

ORIGINAL RESEARCH

A one year prospective study of effects of Platelet count in normal pregnant and preeclamptic patients in JNKTMCH, Madhepura

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ABSTRACT

Pregnancy as we know is the state of carrying a developing embryo or fetus within the female body. This condition can be indicated by positive results on an over-the-counter urine test, and confirmed through a blood test, ultrasound, detection of fetal heartbeat, or an X-ray. Pregnancy lasts for about nine months, measured from the 1st day of the woman's last menstrual period (LMP). It is conventionally divided into three trimesters, each roughly three months long.

Normal pregnancy implies final positive outcome for both pregnant mother and her newborn child. Any deviation from this final result is categorized as abnormal pregnancy/Complicated pregnancy. Preeclamptic pregnancy is one of such type of complicated pregnancy with threat to both fetus and pregnant women. There are so many reasons for preeclampsia/eclampsia syndrome related to various factors associated with pregnancy. In this prospective study we study the effect/consequences of abnormal platelet profile on pregnant and their fetus along with proper control subjects. For this study we randomly selected total 100 pregnant ladies admitted in OBG department of JNKTMCH out of which 50 were preeclamptic, considering all compounding factors into account. Emphasis is mainly to ascertain that whether platelet profile derangement is a cause or effect of preeclampsia syndrome. In this study we emphasize on clinic-pathological aspects of the effect of platelet profile derangement and development of preeclampsia, as well as its implication in future clinical management of such patients on the basis of observations of our study, if any.

Key words – Pregnancy, Preeclampsia, Eclampsia, Platelet, fetus.

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INTRODUCTION

A healthy pregnancy is like a healthy plant & it means a final positive outcome both for mother and her baby. Any complication if occurs to any one of them, then that pregnancy is not considered healthy and normal. Pre-eclampsia is one of the complications of pregnancy. Pre- Eclamptic pregnancy is one of that unhealthy pregnancy defined as "a multi system disorder of unknown etiology characterized by development of hypertension to the extent of 140/90 mm Hg or more with proteinuria after 20th week in a

previously normotensive and non-proteinuric woman"^[1,2,9]. Proteinuria is an objective diagnostic criterion for preeclampsia and eclampsia, defined as 24 hrs urinary protein excretion >300 mg or a urine protein: creatinine ratio ≥ 0.3 or persistent 30mg/dl (1+ dipstick) protein in random urine samples^[14].

Hypertension in pregnancy is diagnosed when resting blood pressure is $\geq 140/90$ mm of Hg, hypertension is present in 6 to 8% of young woman of child bearing age but the prevalence increases with advancing age and is higher in woman with Diabetes mellitus, Renal

disease or Obesity reaching up to 20% in some population [4,5,17]. Normal healthy women who developed hypertension for the first time during pregnancy after 20 weeks of gestation were included in PRE-ECLAMPSIA category. The classical categorization of complications of pregnancy done according to following diagnostic criteria are:-

- 1. Gestational hypertension** – It is defined by the blood pressure elevation of greater than 140 mm Hg of systolic or 90 mm Hg of diastolic in a previously normotensive woman for the first time after mid pregnancy, but in whom proteinuria is not identified.
- 2. Preeclampsia** – It is defined by hypertension (blood pressure elevation of greater than 140 mm Hg of systolic or 90 mm Hg of diastolic) associated with proteinuria >0.3gm/l in a 24 hrs urine sample or 1+ dipstick or greater in random urine collection, after 20 weeks of gestation in a previously normotensive women.
- 3. Severe preeclampsia** – This condition was categorized by blood pressure elevation of greater than 160 mm Hg of systolic or 110 mm Hg of diastolic.
- 4. Eclampsia** – The onset of convulsions in women with pre-eclampsia that cannot be attributed to other cause is termed as eclampsia.

A healthy pregnancy results in a series of physiological, psychological and emotional changes in female body. Hence a great deal of physiological changes take place during pregnancy like there is lot of vascular endothelial changes which ultimately makes female body physiologically hypercoagulable^[2,3]. Hypercoagulability is also a constant accompaniment of hypertensive disease of pregnancy and particularly pre-eclampsia. As a result thrombocytopenia and decreased plasma clotting factors may develop in pre-eclamptic patients. These physiological changes work in a positive way so that she can comfortably cope up with that unlimited stress of labor. In some unfortunate cases these changes are either goes in a wrong way or occur aggressively or excessively which ultimately changes normal healthy pregnancy into an abnormal, unhealthy and complicated pregnancy. One such condition is pre-eclampsia. With progress of pregnancy there is increased metabolism of lipids to produce FFA especially for fetal use. In this process there is peroxidation of fatty acids occur. These oxidized lipid metabolite also leads to endothelial injuries resulting in consumption coagulopathy and fall in platelet count. If proper monitoring of platelet count, platelet distribution width and mean platelet volume will be done then these ultimately results in better diagnostic and prognostic tool in complicated pregnancies like pre eclamptic pregnancy. It is a well-established fact that during normal pregnancy there is significant changes seen in coagulation profile of expectant. These changes shows much more pronounced effect on pre-eclamptic expectant as compared to normal

