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Study of Thrombocytopenia in Pregnancy and its Correlation with Maternal and Fetal Outcome

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Abstract | **Original Research Article**

Background: Thrombocytopenia is the most common hematological condition occurring during pregnancy and affects 7– 8 % of all pregnant women. Pre-eclampsia, the commonest of hypertensive disorders of pregnancy presents with thrombocytopenia and adds significantly to the maternal morbidity and mortality rates. Thus making platelet count estimation an important investigation to be done in pregnant women. ***Aim and objectives:*** To study the relationship between thrombocytopenia in pregnancy associated with various causes and its effects on fetal and maternal outcomes. ***Material and Methods:*** Two years prospective study, carried out in Pathology Department of a tertiary care hospital from June 2016 to May 2018. Material for the present study comprised of 275 cases blood samples obtained from thrombocytopenic pregnant women in third trimester. Platelet count was estimated on 5 Part Automated Hematology Analyzer Sysmex XT- 1800i and was counter checked by preparing a peripheral smear. ***Result:*** The most common cause of thrombocytopenia was gestational thrombocytopenia, 178/275 (64.73%) patients followed by pre-eclampsia and eclampsia -66 cases (24%) and HELLP syndrome 19 cases (6.92%). Maternal mortality was 3/275(1.09%). Out of 4 cases of DIC, 3/4(75%) had severe thrombocytopenia. Two cases of DIC died before delivery and other 2/4 cases had intrauterine fetal deaths. 40/275 thrombocytopenic mothers (14.54%) had intra uterine fetal deaths out of which 16 cases (40%) had severe thrombocytopenia in mother. Out of 235 babies born in this study, one early neonatal death was reported. ***Conclusion:*** Serial estimation of platelet count can help to assess the severity of disease causing maternal thrombocytopenia and can reduce both the maternal and fetal complications if detected and treated early in the course of the illness.

Keywords: Thrombocytopenia, Pregnancy, Fetal Outcome, haematological.

INTRODUCTION

Thrombocytopenia is the most common hematological condition occurring during pregnancy and affects 7– 8 % of all pregnant women [1]. Thrombocytopenia in pregnancy is attributed to third trimester hemodilution, decreased platelet survival time and increased levels of both plasma beta thromboglobulin and platelet factor 4 levels causing increased platelet activation. Hence, there is an increased turnover of platelets during the progression of normal pregnancy [2, 3].

The most common cause for thrombocytopenia in pregnancy is gestational thrombocytopenia followed by pregnancy induced hypertension. Pre-eclampsia, the commonest of hypertensive disorders of pregnancy affects 2 – 10% of all pregnancies and adds significantly to the maternal morbidity and mortality rates [4].

Platelet count is an important investigation done in pregnant women as estimation of platelet count is simple, reliable, rapid, and cheap. An accurate diagnosis and risk assessment in the antenatal period are essential for developing specific plans for any antenatal interventions and for management of delivery, postpartum period and the neonate.

MATERIAL AND METHOD

The present study was a 2 year prospective study which was carried out in the Haematology section of Pathology Department in Krishna Institute of Medical Sciences, Karad from June 2016 to May 2018.

Inclusion criteria

Blood samples of all the third trimester pregnant women from Obstetrics and Gynaecology Department of our hospital with platelet count less than 150000 /mm^3 were included in the study.

Exclusion criteria

Pregnant women with known history of- Diabetes mellitus, collagen vascular disorders**,** tuberculosis**,** epilepsy**,** previous bad obstetric history and patients on anti-platelet therapy were excluded from the study.

METHOD

Two ml of blood was collected in EDTA anticoagulant vacutainer and platelet count was estimated on 5 Part Automated Hematology Analyzer Sysmex XT- 1800i in our Pathology Department. Platelet count was counter checked by preparing a peripheral smear stained with Leishman stain to be viewed under a microscope.

All these cases were followed till delivery and a thorough work up was done to ascertain the cause of thrombocytopenia and to correlate with the maternal and fetal outcome

Statistical analysis- All the data were analysed using commercially available statistical software (SPSS 19.0 IBM Corp; Armonk, NY). Categorical variables were evaluated using Pearson chi-squared test or Fisher exact test as appropriate.

RESULTS

Total of 275 thrombocytopenic third trimester pregnant women were included in this study. The incidence of maternal thrombocytopenia in this study was 6.5 %.

