e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2025; 17(1); 183-187

Original Research Article

Placental Laterality as a Predictor for Development of Preeclampsia

Prathima[1], Sumitra Sangavi[2], Bhavani[3], Vidyashree[4]

[1]Assistant Professor, Dept. of Obstetrics and Gynaecology, ESIC Medical College, Kalaburagi Karnataka
[2,3,4]Senior Resident, Dept. of Obstetrics and Gynaecology, ESIC Medical College Kalaburagi

Received: 25-10-2024 / Revised: 23-11-2024 / Accepted: 26-12-2024
Corresponding Author: Dr. Vidyashree
Conflict of interest: Nil

Abstract:

Background: Hypertension in pregnancy is one of the common medical complications of pregnancy and contributes significantly to maternal and perinatal morbidity and mortality.

Objective: to find out whether the lateral location of placenta as seen by ultrasound at 18-24 weeks of gestation can be used to predict the development of preeclampsia.

Methods: This Prospective study was conducted among 100 pregnant women of 18-24 weeks of gestational age attending the outpatient department for antenatal care at government maternity hospital, Hanamkonda during the period of November 2019 to October 2021.

Result: Out of the 100, 50 had lateral placenta of which 21 developed preeclampsia and 50 had central placenta of which 10 developed preeclampsia. None of the patients were diagnosed with gestational hypertension. Of the total 31 patients with preeclampsia, 3 had urine albumin trace, 15 had urine albumin of 1+ and 13 had urine albumin of 2+ Majority of the preeclampsia was diagnosed preterm between 32-36+6 weeks period of gestation. Of the 31 preeclampsia patients 17(55%) are P1, 8(25%) are primigravida, 4(13%) are P2 and 2(7%) are P3**.** Of the 31 preeclampsia patients 19(61%) underwent LSCS and 12(39%) underwent vaginal delivery but the overall incidence of vaginal delivery is 74% and LSCS being only 26% among 100 patients.

Conclusion: Our study shows correlation between lateral placenta and preeclampsia, many previous studies have shown a positive correlation and hence a strict vigilance and follow up of these patients needed for earlier identification and diagnosis of preeclampsia and to prevent the complications for fetus and mother.

Keywords: Placental Laterality, Predictor, Preeclampsia.

Introduction

Hypertension in pregnancy affects 5% to 10% of all gestations. Approximately 1/3 of hypertensive disorders in pregnancy (HDP) are due to chronic hypertension and 2/3 are due to gestational hypertension–preeclampsia. (FOGSI 2014) The spectrum of the disease ranges from mildly elevated blood pressure with minimal clinical significance to severe hypertension and multi organ dysfunction.

The NER (National Eclampsia Registry) in the new format since 2011 reveals prevalence of pregnancy hypertension continues to be 9% and that of preeclampsia 5%. EOPET (early onset preeclampsia) is of concern as 42% had onset of hypertension before 34 weeks while 55% were reported to have hypertension after 34 weeks. (FOGSI 2014)

This has led to the interest in screening. Screening the population in search for disease at its earlier stages, is a logical extension of the role of preventive medicine. In preventing this disorder the most important factor is lack of timely prediction. Hence the search for ideal predictive test in still on, and the preventive measures for preeclampsia is still very challenging. Placenta is an important connecting organ between mother and fetus. Gestational hypertension and preeclampsia occurs only in the presence of placenta. Several methods were used to document placental location such as isotopic placentography, soft tissue x-ray films. Presently, ultrasound has proved to be easiest, safest, cheapest and most accurate method for assessing placental location.

Kofinas AD et al postulated that when placenta is laterally located the uterine artery close to placenta has lower resistance than the one opposite from it. [1] In centrally located placenta both uterine arteries demonstrate similar resistance [2-4] It is classified as central if placenta is equally distributed between right and left side of uterus irrespective of anterior, posterior or fundal position.

If more than 75% of placenta mass is to one side of midline it is classified as unilateral right or left placenta. It has been shown that both uterine

arteries have significant number of branches and each supplies corresponding uterine side. In some patients arcuate branches of uterine artery crosses over to other side and create major anastomosis between the two uterine arteries but there is no proof that this anastomosis is functional.

