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# Comparative study of perinatal outcome in pregnant patients with thrombocytopenia and those with normal platelet count

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**Abstract**
**Background:** *Thrombocytopenia is the second commonest hematological disorder in pregnancy and may result from diverse etiologies.*
**Aim and Objectives:** *The study aims to investigate the risk factors, complications and perinatal outcome of pregnancies complicated by thrombocytopenia.*
**Materials and Methods:** *A comparative cross sectional study was conducted in Department of obstetrics and Gynaecology, Govt. Medical College, Trivandrum for a period of one year.*
**Study Population:** *Include all pregnant women with thrombocytopenia delivering in Department of obstetrics and Gynaecology, Govt. Medical College, Trivandrum, during one year period and comparing them with equal number of antenatal women without thrombocytopenia.*
**Results:** *In the present study gestational thrombocytopenia was the commonest cause of thrombocytopenia (40%) followed by severe pre eclampsia and HELLP syndrome.44% delivered preterm due to complicating factors like HELLP, APLA syndrome and abruptio placenta and IUGR. Cesarean rates were higher among cases. Still birth rates (18% v/s 0.6%) and NND (4.8% v/s 0.6%) were high in the study group. Neonatal thrombocytopenia was found in 7 cases (p = 0.007) in thrombocytopenia group.*
**Conclusion:** *Gestational thrombocytopenia and ITP had a favorable outcome in the present study. The rare and serious types of thrombocytopenoa like thrombotic thrombocytopenic purpura, APLA syndrome were associated with placental abruption, low APGAR scores and still birth.Careful surveillance help in early detection of complications and timely intervention results in reduced maternal and perinatal mortality.*
**Keywords:** *Thrombocytopenia, HELLP, Perinatal outcome.*

## Introduction

Thrombocytopenia in pregnancy result from diverse etiologies. Some cases of thrombocytopenia are unique to pregnancy and have the potential to result in feto maternal complications

Normal pregnancy is associated with a physiological fall in platelet counts probably due to dilution, reduced platelet production, or increased platelet turnover[1]. In some women platelet count fall to thrombocytopenic range[2]. Thrombocytopenia is defined as platelet count less

than l50,000/ µL'1 and counts from I00,000 to 150,000/ µL are considered mildly de-pressed, 50,000 to I 00,000/ µL moderately depressed, and less than 50,000/µL are severely depressed.

The overall incidence of thrombocytopenia in pregnancy is 8%, but when patients with obstetric or medical disorders are included the incidence drops to 5.1%[4]. 75% cases are due to gestational thrombocytopenia. Thrombocytopenia manifest in 30% women with eclampsia of the patient with several pre eclampsia 4-12% manifest as HELLP syndrome[5]. Thrombocytopenia can have benign to life threatening course in pregnancy[6]. ITP is a common cause for thrombocytopenia at less than 20 weeks of gestation. Anti plateletantibodies can cross the placenta and 12 -15% of infants develop severe thrombocytopenia. Thrombotic thrombocytopenic purpura is a rare life threatening disorder characterized by thrombocytopenia, microangiopathic hemolytic anemia, renal failure, neurologic dysfunction and fetal loss[8].

Thrombocytopenia of SLE may respond to steroids and immune suppressants. A multi disciplinary approach helps to optimize maternal and fetal outcome[9]. Drug induced thrombocytopenia, viral infections like HIV, HCV and sepsis are other rare causes of thrombocytopenia in pregnancy.

Platelet associated IgG antibodies can cross the placenta and cause thrombocytopenia in fetus and neonate. Severe thrombocytopenia in neonate is associated with risk of intracranial hemorrhage. Neonatal thrombocytopenia can manifest as petechiae, echymoses or intracranial bleed. Severe hemorrhage caused by neonatal thrombocytopenia is rare and not associated with mode of delivery[10]. But invasive fetal procedures and instrumental deliveries are preferably avoided to prevent neonatal complications.

Careful analysis of time of onset of thrombocytopenia, associated clinical and laboratory parameters help in determining proper diagnosis and provide appropriate maternal and fetal care.

**Aims and Objective**

The study aims to investigate the risk factors for thrombocytopenia in pregnancy which can vary from benign conditions like gestational thrombocytopenia to severe pre eclampsia or HELLP syndrome. The study further aims to identify perinatal outcome of pregnancies complicated by thrombocytopenia.