Maximum number of cases i.e. 221/275 cases (80.36%) in this study were between 37 to 40 weeks of gestation and 52/275 cases (18.91 %) were less than 36 weeks of gestation at the time of delivery.

Out of 275 thrombocytopenic cases, 68.73% (189 cases) had mild thrombocytopenia, 24.36% (67 cases) had moderate thrombocytopenia and 6.91 % (19 cases) had severe thrombocytopenia (Table1).

In this study, gestational thrombocytopenia was the most common cause of maternal thrombocytopenia (64.73%) i.e. 178/275 cases followed by pre-eclampsia and eclampsia (24 %) i.e. 66/275 cases. (Table 2)

In this study, the commonest etiological factor causing maternal thrombocytopenia was gestational thrombocytopenia i.e.178/275 cases (64.73%) and majority of them, 164/178 cases (92.13%) reported with mild thrombocytopenia.

Thirty five cases of pre-eclampsia and eclampsia i.e. 35/66 cases (53.03%) and 12 cases of HELLP syndrome i.e. 12/19 cases (63.16%) were associated with moderate thrombocytopenia.

Seven cases of HELLP syndrome i.e. 7/19 cases (36.84%) and 3/ 4 cases (75%) of DIC were associated with severe thrombocytopenia (Fig 1). There was only one case of ITP in the present study which presented with severe thrombocytopenia (Fig 2).

Table-1: Distribution of patients into mild, moderate and severe thrombocytopenia

Degree of thrombocytopenia	Number of cases	Percentage of cases
Mild thrombocytopenia (1 lakh to 1.5 lakh /mm^3)	189	68.73%
Moderate thrombocytopenia (50,000 to 1 lakh/mm^3)	67	24.36%
Severe thrombocytopenia (<50,000/mm^3)	19	6.91%
Total	275	100%

Table-2: Distribution of cases of thrombocytopenia in pregnancy according to etiology

Causes of maternal thrombocytopenia	No. of patients (n=275)	Percentage of cases
Gestational thrombocytopenia	178	64.73%
Pre-eclampsia and Eclampsia	66	24%
HELLP syndrome	19	6.92%
DIC	4	1.45%
Dengue fever	4	1.45%
Megaloblastic anaemia	2	0.73%
ITP	1	0.36%
Acute fatty liver of pregnancy	1	0.36%
Total	275	100%

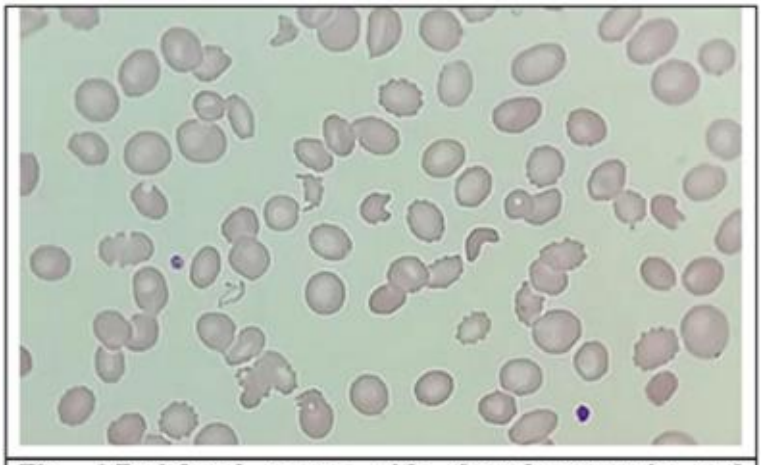


Fig. 1-Peripheral smear with thrombocytopenia and microangiopathic haemolytic anaemia showing schistocytes in HELLP syndrome. (Leishman stain; 1000 X)

