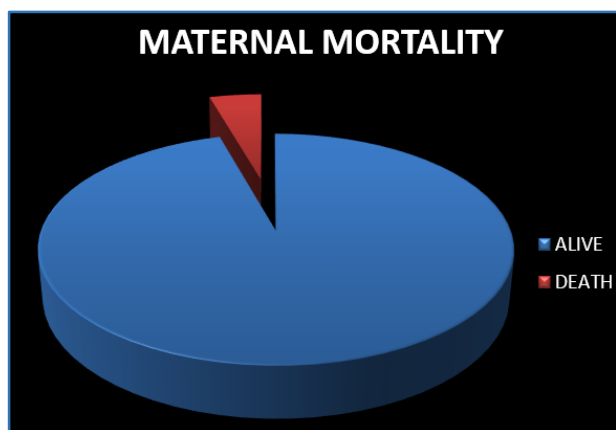


Figure 1. Maternal Mortality in Thrombocytopenic Mothers

7 patients died out of 160 cases. Mortality rate is 4.375%. 5 out of 7 cases had HELLP syndrome and DIC, 1 was a case of antepartum eclampsia.

DISCUSSION

160 cases of moderate and severe thrombocytopenia were studied. Course of pregnancy was followed up and the maternal, obstetric and foetal outcome was noted. Three large series involving together more than 26,000 women suggest that its prevalence at the end of pregnancy is between 6.6% to 11.6%. However, counts $<100 \times 10^9/L$, which is the definition for thrombocytopenia adopted by an International Working Group are observed in only 1% of pregnant women. Thrombocytopenia is a common problem during pregnancy, often under diagnosed and mismanaged. There are several causes of thrombocytopenia in pregnancy; however, in practice, a few are common. The present study was aimed at investigating obstetric risk factors and outcomes of pregnancies complicated by moderate-to-severe thrombocytopenia. Most cases of thrombocytopenia were caused by GT (21%), even though our reference platelet count was below $100 \times 10^9/L$. GT is known to be the most common cause of thrombocytopenia in pregnancy and although the platelet count of these women is usually above $110 \times 10^9/L$. There are several cases in healthy pregnant women with no history of ITP who have platelet counts as low as $70 \times 10^9/L$.

The rarer causes included DIC, delusional state (caused by blood transfusion), familial TTP, APLA syndrome and myeloproliferative disease. The major findings of our study were that thrombocytopenia points to a higher degree of severity of the primary disease (HELLP, severe preeclampsia, etc.), which is known to increase perinatal complications both maternal and neonatal. Such complications include placental abruption, preterm deliveries, low Apgar scores, IUGR and stillbirths. In the

present study, adverse perinatal and maternal outcome are associated with severe preeclampsia and associated HELLP syndrome and DIC. Gestational thrombocytopenia and ITP are associated with good maternal and foetal outcome comparable to normal pregnancies.

Age Distribution

According to this study, maximum number of patients were in age group 21-25 yrs., i.e. 51.8%. Mean gestational age according to this study is 24.725 years. Mean gestational age according to Dwivedi et al is 24.48 ± 3.62 . Maximum incidence of cases being in 20 to 27 years age group with mean age 27.57 ± 5.64 years according to Katke as opposed to a study by Parnas et al⁶ in 2006 in which the mean age was 30.7 ± 5.9 . According to study conducted by Singh Nisha, Dhakad Amita, Singh Uma K. Tripathi⁷ et al (prevalence and characterisation of thrombocytopenia in pregnancy in Indian women). There was no significant difference in the distribution of cases and controls according to age ($P=0.923$), religion ($P=0.947$) and parity ($P=0.068$).

Parity

In present study, thrombocytopenia in pregnancy is most common among multigravidas. 61.8% were multigravida (56.25% were G2, G3 and 5.625% were G4). 38% were primigravida. This is comparable to study by Katke RD et al (2014) of 103 pregnant women with moderate and severe thrombocytopenia. 35% cases were primigravidas, 65% were multigravida (32% cases were gravida 2, 33% cases were gravida 3 to 5). According to Dwivedi study of foetomaternal outcome in 47 cases of severe thrombocytopenia mean gravidity was 2.15 ± 0.99 .

