



STUDY OF PLACENTAL LOCATION BY USG AND ITS MATERNAL AND NEONATAL OUTCOME AT TERTIARY CARE CENTER

Radiology

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ABSTRACT

The site of implantation and resultant location of the placenta within the uterus are likely important determinants of placental blood flow and therefore pregnancy success. Preterm labor, IUFD, and stillbirth have all been linked to posterior placental position. Preterm deliveries, adherent placentas, and early membrane rupture are all more common in central placentas. The purpose of this study was to determine whether placental position and mother fetal outcome are correlated. This was a prospective observational study conducted among antenatal women pf 28 weeks to 34 weeks gestation who reported to the Department of Radiodiagnosis, in tertiary care center, for routine obstetric scan during the period of study from December 2022 to March 2024. The age ranged between 18- 35 years. Maximum number of cases (51%) are seen in 21 to 25 years followed by 26 to 30 years age Group (32%). most common location of placenta is anterior (50.2%) followed by second most common location which is posterior (26.6%). Placental location was significantly associated with PIH, APH, IUGR, Mode of delivery, LBW, APGAR score & NICU admission. From this study we conclude that, Lateral placental location was strongly associated with adverse outcomes, including pregnancy-induced hypertension (PIH), intrauterine growth restriction (IUGR), and low birth weight (LBW).

KEYWORDS

Placental location, ANC women, Fetomaternal outcome

INTRODUCTION:

Placenta is the vital organ which connects fetus to the uterine wall. Nutritive, respiratory, metabolic, endocrine and excretory functions of the fetus are carried out through the placenta. Pregnancy and childbirth itself has health risk to the mother even without pre-existing health problem. Healthy placenta is the single most important factor in producing a healthy baby.

There are four different types of placental locations: fundal, unilateral (left lateral, right lateral), central (anterior and posterior), and low lying (within 2 cm of internal os). There were only limited studies dealing placental location site and maternal fetal outcome.

Low lying placenta associated with fetal & maternal complications. But even if placental location is normal & is well away from internal os, there are variable fetal & maternal adverse outcomes. These outcomes can be correlated with specific locations of placenta. This study is done to evaluate these correlations and to predict, prevent dreadful complications.

This differences in this fetal & maternal outcome are due to two different circulations- maternal and fetal. Blood supply of the uterus comes from the uterine and ovarian arteries. Uterine blood supply is not uniformly distributed. The site of implantation and resultant location of the placenta within the uterus are likely important determinants of placental blood flow and therefore pregnancy success.

Preterm labor, IUFD, and stillbirth have all been linked to posterior placental position. Because the uterine posterior wall is longer and thicker than the anterior wall, the blood supply to the two walls varies as well. The posterior placental position has been linked to meconium-stained liquor incidence, fetal discomfort, higher LSCS rates, and an increase in fetal heart rate decelerations.

Preterm deliveries, adherent placentas, and early membrane rupture are all more common in central placentas. Centrally located placenta receives equitable distribution of blood flow from both the uterine arteries whereas in laterally located placenta, the uterine artery closer to the side of placenta has a low resistance and a good blood flow, which causes disparity in blood distribution.

In the third trimester of pregnancy, obstetric ultrasound is frequently performed on expectant mothers to assess placental position, amniotic fluid volume, and fetal growth. The most popular method for determining placental position is ultrasound.

Ours is a tertiary care center, providing 24 hours emergency Obstetric services and senior obstetricians are available. The hospital provides antenatal care and delivery services for both low and High-risk pregnant women. Hospital has 24 hours facility for ultrasonography. Has Intensive care unit for 24 hours multispecialty services. Being a referral hospital, we receive many referrals from periphery which helps in improving maternal and perinatal outcome. Therefore, the purpose of this study was to determine whether placental position and mother fetal outcome are correlated.

METHODOLOGY

This was a prospective observational study conducted among antenatal women pf 28 weeks to 34 weeks gestation who reported to the Department of Radiodiagnosis, in tertiary care center, for routine obstetric scan during the period of study from December 2022 to March 2024. Total 241 Antenatal women with singleton pregnancy with gestational age more than 28 weeks after obtaining written informed consent were enrolled in this study. Pregnant women who don't give consent, not willing for follow up, with multiple gestation & gestational age less than 28 weeks were excluded.

