Section: Obstetrics and Gynaecology

Original Research Article

A STUDY ON OUTCOMES OF LOW-LYING PLACENTA DIAGNOSED IN SECOND TRIMESTER ULTRASONOGRAPHY AND FACTORS AFFECTING PLACENTAL MIGRATION

N.Agila Raththi[1], S.Nithya[2]

[1]Assistant Professor, Department of Obstetrics and Gynaecology, Government Peripheral Hospital, Anna Nagar, Tamilnadu, India.
[2]Assistant Professor, Department of Obstetrics and Gynaecology, Government Peripheral Hospital, Anna Nagar, Tamilnadu, India.

Received : 13/06/2025
Received in revised form : 22/07/2025
Accepted : 14/08/2025

Keywords:
Low-Lying Placenta, Placenta Previa, Placental Migration, Antepartum Haemorrhage, Caesarean Section, Maternal Age.

Corresponding Author:
Dr. N. Agila Raththi,
Email: rathisavio83@gmail.com

DOI: 10.47009/jamp.2025.7.4.240

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2025; 7 (4); 1269-1273

ABSTRACT

Background: Placenta previa, a major cause of antepartum haemorrhage, complicates 0.4–0.8% of pregnancies. Although commonly detected in mid-trimester scans, up to 66% of low-lying placentas (LIP) resolve by term due to placental migration. This study aimed to evaluate the outcomes of LIP diagnosed by second-trimester ultrasonography and to determine the incidence and factors influencing its progression to placenta previa. **Materials and Methods:** This prospective observational study was conducted on 100 patients at the Institute of Obstetrics and Gynaecology and the Institute of Social Obstetrics of the Government Kasturba Gandhi Maternity Hospital, Chennai, from February 2022 to November 2022. A detailed history was obtained, including information on previous abortions and uterine procedures, and a comprehensive physical, systemic, and obstetric examination was conducted for all recruited patients. **Result:** All 100 women had an LIP at mid-trimester, but only 28 (28%) persisted at term, with a 72% migration rate. Most were aged 21–30 years (55%), homemakers (72%), and multigravida (65%). Prior LSCS was observed in 36% of patients, and anterior placental location was observed in 45% of patients. Migration was significantly lower when the placenta was touching the internal os (p=0.00001), in women aged <20 years (p=0.01), and in primigravida (p=0.03) groups. Persistence was significantly higher in women with a history of LSCS (p=0.0004), anterior placenta (p=0.02), prior medical termination of pregnancy (MTP) (p=0.001), and previous placenta previa (p=0.04). **Conclusion:** LIP poses significant foetal-maternal risks if it persists as placenta previa. Most women showed placental migration by the third trimester, whereas factors such as advanced maternal age, high parity, previous LSCS, MTP, and placenta previa significantly reduced migration rates.

INTRODUCTION

Haemorrhage is the most serious pregnancy complication, accounting for 25% of maternal deaths worldwide. Placenta previa is one of the most common causes of antepartum haemorrhage and can also lead to postpartum haemorrhage. It occurs when the placenta is fully or partially inserted into the lower uterine segment. The condition is characterised by painless, recurrent vaginal bleeding, with symptom severity typically correlating with the volume of blood loss.[1] The incidence varies with risk factors but complicates 0.4–0.8% of pregnancies and increases perinatal mortality by three to four times.[1,2]

The relationship between the internal cervical os and the placental edge determines the four types of placentae praevia. The greatest risk of bleeding during labor is with complete placenta previa, which occurs when the placenta entirely covers the internal os. When it partially covers the internal os, leaving space for cervical opening but still presenting a serious obstetric risk, the condition is known as partial placenta previa. In marginal placenta praevia, the placental edge reaches the internal os but does not cover it. A placental location that extends into the lower uterine segment but remains away from the internal os is referred to as a low-lying placenta (LIP).[3]

Transvaginal sonography (TVS) is a more accurate method for diagnosing and grading LIP in the early antenatal period compared to transabdominal sonography (TAS).[4] In the second trimester, sonography can diagnose the prevalence of LIP when

