Original Article

Prevalence, Outcome, and Predictors of Placenta Migration among Pregnant Women with Placenta Praevia in Enugu Nigeria

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Abstract

Background: Placenta praevia is one of the leading causes of obstetric haemorrhages and a major contributor to maternal and fetal morbidity and mortality. Although low-lying placentae are common during routine midtrimester anomaly scans, the incidence of placenta praevia at term remains low, probably due to placenta migration. It is important to follow-up pregnant women with low-lying placentae to identify the few whose placenta will remain in the lower segment and hence at risk of major obstetric haemorrhage. **Aim:** The objectives of this study were to determine the prevalence, predictors, and pregnancy outcome of low-lying placenta diagnosed in the midtrimester. **Materials and Methods:** The study was a cohort study with longitudinal follow-up of 416 pregnant women from the University of Nigeria Teaching Hospital, Enugu State University Teaching Hospital, and Mother of Christ Specialist Hospital who had an ultrasound diagnosis of low-lying placentae between 16 weeks and 20 weeks of gestation. Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 22. $P < 0.05$ was considered statistically significant. **Results:** The prevalence of low-lying placenta at 20, 24, 28, 32, and 36 weeks of gestation was 51%, 41.3%, 22.3%, 12.7%, and 10.5%, respectively. 87.3% of those with low-lying placenta had normally situated placenta at term. Previous caesarean section and male gender were significant predictors of placenta praevia at delivery ($P < 0.001$ and $P = 0.03$, respectively). **Conclusion:** Despite the high prevalence of low-lying placenta before 20 weeks of gestation, only a few of these placentas remain low-lying at term. Previous caesarean section and male gender were significant predictors of placenta praevia at delivery. This study recommends a routine ultrasound scan in the second or third trimester for placenta localisation.

Keywords: Low-lying placenta, midtrimester, placenta praevia, ultrasonography

Introduction

The major obstetric haemorrhage is the leading cause of maternal morbidity and mortality and accounts for one-third of maternal deaths in Africa.[1] Postpartum haemorrhage is the most common type of obstetric haemorrhage and accounts for the majority of the 14 million cases that occur each year.[2] Placenta praevia is a known cause of obstetric haemorrhage and a major contributor to maternal mortality. Low-lying placenta is a common observation at the routine midtrimester fetal anomaly scan, and it alarms obstetricians because of the possibility of the placenta remaining in the lower segment and its association with maternal and fetal morbidity and mortality.[3] Placenta is defined as low-lying if the leading placental edge is within 20 mm of the internal os of the cervix. Pathophysiology of placenta praevia is initiated by the implantation of the embryo (embryonic plate) in the lower uterus. With placental attachment and growth, the cervical os may become covered by the developing placenta.[4] The reported incidence of low-lying placenta ranges from 6% to 46% in the second trimester and <1% at delivery.[5] The very low incidence of low-lying at term is explained by the concept of placental migration, which is a positional change of the placenta from the lower segment to the upper segment as a result of differential growth of placenta toward well-vascularised uterine fundus; degeneration of peripheral

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villi in the lower uterine segment that receives less blood supply and the differential growth rates of the lower segment of the uterus and placenta.[3,6,7] It is important to identify those groups of patients whose placenta persist as low-lying at term and offer them supervised obstetric care aimed at reducing the incidence of obstetric haemorrhages and hence maternal mortality. This study, therefore, aimed to study the prevalence, outcomes, and predictors of low-lying placenta in three tertiary health institutions in Enugu.

Methods

A longitudinal cohort study of 416 pregnant women attending antenatal care from the University of Nigeria Teaching Hospital, Enugu State University Teaching Hospital, and Mother of Christ Specialist Hospital who had an ultrasound diagnosis of low-lying placentae between 16 weeks and 20 weeks of gestation.

Transvaginal ultrasound examination was performed on all consenting pregnant women before 20 weeks and followed up four weekly until 36 weeks.

Ethical approval was obtained from the health research and ethics committee of the three institutions with ethical clearance number NHREC/05/01/2008B-FWA00002458-1RB00002323.