**Materials and Methods**

This is a comparative cross-sectional study conducted in Department Of Obstetrics And Gynaecology, Government Medical College, Trivandrum. Causes include pregnant women with thrombocytopenia delivered in one year. Controls include pregnant women with normal platelet counts .

**Sample Size:** was calculated by the formula

$$\underline{n = 2\,pq\,(z \propto + zB)2}$$
$$P_1 - P_0$$

$$P = \underline{P_0}$$
$$2$$
$$q=1-p$$

The study population were identified by hemotology laboratory report of our hospital. The clinical details were verified by reviewing case records. Risk factors for thrombocytopenia and any comorbidities were noted. They were followed up for pregnancy or labour complications, mode of deliveries, PPH or wound hematomas.

The perinatal factors studied were gestational age, APGAR score, IUFD, Still birth and neonatal death (NND).

**Statistical Analysis**

Statistical analysis were done by chi square test, odds ratio and logistic regression.

**Results**

167 thrombocytopenia cases were identified in one year study and these cases were compared with 167 controls. They were analysed for risk

factors for thrombocytopenia and maternal and perinatal outcome were studied.

**I. Gestational age of diagnosis of thrombocytopenia**

ITP and SLE cases had thrombocytopenia presenting in the first and second trimester. Abruption which was an important caused of acute onset of thrombocytopenia occurred more towards the third trimester.

| Gestational age of thrombocytopenia | Case | |
|---|---|---|
| | N | % |
| 1st trimester | 24 | 14.4 |
| 2nd trimester | 16 | 9.6 |
| 3rd trimester | 127 | 76 |
| Total | 167 | 100 |

**II. Referred cases**

59.9% of patients among the cases were referred to our hospital while only 18.6% of the control group were referred. This is because our hospital is a tertiary level referral centre catering to high risk cases who were referred to us for multidisciplinary care, ICU management, newborn nursery care and blood bank facilities.

| Referred | Case | | Control | | Total | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Yes | 100 | 59.9 | 31 | 18.6 | 131 | 39.2 |
| No | 67 | 40.1 | 36 | 81.4 | 203 | 60.8 |
| Total | 167 | 100 | 67 | 100 | 334 | 100 |

$\chi^2$ - 59.797

df-1

p-0.000

**III. Degree of thrombocytopenia**

| Case | N | % |
|---|---|---|
| Mild | 92 | 55.1 |
| Moderate | 55 | 32.9 |
| Severe | 20 | 12 |
| Total | 167 | 100 |

55.1% were mild cases of thrombocytopenia as the majority were constituted by gestational thrombocytopenia which usually causes mild to moderate thrombocytopenia only. The severe forms were constituted by ITP, SLE and DIC especially following cases of grade 3 abruption.

**IV. Abruption as a cause of thrombocytopenia**

| Abruption | Case | | Control | | Total | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Grade I | 3 | 1.8 | 0 | 0 | 3 | 0.9 |
| Grade II | 15 | 9 | 2 | 1.2 | 17 | 5.1 |
| Grade III | 20 | 12 | 0 | 0 | 20 | 6 |
| No abruption | 129 | 77.2 | 165 | 98.8 | 294 | 88 |
| Total | 167 | 100 | 167 | 100 | 334 | 100 |

$\chi^2$ - 37.35

p-0.000

Being a tertiary care referral centre with blood bank facilities, newborn nursery care and provision for emergency caesarean section round the clock, many cases of abruptio placentae were referred to us. There were 20 cases of grade III abruption, majority of which required blood transfusion and ICU management for correction of hypotension, coagulation failure and renal compromise.

**V. Maternal Outcome**

| Mode of Delivery | Case | | Control | | Total | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Vaginal | 74 | 44.3 | 121 | 72.5 | 195 | 58.4 |
| Caesarean | 91 | 54.5 | 42 | 25.1 | 133 | 39.8 |
| Instrumental | 2 | 1.2 | 4 | 2.4 | 6 | 1.8 |
| Total | 167 | 100 | 167 | 100 | 334 | 100 |

$\chi^2$ - 30.048

df-2

p<0.001

There were a greater number of caesarean sections in the thrombocytopenia group 54.5% vs 25.1% in the control group. This was mainly because there were a greater number of previous caesarean section cases in the study group. This might have been due to the increased number of failed induction cases done for pre-eclampsia remote from term and also in HELLP syndrome and abruption which demands termination of pregnancy without delay. Placental insufficiency may lead to higher chance of fetal distress also. But gestational thrombocytopenia as such did not add to the increase in caesarean rate among the cases.