ISSN (O): 2687-5365; ISSN (P): 2753-6556

the placenta lies within 3 cm of the internal os. This prevalence ranges from 6–46% and drops to 0.5% at term.[3] A phenomenon known as "migration" accounts for the high number of false-positive diagnoses of placenta previa in early pregnancy.[5] The movement of the placenta from the lower to the upper segment as gestation progresses is termed placental migration.[3,5]

The prevalence of LIP in the mid-trimester, where the placenta is lying within 3 cm from the internal os, can be diagnosed sonographically in the second trimester, and it ranges from 6-46% and reduces to 0.5% at term.3 The high rate of false-positive diagnoses of placenta previa in early pregnancy is the false impression of a LIP, which is caused by a phenomenon called "migration".[5] Placental migration is the positional change of the placenta from the lower to the upper segment with increasing gestation.[3,5] This condition is due to the differential growth of two parts of the placenta, that is, the appropriate growth of the part attached to the well-vascularised fundus and the degeneration of peripheral villi in the lower uterine segment that receives less blood supply. This is also due to the difference in the growth rates of the lower segments of the uterus and placenta. This phenomenon is more obvious in the anterior LIP than in the posterior LIP.[3]

High parity, advanced maternal age, history of caesarean sections (CS), prior medical termination of pregnancy (MTP), and history of previous postpartum (PP) haemorrhage have all been identified as strong contributors to placenta previa. Unlike first-trimester bleeding, PP bleeding is usually caused by abnormal placental implantation that begins in the third trimester.[6] Ultrasonography detects many women with asymptomatic placenta previa or LIP when performed in mid-pregnancy.[7] However, roughly 66% will migrate, especially in LIP, incomplete, or marginal cases, to determine whether placenta previa persists, guidelines recommend a follow-up at 32 weeks.[8,9]

TVS measures the distance between the uterus and internal cervical os, which can help predict placenta previa at term.[4] However, predictions may vary depending on obstetric and maternal characteristics. Therefore, this study aimed to investigate the incidence and factors influencing the progression of LIP to placenta previa, as well as to assess the outcomes of LIP diagnosed by second-trimester ultrasonography.

MATERIALS AND METHODS

This prospective observational study was conducted on antenatal mothers attending OPD or hospitalised with USG findings suggestive of LIP in the second trimester. The study population comprised 100 patients at the Institute of Obstetrics and Gynaecology, Egmore, and the Institute of Social Obstetrics of the Government Kasturba Gandhi Maternity Hospital, Triplicane, Chennai, from February 2022 to November 2022. Before initiating the study, it was approved by the Institutional Ethics Committee. Written informed consent was obtained from the patients before patient enrolment.

Inclusion and exclusion criteria

Antenatal women with a gestational age between 16 and 24 weeks and women with LIP distance ≤ 2 cm from the internal cervical os (TAS/TVS) were included, while women with bleeding complaints were excluded.

Sample size: The following formula was used to determine the sample size: $n = [(Z1-_{\alpha/2})^2 * p * (1-p)]/d^2$, where $Z1-_{\alpha/2} = 1.96$, $p = 0.54$, and $d = 0.1$.[10] Thus, providing n = 95, with a 5% attrition rate, it was rounded off to 100.

Methods

Eligible antenatal women were recruited after counselling and providing written informed consent, with confidentiality maintained throughout the study. Clinical evaluation included detailed demographic, obstetric, and medical histories, along with general, systemic, and obstetric examinations. Ultrasound assessment was performed using transabdominal sonography, and when indicated, transvaginal sonography to measure the shortest distance from the placental edge to the internal cervical os and to determine placental location. The evaluation of placental migration, follow-up scans were planned at 32 weeks of gestation and repeated if necessary. The results were documented as either persistence or resolution of the low-lying placenta at term.

Statistical analysis

Data were analysed using IBM SPSS Statistics (v25). The Chi-square test was applied for categorical variables, and a p-value < 0.05 was considered statistically significant.