Institutional Ethical committee permission was taken. After enrolment detailed demographic history was taken. Past history, family history, obstetric history was noted. Fetal dating scan was advised. The real time ultrasonographic examinations were performed using GE ultrasound equipment & PHILIPS HD11 XE ultrasound using a low frequency V-6/3-5 MHz probe. All selected pregnant females were scanned in supine posture. Placental location of pregnant females more than 28 weeks was taken. Cases were then categorized into 5 groups based on placental location. o Group I: Anterior o Group II: Posterior o Group III: Right lateral. o Group IV: Left lateral. o Group V: placenta previa. These patients followed up for maternal & fetal outcome till termination of pregnancy. Fetal outcomes were assessed in the form of birth weight, APGAR score, NICU admission, IUGR, IUFD &

congenital anomalies. Maternal outcomes were assessed in form of pregnancy induced hypertension, gestational DM, APH/ Placental abruption, mode of delivery.

Observational statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean $\pm$ SD. The 95% Confidence Intervals has been established for placental location according to estimated GA in weeks. The difference between the mean values of placental position and maternal and fetal outcome was examined using the students t test. Regression analysis and Pearson's correlation coefficient were used to determine the relationship between placental position and outcomes for the mother and fetus. The statistical software namely IBM SPSS was used for the statistical tests and analysis of the Data. Microsoft word and Excel have been used to generate graphs, tables etc.

RESULTS:

In the total study group of 241 antenatal cases, the age ranged between 18- 35 years. Maximum number of cases (51%) are seen in 21 to 25 years followed by 26 to 30 years age Group (32%). most common location of placenta is anterior (50.2%) followed by second most common location which is posterior (26.6%). (Table 1)

Table 1: Distribution Of Women According To Age & Placental Location

Demographic Parameter		Frequency	Percentage
Age	<20	51	21.2
	21-25	98	40.7
	26-30	77	32

Table 2: Association Between Placental Location With Feto-maternal Outcome

Placental Location		Anterior	Posterior	Fundal	Lateral	Grade I Placenta Previa	Grade II Placenta Previa	Grade III Placenta Previa	Grade IV Placenta Previa	p Value
PIH	No	106	61	5	25	4	3	3	2	0.000
	Yes	15	3	0	12	0	1	0	1	
GDM	No	115	62	5	37	4	4	3	3	0.938
	Yes	6	2	0	0	0	0	0	0	
APH	No	119	62	5	34	4	1	0	0	0.000
	Yes	2	2	0	3	0	3	3	3	
IUGR	No	108	57	4	22	3	3	3	2	0.000
	Yes	13	7	1	15	1	0	0	1	
Mode Of Delivery	FTND	103	56	4	33	0	0	0	0	0.000
	LSCS	18	8	1	4	4	4	3	3	
LBW	No	106	63	3	32	3	3	1	0	0.000
	Yes	15	1	2	5	1	1	2	3	
APGAR Score	Low	7	2	2	0	1	3	2	3	0.000
	Normal	114	62	3	37	3	1	1	0	
NICU	No	111	61	3	37	3	1	1	1	0.000
	Yes	10	3	2	0	1	3	2	2	
IUFD	No	120	64	5	37	4	4	3	2	0.876
	Yes	1	0	0	0	0	0	0	1	
Congenital Anomalies	No	120	64	5	37	4	4	3	3	0.998
	Yes	1	0	0	0	0	0	0	0	

In this study revealed that highest concentration of participants was within 21-25 years age group (40%). Various studies in literature, didn't focus extensively on maternal age as an isolated factor but mentioned its relevance in association with placental location and complications like hypertension and IUGR. For example, older maternal age is often linked to a higher risk of pregnancy complications, including hypertension, preeclampsia, and diabetes, which can be further exacerbated by abnormal placental locations. In our study most common location of placenta is anterior followed by second most common location which is posterior. This indicates central placental location is most common, which was similar to Nair VV et al study (2). This is contrary to Zia S et al study (3), which showed fundal placenta as most common location. Becker et al. 2001 study stated, The incidence of 'low placental position', with the placenta reaching the internal os was 0.66%. In 0.49% cases, the placenta overlapped the internal os at 20-23 weeks [4]. Ghourab 2001 study found that out of 104 placentae, the lower placental edge was positioned over the internal os in 33 women (complete previa) and within 3 cm from it in 71 women (low – lying placenta) [5]. Our study stated that, pregnancy induced hypertension is more common in lateral placental location. This is similar to Kolfinas et al, Seadati et al and Singh et al [6,7,8] Jaiswal et al, Bhalerao et al, Pai et al, Fung et al,