Aetiology

In the present study, gestational thrombocytopenia has highest incidence of 21.25% followed by severe preeclampsia 18.75%, HELLP and partial HELLP 15% each, severe preeclampsia with abruption 13.1%, DIC 5.6% (9), ITP 4.37% (7), pancytopenia 2.5% (4), dengue fever, SLE, chronic liver disease 1.25% (2 cases) each. Katke RD et al (2014)⁸ studied 103 pregnant women with moderate and severe thrombocytopenia in which gestational thrombocytopenia was the most common aetiological factor with 30.1% cases followed by 27.2% for hypertensive disorders including HELLP syndrome followed by 18.4% for malaria followed by 12.6% for dengue. M. Parnas et al⁶ in a case control study comparing 199 pregnant women with moderate-to-severe thrombocytopenia (platelet count below $100 \times 10^9/L$) with 201 pregnant women without thrombocytopenia found that incidence of gestational thrombocytopenia to be 59.3%, ITP 11.05%, preeclampsia 10.05%, HELLP syndrome 12.06%, DIC 5.02%, familial TTP 0.5%, APLA syndrome 0.5%, delusional 1.0%, myeloproliferative disease 0.5%. Compared to the other studies incidence of preeclampsia is high as our hospital is a tertiary centre with high incidence of preeclampsia cases with added complication.

Gestational Age

In this study, maximum number of cases (85%) belonged to >29 weeks. This is in comparison to study conducted by Katke RD et al⁸ in 103 pregnant women with moderate and severe thrombocytopenia in which mean gestational age was 33±5.139 and maximum cases (74%) belonged to gestational age 30 to ≥40 weeks. According to a study by M. Parnas et al⁶ in 2006, a case-control study comparing 199 pregnant women with moderate-to-severe thrombocytopenia (platelet count below 100×10⁹/L) with 201 pregnant women without thrombocytopenia in which maximum patients 74.4% belonged to 37 to 40+ weeks gestation. P Dwivedi et al⁵ studied fetomaternal outcome in 47 cases of severe thrombocytopenia in which mean gestational age was 38 weeks. As highest number of cases were gestational thrombocytopenia with less incidence of preeclampsia, HELLP in study conducted by Parnas et al,⁶ the highest incidence of gestational age was >37 weeks of gestation (74.4%) as opposed to the present study.

Study	Details
Comparison of Age Distribution	Mean Age (years)
Present study	24.725
Dwivedi et al ⁵	24.48±3.62
Katke et al ⁸	27.57±5.64
M. Parnas et al ⁶	30.7±5.9
Incidence of Multigravida	Percentage
Present study	61.80%
Katke et al ⁸	65%
Dwivedi et al ⁵	2.15±0.99
Gestational Age	Mean Gestational Age in Weeks
Present study	36
Katke et al ⁸	33±5.139
Dwivedi et al ⁵	38
M. Parnas et al ⁶	37-40+
Incidence of C-Section	Percentage
Present Study	42.50%
Singh Nisha et al ⁷	36.26%
M. Parnas et al ⁶	36.20%
Katke RD et al ⁸	26.47%
Preterm Delivery	
Singh Nisha et al ⁷	31.80%
M. Parnas et al ⁶	25.60%
Present study	54.30%
Perinatal Mortality	
Present study (Stillbirth and IUD)	26.5
Katke et al ⁸ (Stillbirths)	14.1
Parnas et al ⁶ (Stillbirths)	6.5
Maternal Morbidity	
Present study	12.40%
Singh Nisha, Dhakad Amita	9.89%
Dwivedi et al	-