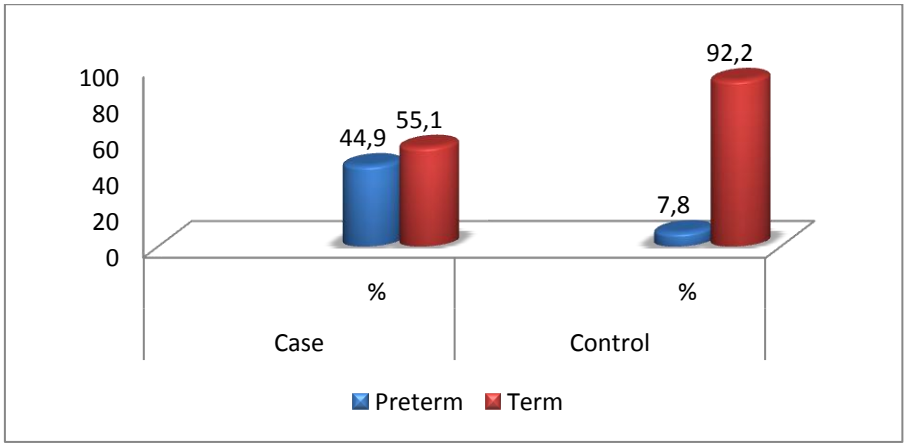
**VI. Perinatal outcome in thrombocytopenia**

| | Case | | Control | | Total | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Preterm | 75 | 44.9 | 13 | 7.8 | 88 | 26.3 |
| Term | 92 | 55.1 | 154 | 92.2 | 246 | 73.7 |
| Total | 167 | 100 | 167 | 100 | 334 | 100 |

$\chi^2$ – 59.308

df-1

p=0.000




There were greater number of preterm babies in the thrombocytopenia group 44.9% as against 7.8% in the control group. This is mainly attributed to the preterm deliveries due to early termination of pregnancies complicated by pre-eclampsia, HELLP, IUGR, abruption etc for maternal and fetal sake.

**VII. Perinatal Complications**

| | | Case | | Control | | Total | | $\chi^2$ | df | p |
|---|---|---|---|---|---|---|---|---|---|---|
| | | N | % | N | % | N | % | | | |
| MSAF | Yes | 9 | 5.4 | 9 | 5.4 | 18 | 5.4 | 0.000 | 1 | 1.000 |
| | No | 158 | 94.6 | 158 | 94.6 | 316 | 94.6 | | | |
| | Total | 167 | 100 | 167 | 100 | 334 | 100 | | | |
| stillbirth | Yes | 29 | 17.4 | 1 | 0.6 | 30 | 9 | - | - | - |
| | Twin | 1 | 0.6 | 0 | 0 | 1 | 0.3 | | | |
| | No | 137 | 82 | 166 | 99.4 | 303 | 90.7 | | | |
| | Total | 167 | 100 | 167 | 100 | 334 | 100 | | | |
| NND | Yes | 7 | 4.2 | 1 | 0.6 | 8 | 2.4 | - | - | - |
| | Twin | 1 | 0.6 | 0 | 0 | 1 | 0.3 | | | |
| | No | 159 | 95.2 | 166 | 99.4 | 325 | 97.3 | | | |
| | Total | 167 | 100 | 167 | 100 | 334 | 100 | | | |
| Thrombocytopenia in newborn | Yes | 7 | 4.2 | 0 | 0 | 7 | 2.1 | 7.193 | 1 | 0.007 |
| | No | 159 | 95.8 | 167 | 100 | 326 | 97.9 | | | |
| | Total | 166 | 100 | 167 | 100 | 333 | 100 | | | |
| DIC | Yes | 2 | 1.2 | 0 | 0 | 2 | 0.6 | 2.012 | 1 | 0.156 |
| | No | 165 | 98.8 | 167 | 100 | 332 | 99.4 | | | |
| | Total | 167 | 100 | 167 | 100 | 334 | 100 | | | |
| Blood transfusion | Yes | 1 | 0.6 | 0 | 0 | 1 | 0.3 | 1.003 | 1 | 0.317 |
| | No | 166 | 99.4 | 167 | 100 | 333 | 99.7 | | | |
| | Total | 167 | 100 | 167 | 100 | 334 | 100 | | | |

Though there were more cases of placental insufficiency among the cases, the incidence of MSAF was similar in both the cases and control. The increase in NND was partly due to the preterm induction of delivery in severe forms of pre-eclampsia and HELLP syndrome for maternal sake. However, no significant difference was noted in the incidence of DIC and blood transfusion in neonates between both groups. There were 7 cases of thrombocytopenia in newborns as against none in the control group (p=0.007).