RESULTS

Most patients were aged between 21 and 30 years (55%), and most were homemakers (72%). Most of the patients were homemakers (72%), followed by skilled (16%) and unskilled (12%) workers. The majority were married for ≤5 years (68%), and most were multigravida (65%). A history of abortion was present in 25% of the patients, and 36% had undergone a previous LSCS. Most placentas were posteriorly located (55%), and only 2% had a history of placenta previa. All patients had an LIP in the mid-trimester; however, at term, only 28% continued to have an LIP, with a migration rate of 72% (Table 1).

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Table 1: Distribution of demographic and clinical profiles

		Frequency (%)
Age group in years	< 20	20 (20%)
	21–30	55 (55%)
	31–40	23 (23%)
	> 41	2 (2%)
Occupation	Homemaker	72 (72%)
	Skilled	16 (16%)
	Unskilled	12 (12%)
Marital history in years	≤ 5	68 (68%)
	> 5	32 (32%)
Obstetric status	Primi	35 (35%)
	P1	57 (57%)
	P2	6 (6%)
	P3	2 (2%)
Abortion history	Yes	25 (25%)
	No	75 (75%)
Placental position	Anterior	45 (45%)
	Posterior	55 (55%)
Previous LSCS	Yes	36 (36%)
	No	64 (64%)
Previous placenta previa	Yes	2 (2%)
	No	98 (98%)
Low lying placenta	Mid-trimester	100 (100%)
	At term	28 (28%)
	Rate of migration	72 (72%)

Placental migration at term showed a significant association with its distance from the internal os (p = 0.00001); migration was lowest when the placenta touched the os, with the position remaining unchanged in 67.7% of cases. Maternal age showed decreased migration with advancing age (p = 0.01), with nearly 50% of patients > 31 years of age not showing any migration. Increased parity was associated with reduced migration (p = 0.03), with 50% of multiparous patients not having migration at term. A prior history of LSCS (p = 0.0004), anterior placental location (p = 0.02), previous MTP (p = 0.001), and previous placenta previa (p = 0.04) were associated with lower rates of placental migration (Table 2).

Table 2: Association of maternal and placental factors with placental migration

Factors	Category	Low Lying Placenta		Difference in %	P-value
		Mid-trimester (18-22 weeks)	At term		
Distance from the internal os	Touching os	31	21	67.74%	0.00001
	< 1 cm	29	5	17.24%	
	1–2 cm	40	2	5%	
Maternal age group (years)	< 20	20	2	10%	0.01
	21–30	55	14	25.45%	
	31–40	23	11	47.82%	
	> 41	2	1	50%	
Parity	P0	35	4	11.4%	0.03
	P1	57	20	35.08%	
	P2	6	3	50%	
	P3	2	1	50%	
Previous LSCS	Yes	36	22	61.11%	0.0004
	No	64	6	9.375%	
Placental position	Anterior	45	16	35.55%	0.02
	Posterior	55	12	21.81%	
Previous MTP	Yes	25	10	40%	0.001
	No	75	18	24%	
Previous placenta previa	Yes	2	2	100%	0.04
	No	98	26	26.53%	

DISCUSSION

Older mothers, a rise in caesarean sections, and routine USG for anomaly scans at 20 weeks have contributed to an increased diagnosis of LIP on mid-trimester obstetric ultrasound (USG) scans in recent years. This study aimed to determine the incidence and factors influencing the persistence or progression of LIP to placenta previa at term, as well as to assess the outcomes of LIP diagnosed during second-trimester ultrasonography.

The majority of patient's age were between 21 and 30 years (55%), and most had multigravida status (65%). Supporting our study, Cleary-Goldman et al. reported that the majority of patients (79%) were under 35 years old.[11] Similarly, Mustafa et al. reported a mean maternal age of 26.9 years, with 33% of patients being primigravidae and 40.7% having had three or

ISSN (O): 2687-5365; ISSN (P): 2753-6556

more gestations.[12] Further supporting our findings, Ananth et al. report that the rate of placenta previa was higher among twin births (40%) than among singleton births. They also found that the rate of placenta previa increased with advancing maternal age and the number of pregnancies (gravidity).[13] Thus, suggesting that LIP is more prevalent among young and multiparous women.

