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A Study of Thrombocytopenia in Pregnancy-Clinical Characteristics and Outcome in a Tertiary Care Centre

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Abstract

Thrombocytopenia is the second most common haematological finding in pregnancy next to anaemia. Platelet count below 1.5 lakh/cu mm. It carries a risk for both the mother and the fetus, associated with substantial maternal or neonatal morbidity and mortality. However, a specific therapy, if instituted promptly, improves the outcome for affected patients and their offspring. In patients in India, thrombocytopenia during pregnancy is an under explored condition. After taking consent from patients detailed history of period of gestation, high risk factors, past history, complications-during present and past pregnancy. History of petechiae, bruising, drug usage, viral infection, thrombocytopenia in previous pregnancy will be taken. General, systemic and obstetric examination will be done. All women platelet count estimation at the time of enrollment. Platelet count assessment will be done through automated blood count analyzer with routine antenatal hematological evaluation of the patient. In this study, there were 53.3% cases of mild thrombocytopenia, 33.4% of moderate thrombocytopenia and13.3%with severe thrombocytopenia. Gestational thrombocytopenia is the most common etiology .60 % of cases delivered at term, those delivered before term were mostly due to abruption or pregnancy was terminated for obstetric indications like severe preeclampsia, antepartum eclampsia, abruption or medical causes. Mode of delivery is not influenced. GT is the most common cause of thrombocytopenia during pregnancy (70%).

Keywords: Thrombocytopenia, pregnancy, outcome.

INTRODUCTION

Thrombocytopenia (TCP) is a common condition that occurs in pregnancy. It is the second most common haematological finding in pregnancy next to anaemia. In pregnancy, physiological and pathological changes occur in platelet number and their functions, which can be of clinical concern. Inherited qualitative and quantitative platelet disorders may also manifest during pregnancy with the risk of bleeding.[1]

TCP affects 7–10% of all pregnancies.1 Most studies report a reduction in platelet count approximately 10% lower than pre-pregnant values. The normal range of platelets in non- pregnant patients is 150–400×109 /L. TCP is defined as a drop in platelet count below150×109 /L. It may result from a variety of causes, from a spectrum of benign conditions such as gestational TCP, to life-threatening syndromes such as haemolysis, elevated liver enzymes, and low platelet (HELLP) syndrome.

Gestational TCP is the most common aetiology, which accounts for almost three-quarters of all cases. TCP complicating hypertensive disorders of pregnancy are responsible for approximately 20%of all cases of TCP during pregnancy. Gestational or incidental TCP, the most common cause of TCP during pregnancy, accounts for 75% of pregnancy-associated TCPs. The incidence of immune thrombocytopenia (ITP) is one case of TCP per 1,000 pregnancies, and it accounts for 5% of cases of pregnancy-associated TCP.[2]

Pre-eclampsia is present in 21% of cases of maternal TCP.[3] TCP is very risky for the mother and the fetus, and it is associated with maternal or neonatal morbidity, as well as mortality. If a specific therapy is applied, it will improve the outcome for affected patients and their offspring [4].

Demand for folic acid rises to 300-400 ng/day in normal pregnancy, and dietary deficiency may cause

thrombocytopenia, particularly where demand is increased by multiple pregnancy, or by an underlying hemolytic state.[5]

Causes of thrombocytopenia in pregnancy

1. **Reduced production:** Congenital Precursor deficiency Marrow failure Malignancy

2. **Increased consumption**
   - Idiopathic (auto-immune) thrombocytopenia (M, F) Pre-eclampsia/eclampsia (M)
   - Thrombotic thrombocytopenic purpura(M) Disseminated intravascular coagulopathy (M) Drugs including heparin (M)
   - Alloimmune thrombocytopenia F (M)

M = disease process causes thrombocytopenia in mother; F = disease process causes thrombocytopenia in fetus.

Platelet count of1,00,000–149,999 /mm3 was classified as mildTCP; 50,000– 100,000 /mm3 as moderate TCP; and <50,000 /mm3 as severe TCP.

Laboratory Evaluation of Platelet Number & Function

In patients suspected of a disorder of haemostasis, defects in platelet number or function, impaired coagulation or abnormalities in vascular function should be considered.