**Apgar scores of newborns**

| Apgar scores of newborns | | Case | | Control | |
|---|---|---|---|---|---|
| | | N | % | N | % |
| At 1’ | Depressed | 13 | 7.8 | 4 | 2.4 |
| | Not Depressed | 123 | 73.7 | 163 | 97.6 |
| | Absent | 31 | 18.6 | 0 | 0 |
| At 5’ | Depressed | 10 | 7.2 | 1 | 0.6 |
| | Not Depressed | 126 | 74.2 | 166 | 99.4 |
| | Absent | 31 | 18.6 | 0 | 0 |

Low Apgar scores among newborns of thrombocytopenic mothers was due to prematurity, birth asphyxia and FGR due to placental insufficiency with poor fetal oxygen reserve. The increased rate of stillbirth - 31 cases (18.6%) in our study was because we had included DIC due to abruption.

**Discussion**

The present study was aimed at investigating the obstetric risk factors and perinatal outcome of pregnancies complicated by thrombocytopenia.

Out of the 200 cases of thrombocytopenia gestational thrombocytopenia was the most common cause (40%) identified. Around 10.8% were complicated by pre eclampsia and 17.5%

were HELLP, syndrome cases. Many patients had co existing conditions like SLE, ITP and pre eclampsia. Gestational thrombocytopenia was the commonest cause for thrombocytopenia in pregnancy (44%) followed by severe pre eclampsia, HELLP (22%) in studies by Vyas R et al. In a retrospective study by Mamtha S etal gestational thrombocytopenia was found in 40% with a benign course. [12]

Retrospective studies by Parna S et al showed gestational thrombocytopenia as the commonest causes in 59%. Adverse perinatal outcomes in thrombocytopenia group were found more in cases of TTP, antiphospholipid syndrome and not in gestational thrombocytopenia group[13].

Regarding gestational age at delivery 44% delivered before 36 weeks compared to 7.8% among controls. This was because of early termination in pre eclampsia and HELLP cases and due to factors like fetal growth restriction. Premature birth rates were 11.3% and 16.7% in gestational thrombocytopenia and ITP groups respectively with higher rates (53.8%) in aplastic anemia. Congenital passive ITP was found in 2% of gestational thrombocytopenia and 13% of ITP groups ($p< 0.05\%$)[14].

IUGR was more among cases (54.5%) v/s (25%) in control group. Cesarean section rates were higher in cases due to associated factors like fetal distress, FGR, pre eclampsia and HELLP syndrome. Perinatal complications like still birth (7.1%), IUGR (17.8%), MSAF (12.5%) and birth asphyxia (13.2%) was noted in study group. [11].

In the present study still birth rates of (17.4% v/s 0.6%) and NND (4.8% v/s 0.6%) were contributed mainly by abruption grade III and extreme prematurity. The perinatal outcomes did not differ in gestational thrombocytopenia group. Studies by Sahlo et al found no association between maternal and fetal platelet counts in thrombocytopenia cases [15]. Prospective studies of 37 consecutive cases observed that 2 new born had mild thrombocytopenia and one had severe thrombocytopenia. All the babies had normal platelet counts by 10 days [16].

The still birth rates were 14.1% and NNDS 8.7% in studies by Ratke et al [17].

Fetal distress and decreased APGAR scores were noted in pre eclampsia and HELLP group due to associated placental insufficiency and premature deliveries. There were 7 cases of neonatal thrombocytopenia in the study group and none in the control group ($p = 0.007$). Congenital passive ITP was found in 13% of ITP patients ($P<0.05$) with Evans syndrome of neonate detected in 3%[14]

**Conclusions**

Gestational thrombocytopenia and ITP had favorable perinatal outcome in the present study. Pre eclampsia and HELLP syndrome are associated with adverse perinatal outcome primarily due to placental insufficiency, IUGR, MSAF and prematurity.

The management of severe thrombocytopenia cases were done in collaboration with the hematology department. Careful supervision is needed for early detection and treatment of complication to reduce maternal and perinatal morbidity.

**Ethical Consideration**

The study was reviewed and approved by the institutional ethics committee.

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