Maternal Mortality	
Present study	4.375
Katke et al ⁸	5.26

Table 7. Comparison of Details of Patient with Other Studies

Blood Products Transfusion

Blood or blood products transfusion was required in 107 patients out of 160, i.e. 66.8% platelet transfusions were required in 69 patients out of 160, i.e. in 43.1% of cases. Out of 34 cases of gestational thrombocytopenia, only 1 case required platelet transfusion, i.e. 2.94% of gestational thrombocytopenia. 57 cases out of 109 cases of preeclampsia, HELLP syndrome group, i.e. 52.2% of these patients required platelets transfusions. 6 out of 7 cases of ITP, i.e. 85.7% of these patients required platelet transfusions. In others group (10) including 4 cases of pancytopenia, 2 cases each of chronic liver disease, SLE, dengue, 5 cases, i.e. 50% required platelet transfusions. 3 cases of pancytopenia, 1 case of SLE, 1 case of chronic liver disease. Blood transfusion was required in 73 patients out of 160. Out of these 73, 71 cases were severe preeclampsia, HELLP syndrome, abruption and DIC. FFPs transfusion was given in 57 cases out of 160 cases, i.e. 35.6% cases.

53 cases (33.125%) did not require any form of blood or blood products transfusion. This is as opposed to study conducted by M. Parnas et al⁶ in 2006 comparing 199 pregnant women with moderate-to-severe thrombocytopenia (platelet count below 100×10⁹/L) with 201 pregnant women without thrombocytopenia in which even while dealing with moderate-to-severe thrombocytopenia, major bleeding requiring blood and platelet transfusion was rare and occurred in only six patients. These patients had either DIC or HELLP syndrome. This difference is due to higher incidence of HELLP syndrome and DIC in the present study compared to study conducted by Parnas in which HELLP and DIC accounted for only 17% of the cases and majority were gestational thrombocytopenia (59.3%).

Route of Delivery

In the present study, 56.8% cases, i.e. 91 delivered vaginally and 42.5%, i.e. 68 cases underwent emergency caesarean section. Caesarean section was done only for obstetric indication and not for thrombocytopenia in any case. 1 case was undelivered - A case of HELLP with DIC. 1 case underwent caesarean hysterectomy due to atonic PPH. Out of 91 cases delivered vaginally, 43 (26.8%) were full term and 46 (28.75%) were preterm and 2 cases had spontaneous abortion. Singh Nisha, Dhakad Amita et al in their study Prevalence and Characterisation of Thrombocytopenia in Pregnancy in Indian Women studied 95 cases of thrombocytopenia of which 61.54% had normal vaginal delivery, 36.26% had CS and 2.2% had instrumental delivery.

All the caesarean sections were performed for obstetric/medical causes and none for thrombocytopenia. In a case control study by M. Parnas et al⁶ comparing 199

pregnant women with moderate-to-severe thrombocytopenia (platelet count below $100 \times 10^9/L$) with 201 pregnant women without thrombocytopenia, 36.2% patients underwent a caesarean section, out of which 19 patients (70.37%) belonged to non-severe thrombocytopenia group and 8 patients (29.62%) belonged to the severe thrombocytopenia group. According to Katke RD et al⁸ (2014), the route of delivery of the 103 was full-term vaginal delivery with episiotomy in 24.27% cases, full-term vaginal delivery without episiotomy in 24.5% cases, LSCS in 24.27% cases, preterm vaginal delivery in 21.35% cases, 3.88% spontaneous abortions. One case required LSCS with obstetric hysterectomy and one case required LSCS with obstetric hysterectomy with internal iliac ligation. According to study conducted by Katke RD et al, 27 patients (26.47%) underwent a caesarean section due to obstetric indications. The rate of caesarean section in the present study is comparable to the above studies.⁸

Preterm Delivery

In the present study, out of 160 patients 87 (54.3%) had preterm delivery. 74 out of 109 cases of preeclampsia, HELLP syndrome group had preterm delivery, induced or spontaneous. 67.88% of all preterm deliveries belonged to preeclampsia and associated disorders group. 6 out of 34 cases of gestational thrombocytopenia (17.6%) had preterm delivery. 2 out of 7 cases of ITP had preterm delivery.

