Scholars Journal of Applied Medical Sciences (SJAMS) **ISSN 2320-6691 (Online)**
Sch. J. App. Med. Sci., 2017; 5(4C):1450-1455 **ISSN 2347-954X (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublishers.com DOI: 10.36347/sjams.2017.v05i04.045

Original Research Article

Clinico-hematological finding of thrombocytopenia in pregnancy

Saniya Sharma, Arjun Singh, Shrikant Nema, Randeep Kaur Bal, Harmeet Singh Chowdhary
Department of Pathology, Index Medical College and Research Center, Indore, Madhya Pradesh, India

***Corresponding author**
Dr Saniya Sharma
Email: saniyasharma55@gmail.com

Abstract: The aim of present study was to find out the prevalence of thrombocytopenia in pregnant women of central India and to see their clinic-hematological findings. A total of 800 pregnant women were screened for thrombocytopenia. Complete blood count was done in all the women to see the hematological findings. Maternal and fetal outcome was recorded in specialized predesigned proforma. Prevalence of thrombocytopenia was 11.4%. Highest incidence (46.8%) of thrombocytopenia was observed in 2nd trimester. Incidence of thrombocytopenia was maximum in nulliparous group (66%). Anemia was more profound in thrombocytopenic patients with a mean hemoglobin 9.88±1.67 gm/dl. The MCV, MCH and PDW values were same in case and control group. The MCHC value was more in cases with the mean value of 32.2± 2.55g/dL. The mean platelet volume were more in thrombocytopenic patients with a mean value of 9.3± 0.94 fl. Gestational age was observed more in 37-40 weeks duration (43.6%). Women with thrombocytopenia were more likely to deliver preterm (<37 weeks) compared with women without thrombocytopenia. Pregnant women should be screened for thrombocytopenia at each trimester.
Keywords: Pregnancy, Thrombocytopenia, Hematology

INTRODUCTION:

Thrombocytopenia in pregnancy deserves special consideration because of the possible consequences on the fetus. Thrombocytopenia is the second most common hematological finding in pregnancy after anemia. It affects 7-10% of all pregnant women [1]. Thrombocytopenia is defined as a drop in platelet count below 150,000/µl. 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 hemodilution, increased platelet consumption, and increased platelet aggregation driven by increased levels of thromboxane A2 [2].

Thrombocytopenia has been more commonly diagnosed in pregnant women in the last 20 years. It usually results in bleeding into mucus membranes presenting as petechiae, ecchymoses, epistaxis, gingival bleeding etc. However, bruising, hematuria, gastrointestinal bleeding and rarely intracranial hemorrhage can also occur[3]. Thrombocytopenia in pregnant women may result from the effects of several diverse processes, which may be either physiological or pathological. The majority of thrombocytopenic pregnant women is healthy, has no history of thrombocytopenia, and is incidentally diagnosed by blood testing. This condition, called incidental or gestational thrombocytopenia (GT), usually has no influence on pregnancy, labor & delivery or on the newborn [2].

Gestational thrombocytopenia occurs in approximately 8% of all pregnancies and accounts for more than 70% of cases with thrombocytopenia in pregnancy. Although the pathophysiology of gestational thrombocytopenia is unknown, it is thought to be related to increased activation and peripheral consumption [4]. Platelet count is typically greater than 70,000/µL, with about two-thirds being 130,000 - 150,000/µl [3]. There is usually no past history of thrombocytopenia. Gestational thrombocytopenia can recur; the risk of recurrence, however, is unknown.

There are various studies on perinatal and maternal outcome of thrombocytopenia in pregnancy however none on them have seen any correlation of other hematological parameters with the outcome of pregnancy with Thrombocytopenias. The aim of the

study is to find out the prevalence of thrombocytopenia developed during pregnancy and to study haematological parameters like hemogram, total leucocyte count, RBC count, peripheral smear, reticulocyte count, in cases of thrombocytopenia and correlate them with outcome of pregnancy.

