



## LATERAL PLACENTATION IN ULTRASONOGRAPHY AND PREDICTION OF PRE-ECLAMPSIA

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### ABSTRACT

Lateral placentation was found to show statistically significant association between lateral placentation and pre-eclampsia, therefore these pregnancies may need cautious obstetric management to ensure a better maternal and perinatal outcome. This study aims to establish whether laterally located placenta in ultrasonography can be taken as a predictor of pre-eclampsia. This prospective descriptive study was conducted in OBG department of Saveetha Medical College and Hospitals, Thandalam from JANUARY 2022 to June 2022. A total of 50 low-risk women with singleton pregnancy underwent ultrasonography to locate the placenta. These cases were followed for the development of signs and symptoms of pre-eclampsia. In this study the calculated sensitivity of lateral placenta for prediction of pre-eclampsia was 75%, specificity of 70.6%, PPV (positive predictive value) was found to be 54.5%, NPV (negative predictive value) was 85.7%. We concluded that there is considerable relation between placental lateralisation and development of pre-eclampsia, hence Ultrasonography is a fairly straightforward, non-invasive, affordable, simple to use, and widely accessible diagnostic technique to spot patients at risk.

**KEYWORDS :** Abnormal placentation, Antenatal ultrasound, Pre-eclampsia

### INTRODUCTION

Approximately 8 to 10 percent of pregnant women experience hypertension disorders. Pre-eclampsia develops mostly because of presence of placenta<sup>1</sup>. It is linked to numerous difficulties for both the mother and the baby. Gestational hypertension, pre-eclampsia, eclampsia, chronic hypertension and pre-eclampsia superimposed on chronic hypertension are the main classifications given by the WHO.

Gestational hypertension, which first appears in the later half (after 20 weeks) of pregnancy and goes away 12 weeks after birth, is different from pre-eclampsia, which first appears at 20 weeks of gestation and has symptoms of multi-organ involvement. Among all the predictors of pre-eclampsia, placental localisation by ultrasound during Anomaly scan is safe, easily accessible, cost effective, non-invasive and with good positive predictive value<sup>2</sup>. According to NICE guidelines 2019 Hypertension in pregnancy definitions are:

#### Hypertension

Hypertension during pregnancy is defined as systolic blood pressure more than or equal to 140 mmHg and diastolic pressure of 90mmHg or more.

#### Pre-Eclampsia

Pre-eclampsia is defined as new onset hypertension  $>=$  140/90mmHg after 20 weeks of gestation and coexistence of deranged laboratory and clinical parameters.

#### Severe Hypertension

If blood pressure is  $>=$  to 160/110mmHg It is defined as severe hypertension.

#### Severe Pre-eclampsia

Pre-eclampsia with uncontrolled hypertension or if it is associated with imminent sign and symptoms like headache, blurring of vision, vomiting, nausea, right upper abdomen pain, reduced urine output and progressive deterioration of laboratory parameters is defined as severe pre-eclampsia. It is associated with intrauterine growth restriction, oligohydramnios and doppler changes.

#### Eclampsia

When pre-eclampsia is associated with convulsive condition it is called eclampsia.

#### HELLP Syndrome

It is rare complication of pre-eclampsia which is characterised by hemolysis, elevated liver enzymes and low platelet counts.

#### Chronic Hypertension

It is defined as hypertension before pregnancy or in the first 20 weeks of gestation, or if patient is already on antihypertensive medication.

### METHOD

This is descriptive study conducted in obstetric and Gynecology department of Saveetha Medical College and Hospitals, Thandalam. The study period is 6 months from JANUARY 2022 TO June 2022. After obtaining informed consent women in study were subjected to ultrasonography to localise the placenta and were followed till delivery for the signs and symptoms of pre-eclampsia syndrome.

#### Sampling technique

Random

#### Inclusion Criteria

Low-risk women with singleton pregnancy

#### Exclusion Criteria

Patient not ready to participate in study, Chronic hypertension, history of pre-eclampsia in previous pregnancies, eclampsia and gestational hypertension, Multiple gestation, Patient with autoimmune disease, Smokers, Obese

#### Statistical Tool

SPSS Software

### RESULTS

In present study 50 low risk patients were included. Placental location was done during anomaly scan. Out of 50 pregnant women 22 had lateral placenta and 28 central placentation were found in ultrasonography. (Table 1).

#### Demography of the patients

2 patients were less than 20 years, 40 patients were in range of 20- 30 years of age, 8 patients were between 31-40 years of age. Among all 33 (66 %) patients were primigravida, 10 (20%) patients were second gravida and 7(14%) of the patients were multigravida. Out of total 50 patients 9 patients developed

severe pre-eclampsia and 7 patients developed mild pre-eclampsia. Most of the patients who developed severe pre-eclampsia were primigravida (Table 2). While 12 pregnant with lateral placenta developed pre-eclampsia, only 4 cases of pre-eclampsia occurred in case of central placentation (Table 3) and (Table 4). In this study the calculated sensitivity of lateral placenta was 75%, specificity of 70.6%, PPV (positive predictive value) was found to be 54.5% %, NPV (negative predictive value) was 85.7% and Accuracy 72% (p value -002). Among all delivery 80% of the babies born with good Apgar score and 4% with very poor Apgar score (Table 5).