Platelet count:

This screening test is performed routinely as a part of the complete blood count using automated particle counters. A typical reference range is 1, 50,000-4, 00,000/ mc 3.

Bleeding time:

The length of time a small skin wound continues to bleed depends largely on the number and function of platelets. The bleeding time cannot predict bleeding, blood loss or transfusion requirements.

Coagulation mechanism:

There are three simple rapid in vitro tests of the integrity of the coagulation cascade.

1. Activated partial thromboplastin time (APTT) - intrinsic system.
2. Prothrombin time (PT) - extrinsic system.
3. Thrombin time (TT) - final common pathway

Table 1: Showing etiology of thrombocytopenia (6)

Pregnancy-specific	Not pregnancy-specific
Gestational thrombocytopenia	Primary immune thrombocytopenia
Preeclampsia/Eclampsia	Secondary immune thrombocytopenia
HELLP syndrome	Viral infection (HIV, Hep C, C MV, EBV, ot hers)
Acute fatty liver	Autoimmune disorders (SLE, others)
	Antiphospholipid antibodies
	Thrombotic microangiopathies
	*Thrombotic thrombocytopenic purpura**
	*Hemolytic-uremic syndrome**
	Disseminated intravascular coagulation (DIC)
	Bone marrow (MDS, myelofibrosis)
	Nutritional deficiencies
	Drugs
	*Type IIB vWD induced thrombocytopenia**
	Inherited thrombocytopenia (May-Hegglin, etc)
	Hypersplenism

Study Population:

All pregnant women who were admitted at the department of obstetrics and gynaecology, RIMS, ADILABAD were included for the study, after taking informed consent from patients and approval from ethics committee.

Sample Setting:

Rajiv Gandhi Institute of Medical sciences, ADILABAD. Sample collection: Department of obstetrics and gynaecology.

Sample Size: 75

Period of Study: 1 year

Sampling Method:

After taking consent from patients detailed history of period of gestation, high risk factors, past history, complications during present and past pregnancy. History of petechiae, bruising, drug usage, viral infection, thrombocytopenia in previous pregnancy was taken. General, systemic and obstetric examination was done.

All women platelet count estimation at the time of enrolment. Platelet count assessment was done through automated blood count analyser with routine antenatal haematological evaluation of the patient.

METHODOLOGY

Patient-related data such as menstrual and obstetric history, presenting complaints, obstetric examination, and basic investigations was collected in a pre-designed, pre- tested pro forma. The detailed work up of all cases of thrombocytopenia was done to ascertain the cause of thrombocytopenia. All women were subjected to blood test for Hb, TLC, DLC, bleeding time, clotting time, RFT, LFT, HBsAg & HIV.

Women with fever were tested for Dengue IgM. Coagulation tests (PT, APTT, FDP and fibrinogen) was done in those with signs or symptoms of DIC. Women with normal platelet count before 28 weeks had a repeated platelet count in third trimester to detect gestational thrombocytopenia. All the thrombocytopenia cases were followed up throughout the antenatal period till delivery to record any complications that developed due to low platelet counts. Women with HIV status and on drugs causing thrombocytopenia were excluded from the study. All cases were followed until delivery to record any maternal complications, or any other morbidities. Maternal outcome regarding mode of delivery, complications occurring during delivery, postpartum period were observed.

Fetal outcome regarding birth weight, NICU admission, early neonatal outcome was noted and were followed up for any complications.

Statistical Analysis

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.

The tests used for statistical calculations were as follows:

1. Chi-Square Test for use in the analysis of the difference between two proportions.
2. T-test to test the significance of the difference between two proportions or percentages.

For the parameters age, BMI, gestational age, hospital stay and haemoglobin an average value was obtained and a calculation of standard deviation was done. A p value less than 0.05 was considered to be statistically significant.

DISCUSSION

1. Demographic characteristics:

52 cases fall in age group of 20 to 25 years, most common among age group is 20 to 25 years. 32cases are primigravida, 26cases 2nd gravida and 17cases are 3rd gravida.