MATERIAL AND METHOD:

The study was carried out on pregnant women at tertiary care center attending Outpatient department of Obstetrics and Gynecology in Index Medical College Hospital and Research Center, Indore, Madhya Pradesh, India. A total of 800 pregnant women were recruited for the study. Pregnant women with bleeding disorders, splenomegaly, hypertension, Systemic lupus erythematosus, and malaria were excluded from the study: Women on drugs such as aspirin, Warfarin, Clopidrogrel were also excluded from study. The study was approved by the ethical Review Committees of Index Medical College Hospital and Research Center, Indore.

Thrombocytopenia was defined as a platelet count of less than 150,000/µL [5, 6]. Counts from 100,000 to 150,000/µL are considered mildly depressed, 50,000 to 100,000/µL are moderately depressed and less than 50,000/µL are severely depressed. Clinical Data was collected in predesigned proforma which include parity, gestational age, birth weight etc.

Sample Collection:

A blood sample (3 mL) was withdrawn from each participant from the antecubital vein using a dry, sterile disposable syringe and needle. The blood was dispensed into tubes containing the anticoagulant ethylene diamine tetra acetic acid (EDTA). The specimens were labeled with the subject's identification number. The EDTA samples were kept at room temperature until processing, which occurred within 4 hours of collection.

Laboratory analysis

Complete blood count was done with fully automated 5 part differential hematology analyzer TRANSASIA Model-XS-800i, able to test 18 parameters per sample including Hb concentration, PCV, RBC,TLC, MCH, MCV, MCHC, MPV ,PDW ,and PLT count. Standardization, calibration of the instrument, and processing of the samples were done according to the manufacturer's instructions.

Statistical Analysis

Data were tabulated and analyzed using Graph Pad (Demo Version). The quantitative data were presented herein as means ± standard deviation (SD). Pearson's Chi-square test and one-way analysis of variance (ANOVA) were used for analytic assessment and the differences were considered statistically significant when the *P* value obtained <0.05.

RESULTS:

Out of 800 pregnant women recruited for the study 94 (11.7%) develop thrombocytopenia during pregnancy. Thus incidence of thrombocytopenia in this study was 11.4%. Out of 94 cases, 67 were having mild thrombocytopenia (Platelet count 100000 to 150000 /µl), 25 were moderate thrombocytopenia (Platelet count 50000 to 1000000/µl). Only 2 patients lies in sever category of thrombocytopenia (Platelet count < 50000/µl). For further analysis thrombocytopenic pregnant women were labeled as case and other pregnant women with normal platelet count were labeled as controls.

The mean age of case was 24.01±4.43 years and that of control was 25.26±5.01 years. The difference in age in both the groups was statistically significant (P = 0.021). Majority of the patients were in their first trimester (312 of 800; 39.0%) at the time of study, followed by second trimester patients (310 of 800; 38.8%), and third trimester patients (178 of 800; 22.2%). Highest incidence of thrombocytopenia had been observed in second trimester in studied group (Table 1).

A statistically significant relationship could not be established between the incidence of thrombocytopenia and various trimesters of pregnancy (p = 0.220). Table 2 shows hematological parameters in cases and control. The mean total leucocyte cell count (TLC) was 9398±2585/µl in case and 9210±2408/µl in controls. There was no statistical significant difference in TLC counts in both the groups (P =0.493). Red Blood cell count in cases and controls was 4.17±0.59 $x10^6$/µl and 4.27±0.57 $x10^6$/µl respectively. No significant difference in red blood cell count was observed in both the groups (p=0.134). Anemia (HGB<12.0g/dl) was more profound in cases with a mean hemoglobin of 9.88±1.67 g/dl as compared to controls in which mean hemoglobin was 11.68±1.78 g/dl. We observed that mean hemoglobin was significantly lower in cases as compared to controls (P<0.0001). Mean hematocrit levels were 32.4±5.13 and 33.28±4.03 in cases and controls respectively. It was statistically not significant (P=0.079). Mean corpuscular volume was also observed similar in both

the groups (p = 0.065) with mean values of 78.59±9.51 fl and 76.84±8.47 fl in cases and controls respectively. Mean platelet volume levels were 9.3±0.94fl and 10.41±0.86fl in cases and controls respectively. It was statistically significant with p value <0.001. Platelet distribution width was 12.0±1.26 and 11.94±1.24 in cases and controls respectively. It was statistically similar in both the groups (P=0.661).