The participants for the study were drawn from pregnant women at 16–20 weeks gestation who had a low-positioned placenta, defined as an internal os distance of <20 mm. Low-positioned placenta included placenta praevia, defined as a placenta covering the internal os of the cervix, and a low-lying placenta, defined as a placenta lying near (within 20 mm) but not overlying the internal os. All women were reevaluated four weekly till 36 weeks gestation.

For the purpose of this study, low-lying placenta, defined as a placenta lying near to (<20 mm) but not overlying the internal os and placenta praevia defined as a placenta lying (>20 mm) of the internal os or overlapping it.

Data on women's age, marital status, religion, educational status, parity, reproductive history, past obstetric history including last confinement, and outcome were collected using a pro forma designed for this study. Every woman had a routine clinical examination with records of maternal height, weight, and blood pressure recorded.

Ultrasound scan was done every four weeks gestation from 20 to 24 weeks gestation on participants with ultrasound evidence of low-lying placenta and followed up to 36 weeks gestation to determine the placenta location and at delivery. This was done by the researcher and radiologist.

Three research assistants were used in each centre of the study. They comprise two residents in obstetrics and gynaecology and an experienced radiologist. The resident doctors aid in the collection of data using the pro forma, whereas the radiologist and researcher aid with the scanning of the participants.

Ultrasound scan was done using Toshiba Xario Xg Prime ultrasound machine with a 7.5 MHz transducer and measurements were taken in freeze mode by a single observer with five years of experience in obstetric sonography. Transvaginal scan of the placenta was performed with the parturient in the supine position with an empty bladder. The distance from the leading placental edge to the internal cervical os was measured. Parturient with a leading placenta edge of >0 mm but 20 mm or less from the internal cervical os was classified as having a low-lying placenta, whereas parturient with a leading placental edge overlapping the internal cervical os has a diagnosis of placenta praevia.

To assess for placental migration, follow-up transvaginal ultrasound examinations were done at 24, 28, 32, and 36 weeks, respectively. The primary outcome measure was the proportion of women who had a resolution on follow-up ultrasound.

Their sociodemographic characteristics, obstetrics history, and pregnancy outcome of those that had resolution were compared with those that had had persistence low-lying placenta and placenta praevia.

All participants were followed up till delivery to ascertain the actual placenta position and mode of delivery and any maternal or fetal morbidity or mortality.

Results

The sociodemographic and clinical profiles of the participants are shown in Table 1. The median age was 30 years, with the age range of 18–43 years. The median gravidity and parity were two and one, respectively, and the majority had above six years of education (89.4%).

Figure 1 shows the prevalence of low-lying placenta at 20 weeks gestation was 51%, whereas Figure 2 shows the prevalence of low-lying placenta at 24 weeks to be 41.3% and the prevalence of placenta praevia at 28, 32, and 36 weeks and delivery were 22.3%, 12.7%, 10.5%, and 12.7%, respectively. Table 2 shows the association between age, gravidity,

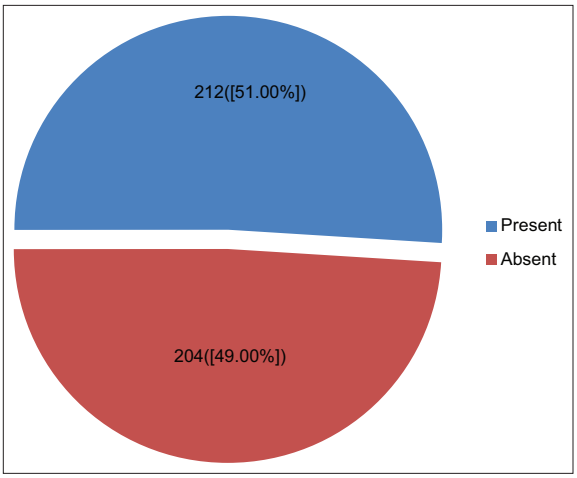

Figure 1: Prevalence of low-lying placenta at 20 weeks of gestation among the participants