**Table 1. Relationship between placental location and parity**

Location of placenta	Primigravida	Second gravida	Multigravida
Central	17 (34%)	4 (8%)	7 (14%)
Lateral	16 (32%)	6 (12%)	0 (0%)

**Table 2. Relationship between severity of pre-eclampsia and parity**

	Preeclampsia with mild hypertension	Severe pre-eclampsia
Primigravida	3 (6%)	8 (16%)
Second gravida	3 (6%)	1 (2%)
Multi gravida	1 (2%)	0 (0%)

**Table 3. Relation between severity of pre-eclampsia and placental location**

Severity of HTN	Central placenta	Lateral placenta
Mild	2 (4%)	5 (10%)
Severe	2 (4%)	7 (14%)

**Table 4. Relationship between location of placenta and occurrence of pre-eclampsia Pearson chi-square test, p= 0.002, df = 1**

Placental location	Pre-eclampsia present	Pre-eclampsia absent
Lateral placenta	12 (24%)	10 (22%)
Central placenta	4 (8%)	24 (48%)

**Table 5. neonatal outcome based on placental location**

Location of placenta	APGAR SCORE OF THE BABIES		
	1-4 (4%)	5-7 (16%)	8-10 (80%)
Central	0	4	24
Lateral	2	4	16

## DISCUSSION

Numerous studies have demonstrated that the placenta's position may affect the distribution of blood flow to the uterus and put the pregnancy at risk for unfavourable outcomes like hypertensive disorder of pregnancies. Ultrasonography has emerged as the safest, simplest, and most reliable technique for determining placental laterality during the past 20 years. In the second trimester of pregnancy, non-invasive tests found that the blood flow to the uterus in laterally situated placenta is poor. It is proved in human that both uterine arteries have numerous branches, and each one supplies the uterus to the respective sides. Although anastomosis exist between both the branches of uterine arteries, each supply the corresponding side of the uterus, there is no evidence that they are functional<sup>3</sup>. when placenta is situated laterally, the uterine artery nearer the placenta use to have blood flow with less resistance than the opposite uterine artery. Both uterine arteries in women with centrally placed placentas showed comparable resistance<sup>4</sup>. When the placenta lies in the middle of the uterus, both uterine arteries contribute equally to the uteroplacental blood flow demand. However, when the placenta is positioned laterally, one uterine artery typically provides the bulk of the utero-placental blood flow requirements, with equal contributions from the other uterine artery through collateral circulation<sup>5</sup>. The proportion of collateral circulation may not be the same in all individuals,

and a lack of it may induce the onset of pre-eclampsia, intrauterine growth restriction, or both, where cytotrophoblasts fail to acquire a vascular adhesion phenotype. When the uteroplacental blood flow requirements are mostly met by one side uterine artery, this may account for the decreased trophoblastic invasion in laterally located placenta. Pre-eclampsia, a multisystemic clinical condition, continues to be the leading cause of maternal and perinatal mortality and morbidity. Pre-eclampsia has complicated pathophysiological features, and its origin remains unknown<sup>6</sup>. The placenta's poor perfusion will prevent the appropriate trophoblastic invasion of spiral arterioles, which could be one of the main causes of pre-eclampsia<sup>7</sup>.

The current study demonstrates statistically very significant (p value .002) findings that individuals with lateral placentas have an elevated risk of pre-eclampsia, intrauterine growth restriction, and a considerably inferior new-born outcome. Our findings show that preeclampsia is substantially linked with the existence of lateral placenta (ODDs ratio- 7.2) The results of the current study indicate that the location of the placenta in pregnant women may be utilised as a simple, inexpensive, readily accessible, and repeatable screening tool for the prediction of pre-eclampsia and IUGR<sup>8</sup>. In this study the calculated sensitivity of lateral placenta in ultrasound for prediction of pre-eclampsia was 75%, specificity of 70.6%, PPV (positive predictive value) was found to be 54.5% %, NPV (negative predictive value) was 85.7% and Accuracy 72%. The findings of the present study are in coherence with the study done by Dr. Kofinas<sup>9</sup> et al and Dr. Muralidhar Pai et al<sup>10</sup>.

## CONCLUSION

Lateral placentation was found to show statistically significant association between lateral placentation and pre-eclampsia, therefore these pregnancies may need cautious obstetric management to ensure a better maternal and perinatal outcome.

## Clinical significance

This study shows considerable relation between placental lateralisation and development of pre-eclampsia hence Ultrasonography is a fairly straightforward, non-invasive, affordable, simple to use, and widely accessible diagnostic technique to spot patients at risk.

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