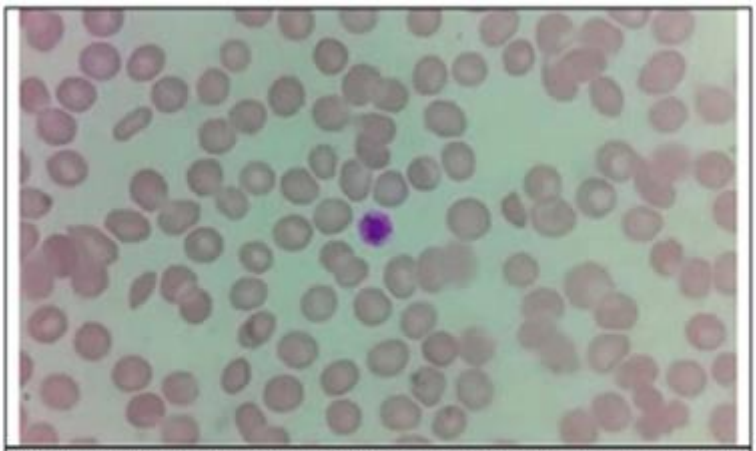
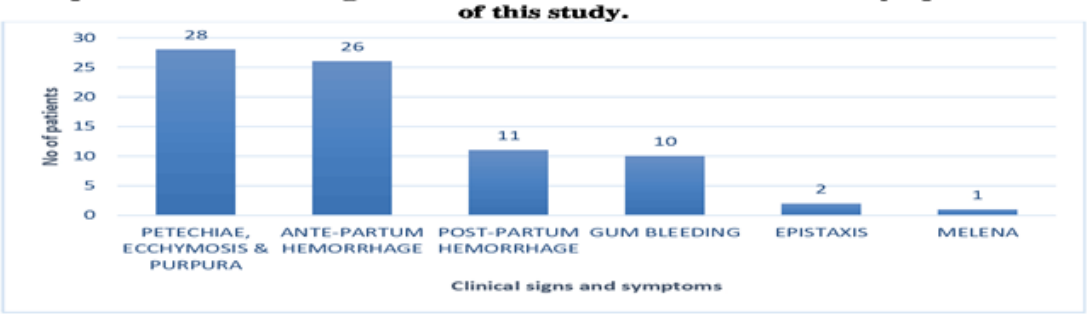


Fig.2- Peripheral smear showing mbocytopenia and a giant platelet in ITP. (Leishman stain; 1000 X)

Graph No. 1: Hemorrhagic manifestations observed in thrombocytopenic cases of this study.



MATERNAL COMPLICATIONS

Out of 275 cases with thrombocytopenia, 78 cases (28.36 %) had hemorrhagic manifestations and remaining 197/275 cases (71.64%) had no hemorrhagic manifestations (Graph No.1).

Maternal Mortality

Total of 3/275 cases (1.09%) of maternal deaths were reported in this study.

- Total of 4 cases of DIC were reported in this study, 2/4 cases died before delivery and other 2/4 cases had intrauterine fetal deaths.
- One case of 32 years died due to acute fatty liver of pregnancy. She had moderate thrombocytopenia, persistent nausea and

vomiting, epigastric pain and deranged liver function tests.

- All 3 cases died before going to labour at 30 to 32 weeks of gestation and had intra-uterine fetal deaths.

FETAL OUTCOME

- Out of 275 cases, 40 intra- uterine fetal deaths (14.54%) were reported in this study**.**
- Thus, 235 babies were live born in this study, out of which one early neonatal death was reported, born to an eclamptic mother and died due to respiratory distress on the first day of life.
- Out of 235 babies, 28 new-borns (11.91%) were admitted to NICU for various complications like birth asphyxia, respiratory distress, jaundice etc.

Correlation of gestational maturity with degree of maternal thrombocytopenia- Out of 52 pre-term deliveries, 36 neonates (69.23%) had moderate thrombocytopenia in mother and 11/52 neonates (21.15%) had severe thrombocytopenia in mother and only 5/52 neonates (9.62%) had mild thrombocytopenia in the mother. Thus with Chi square test, p value = 0.0001. Result was statistically significant ($p<0.05$). Hence, preterm deliveries were associated with moderate to severe maternal thrombocytopenia in this study.

Correlation of fetal maturity with the etiology of maternal thrombocytopenia-Out of 178 cases of gestational thrombocytopenia, 175 cases (98.31%) had term deliveries and only 1/178 case (0.57%) had preterm delivery. Gestational thrombocytopenia in the mother was associated with term deliveries and did not affect the fetal maturity.

Among 13 cases of eclampsia, 9 cases (69.23%) delivered preterm. Among 19 cases of HELLP syndrome, 15 cases (78.95%) gave birth to premature babies. Thus with Fisher Exact test, (p value = 0.0001). Result was statistically significant ($p<0.05$). Thus in this study, cases of thrombocytopenia caused due to eclampsia and HELLP syndrome were associated with prematurity in the new-born baby.

Intra-uterine deaths- In this study, out of 275 cases, 40 thrombocytopenic mothers (14.54%) had intra uterine fetal deaths.