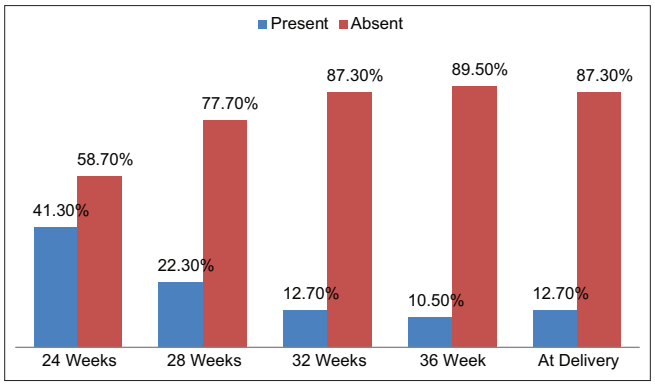

Figure 2: Prevalence of low-lying placenta at 24 weeks and prevalence of placenta praevia at 28, 32, and 36 weeks gestation and at delivery

previous caesarean section, previous miscarriage, and placenta praevia at birth. The table shows that there was a significant association between age and placenta praevia ($P = 0.03$), gravidity ($P = 0.01$), previous caesarean section ($P \leq 0.001$), history of previous miscarriage ($P = 0.001$), and gender of baby ($P = 0.001$). However, when these factors were subjected to multivariate logistic regression shown in Table 3, history of previous caesarean section and male gender were the significant predictors of placenta praevia at birth. The association between low-lying placenta at week 20 and feto-maternal complications is shown in Table 4. The table shows that participants with low-lying placenta had higher predelivery bleeding (26.3% vs. 4.0%, $P < 0.001$), postdelivery bleeding (23.6% vs. 10.9%, $P < 0.001$), and neonatal admission (20.1% vs. 10.0%, $P = 0.004$). However, there was no significant difference between those with or without low-lying placenta with regard to fetal death ($P = 0.85$). Table 5 shows the association between placenta praevia at delivery and feto-maternal complications. The table shows those participants with placenta praevia had higher predelivery bleeding (71.2% vs. 7.3%, $P < 0.001$), postdelivery (82.7% vs. 7.5%, $P = 0.001$), miscarriage (61.5% vs. 16.2%, $P < 0.001$), fetal distress (11.5% vs. 2.5%, $P = 0.001$), and neonatal admission (65.4% vs. 7.8%, $P < 0.001$).

Discussion

The prevalence of low-lying placenta at 20 weeks gestation from this study is 51%, whereas the prevalence at 24 weeks gestation is 41.3%, whereas the prevalence of placenta praevia at 28 weeks, 32 weeks, and 36 weeks and at delivery was 22.3%, 12.7%, 10.5%, and 12.7%, respectively. The findings are similar to the study done by Chama *et al*.[9] It is noted that the prevalence of placenta praevia is reduced with advancing gestational age. This is probably due to the fact that placenta migration occurs with increasing gestational age.

A majority of the women (87.3%) that had low-lying placenta initially had normally situated placenta at term. A similar study showed that 98.4% of patients with low-lying placenta that were sonographically followed up had resolved to no praevia before delivery.[10] The mechanism by which the placenta migrates upward with advancing gestational age has not been

Table 1: Sociodemographic and clinical profile of the participants

Variables	Frequency (%)
Age (years), median (range)	30.00 (18.00–43.00)
Gravidity, median (range)	2.00 (1.00–7.00)
Parity, median (range)	1.00 (0.00–5.00)
Educational status	
No formal	6 (1.4)
Primary	38 (9.1)
Secondary	181 (43.5)
Tertiary	191 (45.9)

Table 2: Association between age, gravidity, previous cesarean section, previous miscarriage, and placenta praevia at birth

Variables	Placenta praevia		χ^2	*P*
	Present, *n* (%)	Absent, *n* (%)		
Age (years)				
<35	38 (73.1)	304 (84.9)	4.60	0.03
≥35	14 (26.9)	54 (15.1)		
Gravidity				
≤5	46 (88.5)	345 (96.4)	6.42	0.01
>5	6 (11.5)	13 (3.6)		
Previous C/S				
Yes	49 (94.2)	68 (19.0)	126.03	<0.001
No	3 (5.8)	290 (81.0)		
History of previous miscarriage				
Yes	28 (53.8)	95 (26.5)	16.13	<0.001
No	24 (46.2)	263 (73.5)		
Gender of the baby				
Male	36 (69.2)	162 (45.3)	10.46	0.001
Female	16 (30.8)	196 (54.7)		

C/S: Cesarean section

Table 3: Multivariate logistic regression analysis of the predictors of placenta praevia at delivery