Table 3 shows Mean platelet volume (MPV) and Platelet distribution width (PDW) according to trimester. The mean MPV in first and third trimester is 10.31, followed by second trimester (10.23). Platelet distribution width in first, second and third trimester is 12.04, 11.90, 11.86 respectively. There was significant higher frequency of sever thrombocytopenia in third trimester as compared to first and second trimester (Table 4). As shown in Table 5 mean platelet count also decreased across the trimester in both cases. Table 6 shows gestational age in cases and control .The maximum cases were found in 37-40 weeks duration followed by >40 weeks and <37 weeks. As compared to control maximum cases were found in duration of <37 weeks (p<0.0001). Birth weights of new born were compared in cases and control. In cases, 2.4% are underweight, followed by 37% have range of 1.5-2.5 kg and maximum are (55%) found of >2.5kg. Controls are found same as cases. (p=0.192)

Table 1:

Trimester	**Case Group**		**Control Group**		**Total**	
	No.	**%**	**No.**	**%**	**No.**	**%**
First	33	35.1	279	39.5	312	39.0
Second	44	46.8	266	37.7	310	38.8
Third	17	18.1	161	22.8	178	22.2
Total	94	100.0	706	100.00	800	100.0

Table 2: Hematological parameters in studied groups

	CASE	**CONTROL**	**P VALUE**
TLC	9398±2585	9210±2408	0.493
RBC	4.17±0.59	4.27±0.57	0.134
HGB	9.88±1.67	11.68±1.78	**<0.0001**
HCT	32.4±5.13	33.28±4.03	0.079
MCV	78.59±9.51	76.84±8.47	0.065
MCH	25.25±4.12	26.24±3.99	0.026
MCHC	32.21±2.55	33.55±2.43	**<0.0001**
MPV	9.3±0.94	10.41±0.86	**<0.0001**
PDW	12.0±1.26	11.94±1.24	0.661
PALTELET	0.97± 0.17	2.65± 0.62	**<0.0001**

Table 3: Comparison of Mean platelet count and platelet distribution width between the groups

Trimester	MPV	PDW
First trimester	10.31±0.89	12.04±1.23
Second trimester	10.23±0.96	11.90±1.22
Third trimester	10.31±0.99	11.86±1.29
Total	10.28±0.94	11.95±1.24

Table 4: Severity of thrombocytopenia according to trimester

Trimester	Severity			Total
	Mild	Moderate	Severe	
First trimester	30(90.9%)	3(9.1%)	0(0.0%)	33
Second trimester	30(68.2%)	14(31.8%)	0(0.0%)	44
Third trimester	7(41.2%)	8(47.1%)	2(11.8%)	17
Total	67(71.3%)	25(26.6%)	2(2.1%)	94

Table 5: Platelet count according to trimester

Diagnosis		N	Mean	Std. Deviation	Minimum	Maximum	P value
Case	first trimester	33	1.01	0.08	0.81	1.29	0.004
	Second trimester	44	1.00	0.19	0.60	1.47	
	third trimester	17	0.85	0.21	0.45	1.13	
	Total	94	0.98	0.18	0.45	1.47	
Control	first trimester	279	2.66	0.64	1.59	5.11	0.872
	Second trimester	266	2.66	0.65	1.59	5.50	
	third trimester	161	2.63	0.58	1.74	4.32	
	Total	706	2.65	0.63	1.59	5.50	

Table 6: Gestational age and Birth weight of the child born in cases and control

	Cases	Control	P value
Gestational Age			
<37 weeks	26(27.6)	71.3(10.1)	<0.0001
37-40 weeks	41(43.6)	339(48.0)	
>40 weeks	27(28.7)	290(41.0)	
Birth weight(In kg)			
<1.5	2(2.4)	15(2.1)	0.192
1.5-2.5	37(39.2)	213(30.2)	
>2.5	55(58.4)	478(67.7)	

DISCUSSION:

The present study was aimed to identifying the incidence of thrombocytopenia in pregnancy and to analyse haematological parameter in hemogram like total leucocyte count, RBC count, peripheral smear, in cases of thrombocytopenia and correlate them with outcome of pregnancy. In the present study, incidence of thrombocytopenia during pregnancy was 11.4%. Nisha *et al.;* [3] screened 1079 antenatal women belonging from Lucknow, Uttar Pradesh for thrombocytopenia and reported the prevalence of thrombocytopenia as 8.8%. In a study done by Burrows *et al.;* [6] in Canada, thrombocytopenia occurred in 513 (7.6%) of 6715 consecutive deliveries over a 3-year interval. Sainio *et al.;* [7] conducted a 1-year population-based surveillance study involving 4,382 full term women. A total of 317 (7.3%) women had platelet counts of less than 150 x 10^9/l. Thus, the prevalence of thrombocytopenia in Indian population is similar to world literature (5–12%) [3, 6, 7].

The present study shows influence of age on prevalence of thrombocytopenia in pregnancy. The mean age of patients in present study was 24.01±4.43 years and that of control was 25.26±5.01 years. In contrast to present study Parnas *et al.;* [8] found significantly higher maternal age in cases as compared to controls. The plausible reason for this

contraindication was that they had done the retrospective study and only included moderate to severe thrombocytopenia cases. We have included the mild thrombocytopenia cases also in present study, which is more common in younger women as compared to elder pregnant women. However Nisha *et al.;* [3] and Mathews *et al.;* [9] failed to find any association of age with occurrence of thrombocytopenia in pregnancy.

Most of the cases in present study were having mild thrombocytopenia. This agrees with the findings of Ajibola *et al.;* [10] and Boehlen *et al.;* [11] who reported gestational thrombocytopenia was usually mild. The most common (42.5%) cause of thrombocytopenia in present study is gestational thrombocytopenia. The other causes included DIC, preclamsia, eclampsia and APH. The prevalence of causes for thrombocytopenia in present study is similar to study by Parans *et al.; [8]*. Similar to Ajibola *et al.;* [10] and Oleyemi *et al.;* [12] thrombocytopenia was occurred across the trimesters in present study. This was against the report of Crowther *et al.;* [13] who reported that gestational thrombocytopenia in pregnancy is a disorder that develops primarily in the late second or third trimester.

Similar to our study, Pranas *et al.;* [8] did not observed any significant association of previous gestation and delivery with the occurrence of thrombocytopenia. In present study we did not observed any significant difference in total leukocyte count, red blood cell count, mean corpuscular volume and platelet distribution width. Hemoglobin, mean cell hemoglobin and mean corpuscular hemoglobin concentration was found significantly low in cases as compared to controls which suggest the main cause of thrombocytopenia in pregnancy is hemodilution. Mean platelet volume was also found low in cases as compared to controls. Present study shows the significant increase in severity as the pregnancy advances. This is also comparable with the study of Ajibola *et al.;* [10] and Akingbola *et al.;* [14] Due to haemodilution secondary to expansion of plasma volume, platelet count in normal pregnancies may decrease by approximately 10%, most of this decrease occurs during the third trimester, though the absolute platelet count remains within normal reference range in patients [5, 15, 16]. The trimester specific platelet count in controls obtained in this study is similar to Amah-Tariah *et al.;* [17] reported in Port Harcourt, Nigeria in 2011 and slightly higher than Onwunkeme *et al.;* [18] reported in Jos Nigeria in 1990 and Akingbola *et al.;* [14] reported in Ibadan Nigeria in 2006. Women with thrombocytopenia were more likely to deliver preterm (<37 weeks) compared with women without thrombocytopenia. Pranas *et al.;* [8] also reported the same. Grzyb *et al.;* [19] in a retrospective study reported that premature labor (<37 week of pregnancy) were observed more often in patients with severe, than in moderate thrombocytopenia ($p < 0.05$).

Similar to study done by Parnas *et al.;* [8] we did not observed any significant association of neonatal birth weight and gestational thrombocytopenia. The baseline low platelet counts and declining trend with increasing gestational age predispose Indian women to increased risk of thrombocytopenia in pregnancy. Thus, platelet count estimation should be a routine at first antenatal visit for timely diagnosis and to achieve favorable fetomaternal outcome in all types of thrombocytopenia during pregnancy. Careful surveillance is required in high risk patients in order to ensure early detection and treatment of the complications; so as to decrease the fetomaternal morbidities.