When placenta is laterally located the uteroplacental blood flow needs are met primarily by one of the uterine arteries with some contribution from other uterine artery via collateral circulation, which is insufficient for adequate placental perfusion. [2,3] Hence deficient perfusion will impede proper trophoblastic invasion of spiral arterioles which is the primary inciting factor in development of pre-ecclampsia. Degree of collateral circulation may not be same in all and deficient contribution may facilitate the development of IUGR, pre-eclampsia and other complications. Existence of major vascular anastomosis in some patients may explain the normal uterine flow velocity wave form and absence of preeclampsia despite presence of unilateral placenta.

Hence we designed a prospective study to find out whether the lateral location of placenta as seen by ultrasound at 18-24 weeks of gestation can be used to predict the development of preeclampsia.

Material and Methods: This Prospective study was conducted among 100 pregnant women of 18-24 weeks of gestational age attending the outpatient department for antenatal care at government maternity hospital, Hanamkonda during the period of November 2019 to October 2021

Women booking for antenatal care will be interrogated, examined and investigated. After an informed consent, the women will be subjected for ultrasound examination and placental location will be determined. These women will be further followed up for development of preeclampsia

Inclusion Criteria

- All pregnant women between 18-24 weeks of gestational age with singleton pregnancy without any high risk factors

Exclusion Criteria:

- Chronic hypertension and essential hypertension.
- Diabetes mellitus.
- Thyrotoxicosis.
- Renal diseases
- Severe anaemia
- Connective tissue disorders
- Positive lupus anticoagulant
- Anticardiolipin antibodies
- Rh incompatibility
- Twin gestation.

Sample Size: 100

Pregnant women who fulfill inclusion and exclusion criteria were selected and data was collected.

- Detailed obstetric, past and surgical history was taken
- General physical examination including vital signs (BP and weight) was done
- Per abdomen examination was done
    - Patients were subjected to placental localization by
    - USG between 18-24weeks
    - They were followed up upto delivery for detection of preeclampsia and upto

12 weeks postpartum for detection of gestational hypertension.

- During USG when 75% or more mass of placenta on one side of midline in uterus if noted it is called lateral placenta, irrespective of anterior, posterior or fundal position.

These patients were followed up till delivery and maternal outcome was assessed and if any cases with increased BP without proteinuria were followed up till 12weeks postpartum for diagnosing gestational hypertension/chronic hypertension.

Results:

Out of the 100 patients included in our study, 50 had lateral placenta of which 21 developed preeclampsia and 50 had central placenta of which 10 developed preeclampsia.

Those with preeclampsia majority of them fell in age group of 26-29years. 55% of the patients belonged to class III according to modified Kuppuswamy classification. 15 had urine albumin of 1+ and 13 had urine albumin of 2+. Majority of the preeclampsia was diagnosed preterm between 32-36+6 weeks period of gestation. Of the 31 preeclampsia patients 17 (55%) are P1, 19(61%) underwent LSCS and 12(39%) underwent vaginal delivery.

Table 1: Occurrence of preeclampsia

	Lateral placenta (50)	Central placenta(50)
Pre-eclampsia	21	10
Gestational hypertension	0	0

Table 2: Comparison of age group between two groups

	Lateral Placenta		Central Placenta		Total	
	count	percentage	count	percentage	count	percentage
18-20	9	18%	5	10%	14	14%
21 -25	11	22.0%	27	54.0%	38	38.0%
26 -29	30	60.0%	18	36.0%	48	48.0%
Total	50	100%	50	100.0%	100	100.0%

In lateral placenta group majority belonged to 26-29 years age. In central placenta group majority belonged to 21-25 years of age. P value= 0.02 (Statistically Significant)

Table 3: Age distribution among the pre-eclampsia cases in both the groups

Age	Lateral Placenta	Central Placenta
18-20	2	1
21 - 25	4	2
26 - 29	15	7
Total	21	10

In lateral placenta group 71%% and in central placenta 70% belonged to age group of 26-29 years, P value= 0.995. In our study majority belong to class III according to modified Kuppuswamy classification, P value=1.

Table 4: Development of preeclampsia

	Lateral placenta		Central Placenta		Total	
	count	percentage	count	percentage	count	percentage
yes	21	42.0%	10	20.0%	31	31%
no	29	58.0%	40	80.0%	69	69.0%
Total	50	100.0%	50	100.0%	100	100.0%

In lateral group 42% developed preeclampsia compared to 20% in central group with overall incidence being 31% and Odds Ratio of 2.8, P value=0.01(significant).