During pregnancy, haemodilution caused by the relative increase in plasma volume, coupled with increased platelet turnover, leads to the development of so-called gestational or incidental TCP, which accounts for three-quarters of cases of TCP detected during pregnancy. [7]

2. Severity of Thrombocytopenia:

According to the study
<50,000mm3 = 10 cases(severe)
50,000mm3 to 1,00,000mm3 = 25 cases(moderate)
1,00,000mm3 to 1,50,000mm3 = 40 cases(mild)

There were 53.3% cases of mild thrombocytopenia, 33.4% of moderate thrombocytopenia and 13.3% with severe thrombocytopenia.

This is comparable with Olayemi *et al*.'s [8] study in Ghana, where 65% had mild TCP Boehlen *et al.,* [9] also reported that gestational TCP is usually mild.

1. Etiology of Thrombocytopenia:

In the study gestational thrombocytopenia is the most common etiology which included 68% of cases, next is hypertensive disorders which included 21.3% of cases.

Cause	No. of Cases	%
1. Gestational	51	68
2. Obstetric	16	21
(a) Hypertensive disorders	15	20
Preeclampsia	13	17
Eclampsia	2	2.7
(b) DIC	1	1.3
3. Medical	8	10

(a) Hypersplenism	1	1.3
(b) Hepatic diseases	3	4%
(c) Malarial	1	1.3
(d) Megaloblastic anemia	2	2.7
(e) ITP	1	1.3

A study conducted by Parnas *et al.,* [10] found that the main causes of TCP were gestational TCP (59.30%), immune thrombocytopenia purpura (11.05%), pre-eclampsia (10.05%), and HELLP syndrome (12.06%).

In study conducted by Anita *et al.,* [11] gestational TCP included 64%, with hypertensive disorders making up 21%, and other disorders 13%. Ajzenberg *et al.,* [12]

2. Mode of Delivery and Gestational Age at Delivery:

According to study 16 cases delivered between 28 to 32 weeks 15 cases delivered between 32 to 36 weeks and 44 cases delivered at term.

60 % of cases delivered at term, those delivered before term were mostly due to abruption or pregnancy was terminated for obstetric indications like severe preeclampsia, ante partum eclampsia, abruption or medical causes.

Mode of delivery is not influenced by platelet count.60 % cases delivered by LSCS and 40% by SPVD. LSCS was done for obstetric and medical conditions like previous LSCS, fetal distress, failed induction etc.,

In a study at Safdarjung Hospital, New Delhi, India, it has been found that around 94.00% patients delivered vaginally and, among these, nine patients had instrumental delivery.[13]

3. Thrombocytopenia And Maternal Outcome:

PPH is the most common complication. Other complications include DIC, multiple organ failure, maternal death etc.

According to this study 14 cases had complications which included PPH, Liver failure, CCF, psychosis, renal failure, sepsis, DIC, 2 maternal deaths. Maternal deaths were 2 which come up to 5.33%. The mean platelet count for maternal complications is 1, 02,482mm3, standard deviation 28,754. Z is 1.13 and p value is >0.05 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 the maternal outcome like anaemia, preeclampsia, sepsis etc. Thrombocytopenia is an additional factor and not independent factor.

Activation of the coagulation and fibrinolytic systems cause the development of life-threatening TCP and disseminated intravascular coagulation, which occurs in some patients having symptoms of pre-eclampsia, and plays a role in stimulating platelet activation and accelerated clearance.[14]

Thrombocytopenia and Fetal Outcome:

Neonatal complications are not directly related to maternal platelet count. The fetal complications occur in cases of preterm delivery, abruption, thrombocytopenia associated with anaemia, sepsis. None of the babies had bleeding complications. In this study fetal deaths were 15, NICU admissions were 21.

CONCLUSION

Gestational thrombocytopenia is the most common cause of thrombocytopenia during pregnancy other underlying causes must be consider. A thorough history and physical examination will rule out other causes. By CBC and smear we can rule out pancytopenia and platelet clumping associated with pseudo thrombocytopenia.

If no antecedent history of thrombocytopenia is present and platelet counts are above 70,000/mcL, the condition is more likely to be gestational thrombocytopenia. If platelet counts fall below 50,000/mcL or if a prior history of thrombocytopenia is present, the condition is more likely to be ITP.

Correct etiological diagnosis, and promptly administered adequate therapy are therefore essential to significantly improve the outcomes of pregnant patients and their offspring; special attention should be given to patients with severe TCP due to pre-eclampsia and HELLP syndrome for timely therapeutical intervention.

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