- The most common cause of IUD in this study was pre-eclampsia -23/40 cases (57.50%), followed by eclampsia-7/40 cases (17.50%), followed by HELLP syndrome 5/40 cases (12.50%).
- DIC was reported in 4 cases, out of which all 4/4 cases (100%) had intra-uterine fetal deaths.
- Among 40 intra-uterine fetal deaths, 16 cases (40%) had severe thrombocytopenia in mother and 24/40 cases (60%) had moderate maternal thrombocytopenia and no case of intra uterine fetal death was reported in mothers having mild thrombocytopenia. Thus, with chi square test, p value = 0.0367. The result was statistically significant ($p <0.05$). Hence, IUD was correlated with severity of the degree of maternal thrombocytopenia.

DISCUSSION

The incidence of maternal thrombocytopenia in this study was 6.5 % which was similar to studies of Singh *et al.* [5] i.e. 8.8% and Chauhan *et al*. [6] i.e. 8.4%.

In this study, 68.73 % of cases had mild thrombocytopenia, moderate thrombocytopenia was observed in 24.36% of cases, severe thrombocytopenia was seen in 6.91% of cases which was comparable to Singh *et al*.[5], Chauhan *et al*. [6].

In the present study, gestational thrombocytopenia was the most common cause of maternal thrombocytopenia comprising of 178 cases (64.73%) followed by pre- eclampsia and eclampsia 24 % and HELLP syndrome 6.92%. This was in concordance to studies conducted by Somani *et al*. [7], chauhan *et al*. [6] and Vishwekar *et al*. [8].

Out of 178 cases of gestational thrombocytopenia, 164 cases i.e. (92.13%) showed mild thrombocytopenia. Pre-eclampsia, eclampsia, HELLP syndrome and DIC were associated with moderate to severe thrombocytopenia. ITP was associated with severe thrombocytopenia in the present study. These findings were in concordance with Burrows *et al*. [9], Singh *et al*. [5] and Chauhan *et al*. [6], Cook *et al*. [10] and Wang *et al.* [11].

In the present study only 3 maternal deaths (1.09%) were reported. Somani *et al*. [7] reported no maternal deaths in her study. However, higher maternal deaths were observed by Brohi *et al.* [12] i.e. 28.1%.

Two cases of DIC and one case of acute fatty liver of pregnancy died in this study at 30-32 weeks of gestation. These findings were also reported by Parnas *et al*. [13] and Mc Crae *et al*. [14].

Out of 235 neonates in this study, one early neonatal death was reported. This neonate was preterm, born to an eclamptic mother and died of respiratory distress on the first day of life. These findings were also reported by Khuman V *et al*. [15].

In this study, 52/272 cases (19.12%) cases were associated with pre-term delivery which was in

concordance with studies conducted by Brohi *et al*. [12].

In this study, 40/275 thrombocytopenic mothers (14.54%) had intra uterine fetal deaths. Among 19 cases with severe maternal thrombocytopenia, 16/19 cases (84.21%) reported to have intra-uterine deaths of foetuses. These findings were in concordance to studies conducted by Katke *et al*. [16] and Somani *et al*. [17].

Higher incidence of IUD was seen in cases of pre-eclampsia i.e. 23/40 (57.50%), eclampsia 7/40 cases (17.50%) and in HELLP syndrome 5/40 cases (12.50%). In cases of DIC all 4/4 cases (100%) had intra- uterine fetal deaths. Similar findings were reported by Brohi *et al*. [12].

CONCLUSIONS

The results from this study of thrombocytopenia in pregnancy show that the etiology of thrombocytopenia in pregnancy is varied. The commonest cause of maternal thrombocytopenia was gestational thrombocytopenia. It manifests in the third trimester comprising almost three fourths of all cases and it poses no complication during delivery and no risk either to the mother or to the fetus.

Second most common cause of maternal thrombocytopenia was due to disorders secondary to pregnancy induced hypertension or HELLP syndrome which was associated with maternal morbidity and life threatening maternal complications like post- partum haemorrhage. It was also associated with fetal morbidities and mortality like prematurity, intra-uterine fetal deaths and early neonatal death.

From this study it can be concluded that the outcome of thrombocytopenia in pregnancy depends upon the cause and the degree or severity of thrombocytopenia. Thus, serial estimation of platelet count and peripheral blood smear examination can help to assess the severity of disease causing maternal thrombocytopenia and can reduce both the maternal and fetal complications if detected and treated early in the course of the illness.

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