Table 5: Comparison of urine albumin in both the groups

	Lateral placenta		Central placenta		Total	
	count	percentage	count	percentage	count	percentage
Trace	2	4%	1	2%	3	3%
1+	13	26%	2	4%	15	15.0%
2+	6	12%	7	14%	13	13.0%
Nil	29	58%	40	80%	69	69.0%
Total	50	100%	50	100%	100	100%

Among the 21 preeclampsia patients in lateral group 26% had 1+ urine albumin and among the 10 preeclampsia patients in central group 14% had 2+ urine albumin. P value=0.01. Statistically Significant

Table 6: Gestational age at detection

	Lateral placenta		Central placenta		Total	
	count	percentage	count	percentage	count	percentage
32 - 36+6	15	30.0%	8	16%	23	23%
37 - 40	6	12.0%	2	4%	8	8%
nil	29	58.0%	40	80.0%	69	69.0%
Total	50	100.0%	50	100.0%	100	100.0%

Among both the groups pre-eclampsia was diagnosed preterm. P value=0.05

Table 7: Comparison of parity in both groups

	Lateral placenta		Central Placenta		Total	
	count	percentage	count	percentage	count	percentage
P0	24	48%	22	44%	46	46%
P1	20	40%	17	34%	37	37%
P2	6	12%	9	18%	15	15%
P3	0	0	2	4%	2	2%
Total	50	100%	50	100%	100	100%

In both the groups majority are primigravida, P value=0.4. Among the lateral placenta group out of 21 preeclampsia patients 6(20%) are primigravida, 13(70%) are P1 and 2(10%) are P3. Among the central placenta group out of 10 preeclampsia patients 2(20%) are primigravida, 4(40%) are P1, 2 (20%) are P2 and 2 (20%) are P3.

Of the 31 preeclampsia patients 8(25%) are Primigravida, 17(55%) are P1, 4(13%) are P2 and 2(7%) are P3.

Table 8: Comparison of mode of delivery among the groups

	Lateral Placenta		Central Placenta		Total	
	count	percentage	count	percentage	count	percentage
Vaginal delivery	35	70%	39	78%	74	74%
LSCS	15	30%	11	22.0%	26	26.0%
Total	50	100.0%	50	100.0%	100	100.0%

In both the groups majority had vaginal delivery (74%), P value=0.3.

Among the lateral placenta group, out of 21pre eclampsia patients 13 had LSCS, 3went for spontaneous vaginal delivery and 5 had induction of labor and delivered vaginally whereas in central placenta group out of 10 preeclampsia patients 6 had LSCS, 2 had spontaneous vaginal delivery and 2 had induction of labor.

Discussion

Incidence and prevalence: The National Eclampsia Registry in its initial format (2008-10) stated the prevalence of pregnancy with hypertension was reported to be 8.3% (n=11266) with the prevalence of preeclampsia being 11.71% with a total of 15784 cases.

The NER in the new format since 2011 reveals incidence of preeclampsia to be 10.3% and incidence of eclampsia is 1.9%.(FOGSI 2020)

In our study the overall incidence of preeclampsia is 31%. This higher incidence may be due to small sample size.

Age distribution: Study conducted by J. Prakash et al [5] in 2006 showed that most of the patients who developed hypertension belonged to age group of 21-25 years whereas in our study majority belonged to 26-29years group. There is a conflicting data on relationship of age with preeclampsia. Some studies have reported association between age and preeclampsia especially in elderly women above age of 35years while others have shown an association with younger age group. Advancing as well as younger age group is a risk factor. [6,7]

Women aged 40years and above had twice the risk of preeclampsia whether primiparous or multiparous [8].

Socio economic status: Low socio economic status have higher incidence of hypertensive disorders of pregnancy. According to a study by Zenebe et al [9] incidence of pre-eclampsia was higher in class V socio economic status which was not in concordance with our study where majority belonged to lower middle class (class III). This could be due to majority of patients being from urban and sub urban areas.

Proteinuria: In our study 15 patients had proteinuria of 1+ and 13 had 2+ proteinuria which was significant. Other studies have shown that heavy proteinuria indicates severe form of preeclampsia.

Placenta location by ultrasound: Many studies have been conducted on association of location of placenta and development of preeclampsia but the results have been controversial. However majority of studies show positive correlation between lateral placenta and development of preeclampsia.