Singh Nisha, Dhakad Amita et al in their study prevalence and characterisation of thrombocytopenia in pregnancy in Indian women compared 95 cases of thrombocytopenia with controls. The preterm delivery rate (31.8%) among cases was higher than the controls. This was due to the associated obstetric and medical complications that indicate preterm delivery. According to M. Parnas et al, higher rates of preterm deliveries (<37 weeks) were observed among parturients with moderate-to-severe thrombocytopenia since the management of preeclampsia and HELLP syndrome includes early delivery of foetus. Labour induction could be a confounder for this association. All the caesarean sections were performed for obstetric/medical causes and none for thrombocytopenia. M. Onisai et al (2012) studied perinatal outcome for pregnancies complicated with thrombocytopenia in 104 cases. Among preeclamptic patients, 21 (75.00%) gave birth to premature newborns, 19 (67.86%) to underweight newborns and 2 (7.14%) had SGA offspring.

Perinatal Outcome

Neonatal complications is not directly related to maternal platelet count. The foetal complications occur in cases of preterm delivery, abruption, thrombocytopenia associated with anaemia, sepsis. Foetal platelet count was done in all the cases of ITP out of which two babies had thrombocytopenia. One of them was treated with immunoglobulins. None of the babies had bleeding complications.

Perinatal outcome was measured in terms of IUGR, IUD, stillbirths, birth weights. Out of 162 babies, 110 are alive and

healthy. 42 were IUD and stillborn. Most of them due to abruption and associated IUD.

IUGR

In the present study, incidence of IUGR is 16%. All the 26 cases of IUGR belong to severe preeclampsia and HELLP syndrome group including severe preeclampsia, HELLP, Partial HELLP, Abruption, DIC. No cases of IUGR were associated with ITP, gestational thrombocytopenia and dengue, pancytopenia, SLE. Applying chi-square test value p value is 0.0003, which is highly statistically significant, which implies that there is an association between IUGR and cases of thrombocytopenia belonging to severe preeclampsia group including severe preeclampsia, HELLP, Partial HELLP, Abruption, DIC. According to study by M. Parnas et al, incidence of IUGR was 8.5%. Adverse perinatal outcome was mostly associated with preeclampsia, HELLP syndrome and the group of rarer causes including DIC. In the present study, incidence of IUGR is high compared to Parnas as incidence of severe preeclampsia and HELLP syndrome cases is high in the present study when compared to M. Parnas et al. McCrae concluded that hypertensive disorders are associated with more severe cases of IUGR. Likewise, Aslan et al 2004 found a significant difference in the incidence of IUGR in pregnant women with HELLP syndrome compared with women without HELLP syndrome.

IUD and Stillborn

In the present study, 26.5% of the babies were IUD and stillborn. 11 were nonviable <28 weeks, which had spontaneous abortion or induced due to early onset severe preeclampsia. 110 neonates are alive and healthy. According to study by Katke RD et al (2014), 14 patients (14.1%) had stillbirths. Out of 14 cases, 13 were above 30 weeks (30-34 wks.: 5 and >35 weeks:8). Out of 14, 8 patients (57.14%) belonged to the severe thrombocytopenia group and 6 patients (42.85%) belonged to non-severe thrombocytopenia group. The association of stillbirths with severe thrombocytopenia was statistically significant (chi-square $p=0.0134$). According to the study conducted by M. Parnas et al. in 2006 comparing 199 pregnant women with moderate-to-severe thrombocytopenia (platelet count below $100 \times 10^9/L$) with 201 pregnant women without thrombocytopenia 6.5% cases had stillbirths. Present study has higher incidence of 26.5% as IUDs were also included in association with stillbirth. In the present study, severe degree of abruption with IUD was high and incidence of IUGR was high (16%) and preterm births were also high (54.3%) contributing to the higher stillborn and IUD rate of 26.5% out of 52 cases of IUD, stillborn and nonviable fetuses. 49 belonged to severe preeclampsia and associated HELLP syndrome and DIC. Only one case belonged to gestational thrombocytopenia and 2 cases belonged to others.

Foetal Weight

In the present study, 73% of the neonates were >1.6 kg (40% between 1.6-2 kg and 32.7% between 2.6-3.5 kg).