In our study, 25% of patients had a history of abortion, and 36% had undergone a previous LSCS. Coinciding with our results, Mustafa et al. reported that 22% of patients had a history of one uterine curettage, and 16.6% had one prior Caesarean section.[12] Getahun et al. showed that, compared to vaginal delivery (0.38%), pregnancy following caesarean delivery was associated with a higher risk of placenta previa (0.63%).[14] Similarly, Leung et al. found that there is a higher risk of placenta previa among women with a previous caesarean section (1.31%) than among those without (0.75%). The risk of anterior placenta previa increases with the number of prior caesarean sections.[15] Taylor et al. reported that women with one or more previous spontaneous or induced abortions are 30% more likely to develop placenta previa during pregnancy.[16] This suggests that a history of LSCS or abortion may increase the risk of placenta previa.

In our study, all patients had an LIP in the mid-trimester; however, at term, only 28% continued to have an LIP, with a migration rate of 72%. Similarly, Jyotsna et al. observed a migration rate of 70.73%, as the prevalence of LIP was 8.08% in the mid-trimester, which reduced to 2.36% at term.[17] Karmakar et al. reported a migration rate of 77.3%, where 75 LIPs detected at 18-22 weeks migrated at term.[10] Thus, emphasising that most LIPs can resolve on their own before term.

Our study showed a significant relationship ($p = 0.00001$) between placental migration at term and its distance from the internal os; migration was least when the placenta was in contact with the os. Similarly, Pradhan et al. reported that when the distance was less than 1.5 cm, no migration occurred.18 Supporting our study, Karmakar et al. found that when the placenta overlapped the internal os by more than 2.5 cm at 18–22 weeks, no migration occurred.[10] Thus, indicating that the closer the placenta is to the internal os, the more persistent it will be.

In our study, increased maternal age and parity were significantly associated with decreased migration ($p = 0.01$ and 0.03, respectively). Aligning with our findings, Karmakar et al. reported that the rate of persistence was 10% for mothers < 20 years but rose to 55.5% for those aged 30-35 and 75.3% for those 35 years and older. They also reported that increased parity is associated with a higher chance of LIP persisting until delivery.[10] Babinszki et al. reported a 2.2% incidence of placenta previa at term in women with parity of five or higher, significantly higher than in those with low parity.[19] Cleary-Goldman et al. found that the risk of previa was 1.1% for women over 35 and 0.5% for those under 35.11 This is likely due to the general decline in uterine vascularity with age, making the migration mechanism less effective.

In our study, lower rates of placental migration were associated with a history of LSCS ($p = 0.0004$), anterior placental location ($p = 0.02$), previous MTP ($p = 0.001$), and prior placenta previa ($p = 0.04$). Coinciding with our findings, Karmakar et al. reported that women with a prior LSCS had a 1.9 times higher chance of LIP compared to those without such a history. They also reported that anterior placentas had a 70.4% migration rate, whereas posterior placentas had a 95.3% migration rate, a significant difference.[10] Similarly, Jyotsna et al. reported a lower migration rate for anterior placentas (64.51%) compared to posterior ones (90%).[17] Pradhan et al. reported that a prior history of MTP is linked to a higher persistence rate of LIP.18

The majority of LIP diagnosed in the second trimester migrate by term, and certain maternal and placental factors significantly influence persistence. Recognising these risk factors can aid in targeted monitoring and timely intervention to optimise maternal and foetal outcomes.

Limitations

The small sample size and single-centre design of this study may have limited the generalisability of the results. Factors such as maternal BMI, smoking status, and variability in USG measurements were not assessed, which could have influenced placental migration outcomes.

CONCLUSION

The majority were young, multigravida, and homemakers, and they showed spontaneous placental migration by term. However, persistence was observed when the placenta was closer to the internal os, anteriorly located, or associated with risk factors such as younger maternal age, primigravidity, previous caesarean section, medical termination of pregnancy, or a history of placenta previa. Further research through larger multicentre studies is recommended to improve follow-up protocols and develop predictive models for placental migration.