	>31	15	6.2
Placental Location	Anterior	11	50.2
	Posterior	64	26.6
	Fundal	5	2.1
	Lateral	37	15.4
	Grade I Placenta Previa	4	1.7
	Grade II Placenta Previa	4	1.7
	Grade III Placenta Previa	3	1.2
	Grade IV Placenta Previa	3	1.2

Placental location was significantly associated with PIH, APH, IUGR, Mode of delivery, LBW, APGAR score & NICU admission. (Table 2)

DISCUSSION:

This study primarily aimed to evaluate the impact of placental location, as determined by ultrasound, on maternal and neonatal outcomes in a tertiary care setting. The findings demonstrated significant associations between specific placental locations and various maternal and neonatal outcomes. Notably, placental locations such as anterior, posterior, lateral, and low-lying were correlated with outcomes including pregnancy-induced hypertension, APH/placental abruption, intrauterine growth restriction (IUGR), and neonatal intensive care unit (NICU) admissions, APGAR score and low birth weight. This was in contrary to Devarajan et al study (1), which states placental location was not associated with any differences in perinatal outcome.

Kakkar et al studies also reported high risk of development of PIH in lateral placentation which is consistent with our study. (9-13) In this study, there was no statistically significant correlation between with placental location and development of gestational diabetes mellitus. In this study, two cases (1.6%) out of 121 cases of anterior placenta, 2 (3.2%) out of 64 cases of posterior placenta and 3(8.6%) out of 37 cases of lateral placenta developed APH/Abruption placenta. However, this is statistically insignificant. According to Jang et al. (14) and Sekiguchi et al. (15), there is a 4.3% risk of placental abruption linked with anterior placentation.

In our study, out of total 37 patients with lateral placenta 15 patients (40%) were associated with IUGR. It is statistically significant with P value of ($p < 0.01$). Kolfinas et al, Seadati et al and Singh et al studies reported that Preeclampsia, intrauterine growth restriction (IUGR), and gestational hypertension were more prevalent in lateral placental locations. The reason for this could be an uneven blood supply. (13,14,15). Singh et al, Nair VV et al and Kalanithi et al found significant correlation between IUGR and lateral placenta [15,16,2]. Kofinas et al study reported that unilateral placentas are more common than central (anterior and posterior) ones in pregnancies with IUGR (13). This is consistent with our study. The Rajeswari et al study found

that low lying placenta, followed by posterior and lateral placental placement, was statistically associated with preterm labor, an increase in caesarean births, prematurity, low birth weight, and NICU admission of babies (17). Our study consistent with this association. Our study stated that Low APGAR score is commonly seen with placenta previa followed by anterior placenta. Kalanithi et al. examined the potential impact of placental position on infants' APGAR scores. Rajeswari et al study reported low lying placenta and posterior locations were statistically linked to premature labor, a higher frequency of caesarean deliveries, prematurity, low birth weight, and neonatal intensive care unit hospitalization. (17) This was consistent with our study. Singh et al, Warland et al and Jaisal et al stated that still birth was associated with posterior placenta [15,18,19]. Zia S et al found that anterior placenta was associated with IUD [3]. This is contrast to our study. There is no literature stating significant association of placental location with congenital anomalies.

CONCLUSION:

From this study we conclude that, Lateral placental location was strongly associated with adverse outcomes, including pregnancy-induced hypertension (PIH), intrauterine growth restriction (IUGR), and low birth weight (LBW). Placenta previa was particularly concerning, as it was linked to a higher risk of antepartum haemorrhage (APH) and placental abruption, as well as lower APGAR scores and increased NICU admissions, with a 100% rate of LSCS for fetal and maternal well-being. These findings signifies the critical role of placental location in determining pregnancy outcomes and highlight the need for close monitoring and management of pregnancies with lateral and previa placental placements to mitigate risks.

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