Below some similar studies are mentioned with their results.

Table 9:

Study	Ultrasound timing (weeks)	Preeclampsia
Kofinas et al [1],1989	24-40	PIH 2.8 times more likely in cases with lateral placenta
Lieberman et al [10], 1991	Not defined	Decrease incidence of preeclampsia in women with placenta previa
Liberati et al [11], 1997	22-24	No significant association between PIH and lateral placenta
Ito et al [12], 1998	33-38	No significant association
Kalaniti et al [13], 2007	16-20	No association
Magnann et al [14], 2007	14-40	No significant association
Belogolovkin et al [15], 2007	20	No significant association

In our study 42% developed preeclampsia in lateral placenta compared to 20% in central placenta group with Odds ratio of 2.8. Hence there was correlation between lateral placenta and development of preeclampsia and 2.8 times increased risk in lateral placenta in our study.

Many studies do show positive correlation between lateral placenta and development of preeclampsia and hence it is an important risk factor. If lateral placenta detected early in the antenatal period require close monitoring for the development of preeclampsia.

Conclusion

Hypertension complicating pregnancy is one of the most common disorder and early prediction prevents dreadful maternal complications thereby reducing maternal mortality and morbidity.

Despite of many advancements in the field of medicine predicting the occurrence of preeclampsia is a challenge as there is no single reliable predictor. Ultrasonography is simple, non-invasive, easy to perform, cost effective, diagnostic method to identify high risk cases.

Our study shows correlation between lateral placenta and preeclampsia, many previous studies have shown a positive correlation and hence a strict vigilance and follow up of these patients needed for earlier identification and diagnosis of preeclampsia and to prevent the complications for fetus and mother.

References

1. Kofinas AD, Penry M, Swain M, Hatjis CG. Effect of placental laterality on uterine artery resistance and development of preeclampsia and intrauterine growth retardation. AM. J Obstet Gynecol 1989; 161:153-69.
2. Fleischer A, Schulman H, Farmakides G, et al. Uterine artery Doppler velocimetry in pregnant women with hypertension. Am J Obstet Gynecol. 1986; 154:806–13.
3. Schulman H, Winter D, Farmakides G, et al. Pregnancy surveillance with Doppler velocimetry of uterine and umbilical arteries. Am J Obstet Gynecol. 1989; 160:192–6.
4. Campbell S, Bewbey S, Cohen-over beek T. Investigation of the uteroplacental circulation by Doppler ultrasound. Semin Perinatol. 1987; 11:362.
5. J Prakash, L K Pandey Hypertension in pregnancy-Hospital based study.J Association physicians India 2006 April;54:273-8
6. Dekker GA. Risk factors for preeclampsia. Clin ObstetGynecol, 1999; 42(3):422-35.
7. Duckitt K and Harrington D. Risk factors for preeclampsia at antenatal booking: systematic review of controlled studies. BMJ, 2005; 330(7491):565.
8. Biianco A, SJ, Lynch L, Pregnancy at age 40 and older. ObstetGynecol, 1996; 87:917-22.
9. Zenebe Wolde, Hailemariam Segni; Hypertensive disorders of pregnancy in Jimma University Specialized Hospital; Ethiop J health sci;vol 21, no 3, nov2011
10. Liberman Jr, Fraser J, Kasis A, Mazor M. Reduce frequency of hypertensive disorder and placenta previa. Obstat Gynaecol 1991:77:83-610
11. Liberati M, Rotmensch, Zanolli P, Perinno S, Celentano C, Tiboni GM, et al. Uterine artery Doppler velocimetry in pregnant women with lateral placenta. J Perinat Med 1997:25:133-185
12. Ito Y, Shono M, Uchiyama A Suigimori H. Resistance index of uterine artery and placental location in intrauterine growth retardation. Aceta ObstetGynecol Sc and 1998:77:385-909
13. Kalanithi LE, Illuzzi JL et al. Intrauterine growth restriction and placental location. J Ultrasound Med 2007:26:1481-1489.
14. Magann EF, Doherty DA et al. Second trimester placenta; Location as a predictor of an adverse pregnancy outcome. J Pernatol 2007:27:9-14.
15. Belogolovkin V, Engel SM et al. Does sonographic determination of placental location predict fetal birth weight in diamniotic-dichorionic twins? J ultrasound med 2007:26: 187-191