Variables	Wald	AOR	95% CI	*P*
Age (years)				
<35	Reference			
≥35	2.03	2.01	0.76–5.27	0.16
Gravidity				
≤5	Reference			
>5	0.03	0.90	0.27–3.00	0.86
Previous C/S				
Yes	43.76	72.14	20.31–256.31	<0.001
No	Reference			
History of previous miscarriage				
Yes	0.27	0.79	0.34–1.87	0.60
No	Reference			
Gender of the baby				
Male	4.84	0.42	0.19–0.91	0.03
Female	Reference			

C/S: Cesarean section, AOR: Adjusted odds ratio, CI: Confidence interval

Table 4: The association between low-lying placenta at week 20 and feto-maternal complications

Variables	Low-lying placenta		χ^2	*P*
	Present, *n* (%)	Absent, *n* (%)		
Predelivery bleeding				
Yes	55 (26.3)	8 (4.0)	39.31	<0.001
No	154 (73.7)	193 (96.0)		
Postdelivery bleeding				
Yes	48 (23.0)	22 (10.9)	10.46	0.001
No	161 (77.0)	179 (89.1)		
Miscarriage				
Yes	61 (29.2)	29 (14.4)	13.03	<0.001
No	148 (70.8)	172 (85.6)		
Foetal death				
Yes	8 (3.8)	7 (3.5)	0.04	0.85
No	201 (96.2)	194 (96.5)		
Neonatal admission				
Yes	42 (20.1)	20 (10.0)	8.22	0.004
No	167 (79.9)	181 (90.0)		

Table 5: The association between placenta praevia at delivery and feto-maternal complications

Variables	Placenta praevia		χ^2	*P*
	Present, *n* (%)	Absent, *n* (%)		
Predelivery bleeding				
Yes	37 (71.2)	26 (7.3)	142.52	<0.001
No	15 (28.8)	332 (92.7)		
Postdelivery bleeding				
Yes	43 (82.7)	27 (7.5)	181.17	0.001
No	9 (17.3)	331 (92.5)		
Miscarriage				
Yes	32 (61.5)	58 (16.2)	54.47	<0.001
No	20 (38.5)	300 (83.8)		
Fetal death				
Yes	6 (11.5)	9 (2.5)	10.49	0.001
No	46 (88.5)	349 (97.5)		
Neonatal admission				
Yes	34 (65.4)	28 (7.8)	117.22	<0.001
No	18 (34.6)	330 (92.2)		

fully understood. Certain theories have proposed changes in the architecture of the lower uterine segment with advancing gestational age.[3,10]

The study shows that previous history of caesarean section and male gender was significant predictions of placenta praevia at delivery ($P < 0.001$ and $P = 0.03$, respectively). 94.2% of participants with placenta praevia were found to have had previous caesarean section. This is similar to findings of studies done where it was shown that previous caesarean section was implicated in placenta praevia.[8,11-13] This could be explained by the fact that the presence of scar in the lower uterine segment will be reduced placenta migration.[11] Furthermore, our study showed that 69.2% of babies delivered with placenta praevia were males. This is in keeping with findings of other studies, although the mechanism for this association remains to be determined.[14]

A total of 26.3% of those with low-lying placenta at recruitment had threatened abortion, whereas 71.2% had antepartum haemorrhage. A study in Northern Nigeria showed that women with placenta praevia were at 12–14 weeks had 44% risk of threatened abortion and 15.7% risk of antepartum haemorrhage.[9] Although this was as high as in our study, it showed increase risk as when compared to those without low-lying placenta.

The caesarean section rate was as high as 26% among the study population compared with 8.4% among the general population ($P < 0.005$). This may be attributed to the fact that vaginal delivery could not be attempted in the presence of major placenta praevia. This finding is similar to what was found in Northern Nigeria.[9]

Conclusion

The prevalence of low-lying placenta at 20 weeks is high, and the outcome shows that previous history of caesarean section and male gender was significant predictors of placenta praevia at delivery. It is recommended that pregnant women should have at least one ultrasound scan in the second or third trimester for placenta localisation. Those found to have major placenta praevia in the third trimester should be closely followed up.[9]

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Conflicts of interest

There are no conflicts of interest.

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