REFERENCES:

1. Silver R, Berkowitz R, Bussel J. Thrombocytopenia in pregnancy. Practice bulletin, No 6. Chicago: American College of Obstetrics and Gynecology, 1999.
2. Fay RA, Hughes AO, Farron NT. Platelets in pregnancy: hyperdestruction in pregnancy. Obstetrics & Gynecology. 1983 Feb 1; 61(2):238-40.
3. Nisha S, Amita D, Uma S, Tripathi AK, Pushplata S. Prevalence and characterization of thrombocytopenia in pregnancy in Indian women. Indian Journal of Hematology and Blood Transfusion. 2012 Jun 1; 28(2):77-81.
4. Bockenstedt PL. Thrombocytopenia in pregnancy. Hematology/oncology clinics of North America. 2011 Apr 30; 25(2):293-310.
5. Shehata N, Burrows R, Kelton JG. Gestational thrombocytopenia. Clin Obstet Gynecol 1999;42: 327–34.
6. Burrows RF, Kelton JG. Thrombocytopenia at delivery: a prospective survey of 6715 deliveries. American journal of obstetrics and gynecology. 1990 Mar 1; 162(3):731-4.
7. Sainio S, Kekomäki R, Riikonen S, Teramo K. Maternal thrombocytopenia at term: a population-based study. Acta obstetricia et gynecologica Scandinavica. 2000 Sep 1; 79(9):744-9.
8. Parnas M, Sheiner E, Shoham-Vardi I, Burstein E, Yermiahu T, Levi I, Holcberg G, Yerushalmi R. Moderate to severe thrombocytopenia during pregnancy.

European Journal of Obstetrics & Gynecology and reproductive biology. 2006 Oct 31; 128(1):163-8.

9. Matthews JH, Benjamin S, Gill DS, Smith NA. Pregnancy-associated thrombocytopenia: definition, incidence and natural history. Acta haematologica. 1990 Jul 1; 84(1):24-9.
10. Ajibola SO, Akinbami A, Rabiu K, Adewunmi A, Dosunmu A, Adewumi A, Osikomaiya B, Ismail K. Gestational thrombocytopaenia among pregnant women in Lagos, Nigeria. Nigerian medical journal: journal of the Nigeria Medical Association. 2014 Mar; 55(2):139.
11. Boehlen F, Hohlfeld P, Extermann P, Perneger TV, De Moerloose P. Platelet count at term pregnancy: a reappraisal of the threshold. Obstetrics & Gynecology. 2000 Jan 1; 95(1):29-33.
12. Olayemi E, Akuffo FW. Gestational thrombocytopenia among pregnant Ghanaian women. Pan African Medical Journal. 2012; 12(1).
13. Crowther MA, Burrows RF, Ginsberg J, Kelton JG. Thrombocytopenia in pregnancy: diagnosis, pathogenesis and management. Blood reviews. 1996 Mar 1; 10(1):8-16.
14. Akingbola TS, Adewole IF, Adesina OA, Afolabi KA, Fehintola FA, Bamgboye EA, Aken'ova YA, Shokunbi WA, Anwo JA, Nwegbu MM. Haematological profile of healthy pregnant women in Ibadan, south-western Nigeria. Journal of obstetrics and gynaecology. 2006 Jan 1; 26(8):763-9.
15. McCrae KR. Thrombocytopenia in pregnancy: differential diagnosis, pathogenesis, and management. Blood reviews. 2003 Mar 31; 17(1):7-14.
16. Ballem PJ. Hematological problems of pregnancy. Can Fam Physician. 1988; 34:2531-7.
17. Amah-Tariah FS, Ojeka SO, Dapper DV. Haematological values in pregnant women in Port Harcourt, Nigeria II: Serum iron and transferrin, total and unsaturated iron binding capacity and some red cell and platelet indices.Onwukeme KE, Uguru VE. Haematological values in pregnancy in Jos. West Afr J Med. 1990;9(2):70-5
18. Grzyb A, Rytlewski K, Domanska A, Tomaszczyk J, Basta A. Pregnancy complicated with thrombocytopenia. Ginekol Pol. 2006; 77(9):712-9.