M. Onisai et al (2012) studied perinatal outcome for pregnancies complicated with thrombocytopenia in 104 cases. 24.48% cases had birth weight less than 2.5 kg.

Maternal Morbidity

Thrombocytopenia itself causes complications and thrombocytopenia is a complication of other disorders. Maternal morbidity in the present study was measured in terms of PPH, renal failure, CVA, hysterectomy, bleeding from surgical site, vulval haematoma. In the present study, PPH was seen in 12.4% of the cases, i.e. 18 cases. This is comparable to incidence of PPH (9.89%) according to Singh Nisha, Dhakad Amita et al 2011 study of 95 cases of thrombocytopenia in which PPH was seen in 30% of medical, 15% of obstetric and only 4.92% of gestational thrombocytopenia. Incidence was significantly higher in medical thrombocytopenia ($P=0.008$). In the present study, renal failure and bleeding from surgical site was seen in 4 cases, i.e. 2.75%. Vulval haematoma, CVA, Hysterectomy was seen in 1 case each, i.e. 0.69%. Caesarean hysterectomy was done in a case of severe preeclampsia with abruption in view of atonic PPH. This is opposed to study of foetomaternal outcome in 47 cases of severe thrombocytopenia of Dwivedi et al 2012 in which severe thrombocytopenia was not associated with any maternal complication except for incision site oozing.

Maternal Mortality

In the present study, maternal mortality was found in 7 cases, i.e. 4.375%, 153 patients, i.e. 95.6% were alive. Out of 7 cases, 4 cases were HELLP with DIC, 1 case was HELLP with heart disease, 1 was DIC due to transfusion reaction, 1 was a case of antepartum eclampsia. Gestational thrombocytopenia showed nil mortality. This is comparable to study conducted by Singh Nisha et al. According to Singh Nisha, Dhakad Amita et al in their study, three cases of obstetric and two of medical thrombocytopenia died during the study giving a mortality rate of 5.26%. Significantly, higher mortality ($P=0.009$) was seen in these cases as compared to GT that showed nil mortality. The mean platelet count for maternal complications is 59,571/mm³, standard deviation is 26,165.92. Z is 0.8172 and p value is 0.4150, which means it is not significant. So, according to this study, thrombocytopenia is not directly related to maternal outcome, there are also other factors, which influence maternal outcome like anaemia, preeclampsia, sepsis, etc. Thrombocytopenia is an additional factor and not independent factor. In study by Katke RD et al⁸ (2014), the number of mortalities seen were 8 (7.76% of cases). 5 cases belonged to the severe thrombocytopenia group. The association of mortality with severe thrombocytopenia was statistically significant. The cause for mortality in these 6 cases were one each due to acute respiratory distress syndrome, haemothorax with liver failure, intracranial bleed, cardiorespiratory arrest, hypotension, pulmonary embolism, kidney failure, multiorgan failure, stroke.

CONCLUSION

Very high risks were found in association with moderate and severe thrombocytopenia.

Gestational thrombocytopenia and ITP are associated with good maternal and foetal outcome. Careful surveillance is required in these high-risk patients in order to ensure early detection and treatment of the complications; so, as to decrease the foetomaternal morbidities.

Facts to be remembered in Platelet Transfusion during Thrombocytopenia

Spontaneous bleeding is rare unless the platelet counts are <10,000/cu mm. Women with no bleeding manifestations and platelet counts of <30,000/cu mm do not require any treatment until delivery is imminent. Bleeding associated with surgery is uncommon unless platelet count <50,000/cu mm SDP is more potent than RDP. One SDP=6-8RDP'S. SDP can be transfused to any person irrespective of blood group. SDP increases platelet count by 30-40 thousands. RDP increases platelet count by 5-6 thousand. The number of platelets per unit varies according to the platelet count of the donor; a yield of 7×10^{10} platelets is typical. Since, this number is inadequate to raise the platelet count in an adult recipient, four to six units are pooled to allow transfusion of 3 to 4×10^{11} platelets per transfusion.

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