pregnant. Present study is undertaken to study the platelet count in normal pregnant women and Preeclamptic patients to understand the new concepts in the pathophysiology of Pre-eclampsia & to find out whether platelet count profile have any role in causation of Pre-eclampsia and this will help in the future prediction, prognosis as well as clinical management of cases of pre-eclampsia.

MATERIAL & METHOD

The present study was carried out at Department of Physiology at Jan nayak karpuri thakur medical college, Madhepura along with collaboration from Department of Obstetrics and Gynecology, Jnktmch and sadar hospital Madhepura over a period of 01 year from March 2022 to March 2023. A total number of 100 pregnant women were studied. These were divided into two groups:

Group 1 - Study group - 50 cases of Pre-eclampsia

Group 2 - Control group - 50 cases of normal gravidas of same age, parity and gestational age.

INCLUSION CRITERIA

1. Study subjects are in 2nd and/ or 3rd trimester of pregnancy.
2. All subjects under study are of similar low socioeconomic status and dietary habits.
3. Their age range is from 18 to 35 years.
4. Blood pressure \geq 140/90 mm Hg for 1st time in pregnancy after 20 weeks.
5. Both nulliparous and multiparous women were included.

EXCLUSION CRITERIA

1. Subjects with habit of smoking.
2. Subjects suffering from any chronic illness like hypertension (HTN), Diabetes Mellitus (DM), Hyperlipidemia, Ischemic Heart Disease (IHD), Chronic Renal Disease, Seizure disorders.
3. Subjects having any past H/O cardiac, renal or hepatic dysfunction, hemorrhagic disorder, thrombotic disorder or epilepsy.
4. Subjects having any medical/ surgical/drug history affecting platelet count.
5. Patients in active labour.
6. Uncooperative patient.

STUDY DESIGN

Prospective randomized case control study.

MEHTODOLOGY

Indoor patients admitted through Gynecology OPD or Emergency was selected as per the inclusion criteria for both groups. Study group having BP \geq 140/90 mm of Hg to <160/110 mm of Hg and without the ominous symptoms of eminent eclampsia like headache, visual disturbance or epigastric discomfort or vascular complications.

SPECIMEN COLLECTION AND PREPARATION

Specimen collection - The phlebotomist collects 3 mL blood in K3 EDTA tube on all SP's age 1+ following established venipuncture protocol and procedures. (A 1-2% dilution effect occurs in this liquid EDTA tube). This is sample meant for platelet count.

Sample volume is 185 μ L of whole blood in the closed-vial mode. The minimum sample volume per tube in the closed-vial mode is 1-mL with the proper proportion of blood to anticoagulant. The blood specimen-processing technologist initially processes the tube by taking off whole blood for various tests.

The blood specimen-processing technologist places the specimen on a rocker until the hematology technologist can perform the CBC. Run the CBC as soon as possible; there is no requirement to wait any length of time between drawing the blood and running the CBC. Platelet count was done based on principle of unique fluorescence flow cytometry also reassessed by peripheral method. This all was done using SYSMEX- XT-2000 Auto analyzer machine. The levels compared in the study and control groups and results obtained via student't' test.

Both cases and controls were studied further as per the standard Performa;

OBSERVATION

A total of 100 patients were recruited in this study. 50 cases of preeclamptic pregnant and 50 cases of normal pregnant women were studied.

Table – 1 Age distribution of study group

	preeclampsia	control
Total Number 'n' =	50	50
Age		
≤ 20 yrs	13	7
21-25 yrs	28	34
26-30 yrs	7	6
31-35 yrs	2	3

Table -1 shows the age distribution of both cases and controls. The age group of preeclampsia cases range from 18yrs to 35yrs and in case of control it was from 19yrs to 34yrs. Age distribution of both the groups was similar. Maximum numbers of preeclampsia cases were in the age group of 18 to 24 yrs.

Table – 2 Clinical Profile of Preeclamptic patients (n = 50)

Symptom	No of patients	Percentage
Seizure	20	40
Edema	50	100
Headache	25	50
Blurring of vision	3	6
Epigastric pain	14	28

Oedema was the most common symptom occurring in all the patients followed by Headache in 50% of patients, Seizure in 40%, Epigastric pain in 28% and Blurring of vision in 6%.

Table – 3 Platelet count Profile

Platelet count	No of patients	Percentage
< 100000	10	20
100000 - 150000	2	4
>150000	38	76

As evident from above table 76% of patient had normal platelet count. It was less than normal in 24% of patients and 10 patients (20%) had markedly reduced counts. Of these 10 patients 6 patients had HELLP Syndrome.

DISCUSSION

Present study was carried out to compare the platelet in normal and pre-eclampsia patients. The exact role of socioeconomic status has not been determined; however pre-eclampsia occurs more commonly in the poorer and under privileged communities due to ignorance and apathy leading to improper antenatal care.

Now let us consider our finding in table-2 as we see, edema was the most common symptom seen in 100% of patients in our study. It is the most common

manifestation of pre-eclampsia and is also seen in majority of normal pregnancies. It is invariably present in patients with pre-eclampsia.

Again on considering Table- 3, platelet count less than normal were noted in 24% of patients of which < 100000/cu. mm seen in 20% of preeclamptics.

Age distribution in both pre-eclampsia subjects and controls were relatively homogenous. However when compared as a group, the pre-eclampsia subjects were relatively younger, maximum in age group 18-23

years. This result confirms that nulliparity is an important risk factor for pre-eclampsia.

Some of the following features of PRE-ECLAMPSIA could be explained as follows:-

Endothelial dysfunction: The increased triglycerides get deposited in the micro vessels at placental bed leading to endothelial dysfunction via activation of leukocytes, platelets and lipid laden foam cells, named 'Acute Atherosclerosis' at the placental bed- stage 1 of the two stage process.

Micro albuminuria: It can be explained by altered endothelial pathophysiology.

Thrombocytopenia: It can be explained by the concept of consumption coagulopathy in advancing stage of preeclampsia.

Anemia: It can be described in terms of Hemolysis resulting from disturbed microcirculation in pregnant especially in placental bed.

SUMMARY & CONCLUSION

What we already know of this topic is that hypertensive disorders of pregnancy are among the most common and significant medical disorders during pregnancy. Yet how pregnancy incites or aggravates hypertension is largely ill understood despite decades of intensive research.

Thrombocytopenia is seen as after effect of metabolic syndromes developed during any pregnancy. PRE-ECLAMPSIA, the pregnancy specific occlusive vascular disorder is known to be a type of metabolic syndrome, hence associated with several metabolic changes, of which one is thrombocytopenia.

Thus, with this preview this study was undertaken to study the platelet count among Pre-eclampsia cases and normotensive controls to know whether this parameter have any significant role in the etiopathogenesis, prediction or prognosis of PRE-ECLAMPSIA.

The final conclusion of our study may be summarized as follows:

The mean age group of the PRE-ECLAMPTIC cases and controls was 21 ± 3.8 and 23.7 ± 3.5 years respectively. PRE-ECLAMPSIA was thus seen to be associated with younger age group.

As we see the Pre-eclamptic subjects 28 % cases had decreased platelet count. Further out of these 16% cases of thrombocytopenia seen in severe Preeclampsia as compared to 12% in mild cases Thrombocytopenia can be correlated with severity of hypertension as well.

With regard to clinical presentation of PRE-ECLAMPSIA this study clearly shows that most common presentation was Edema (100%) and the least common presentation was Blurred vision (6%).

Our study shows that in 24% of cases having thrombocytopenia in which 4% were having severe thrombocytopenia ($< 100000/ \text{cu. mm.}$). This result clearly shows the association between pre-eclampsia and thrombocytopenia. The result here is only 24%, that might result due to our exclusion criteria which is

directly associated with deterioration of platelet count as the severity increases.

As we minutely study the data it's clear that 68% of preeclamptic cases were seen in primigravida group which were in younger age group. If gravida status were kept comparable than higher age group represent more number of Preeclamptic cases, similar to previous study results.

Hence to conclude, endothelial dysfunction is the key event in disease progression. The resulting vaso-occlusive condition at placental bed poses a future cardiovascular risk. Placental bed insufficiency poses an additional threat as well as further complication to growing fetus. These all emphasize the importance of measuring above mentioned parameters in expectants so that early diagnosis and prevention/management can be commenced.

Thus the study was important to establish a connection between Platelet count of PREECLAMPTIC expectants and final outcome of pregnancy. Further research with serial measurement of above parameter in each trimester of pregnancy as well as in Pre-pregnant future subjects and by using more advanced biochemical/pathological setup, may further verify the causative role and predictive values of these variables; and thus may help to prevent and manage this commonest medical disorder of pregnancy namely 'PRE-ECLAMPSIA'.

CONFLICT OF INTEREST

Nil

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