REFERENCES

1. Im MJ, Kamel I. Antepartum haemorrhage. Oxford Academic 2023;793-C314.S10. https://doi.org/10.1093/med/9780197584521.003.0313.
2. Ananth CV, Smulian JC, Vintzileos AM. The effect of placenta previa on neonatal mortality: a population-based study in the United States. Am J Obstet Gynecol 1989; 188:1299–304. https://pubmed.ncbi.nlm.nih.gov/12748502/.
3. Rani G, Singh SK, Kumari U, Sinha A. Role of transvaginal sonography in the study of migration of low-lying placenta from second trimester to end of third trimester. MedPulse 2019;9(1). https://www.medpulse.in/Gynacology/html_9_1_7.php.
4. Lauria MR, Smith RS, Treadwell MC. The use of second-trimester transvaginal sonography to predict placenta previa.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Ultrasound Obstet Gynecol 1996; 8:337–40. https://pubmed.ncbi.nlm.nih.gov/8978009/.
5. Kumari JS, Bhavani V, Swetha, Himabindu, Madhumitha M. Placental migration in mid-trimester low-lying placenta. IOSR J Dental Med Sci 2016; 15:150–6. https://doi.org/10.9790/0853-15110150156.
6. Rosenberg T, Pariente G, Sergienko R, Wiznitzer A, Sheiner E. Critical analysis of risk factors and outcome of placenta previa. Arch Gynecol Obstet 2011; 284:47–51. https://doi.org/10.1007/s00404-010-1598-7.
7. Sekiguchi A, Nakai A, Kawabata I, Hayashi M, Takeshita T. Type and location of placenta previa affect preterm delivery risk related to antepartum haemorrhage. Int J Med Sci 2013; 10:1683–8. https://doi.org/10.7150/ijms.6416.
8. Bhide A, Thilaganathan B. Recent advances in the management of placenta previa. Curr Opin Obstet Gynecol 2004; 16:447–51. https://doi.org/10.1097/00001703-200412000-00002.
9. Reddy UM, Abuhamad AZ, Levine D, Saade GR, Fetal Imaging Workshop Invited Participants. Fetal imaging: Executive summary of a joint Eunice Kennedy Shriver National Institute of Child Health and Human Development, society for maternal-fetal medicine, American institute of ultrasound in medicine, American college of obstetricians and gynecologists, American college of radiology, society for pediatric radiology, and society of radiologists in ultrasound fetal imaging workshop. J Ultrasound Med. 2014;33(5):745-757. https://pubmed.ncbi.nlm.nih.gov/24764329/.
10. Karmakar KS, Paria L, Chattapodhaya D. Outcome of low lying placenta at 18-22 weeks Prospective observational study. J Evolution Med Dent Sci 2019;8(40):3010-13. https://www.jemds.com/data_pdf/kakali%20sinhai-oct-7-.pdf.
11. Cleary-Goldman J, Malone FD, Vidaver J, Ball RH, Nyberg DA, Comstock CH, et al. Impact of maternal age on obstetric outcome. Obstet Gynecol 2005; 105:983–90. https://doi.org/10.1097/01.AOG.0000158118.75532.51.
12. Mustafá SA, Brizot ML, Carvalho MHB, Watanabe L, Kahhale S, Zugaib M. Transvaginal ultrasonography in predicting placenta previa at delivery: a longitudinal study: Transvaginal ultrasound and placenta previa. Ultrasound Obstet Gynecol 2002; 20:356–9. https://doi.org/10.1046/j.1469-0705.2002.00814.x.
13. Ananth CV, Demissie K, Smulian JC, Vintzileos AM. Placenta previa in singleton and twin births in the United States, 1989 through 1998: a comparison of risk factor profiles and associated conditions. Am J Obstet Gynecol 2003; 188:275–81. https://doi.org/10.1067/mob.2003.10.
14. Getahun D, Oyelese Y, Salihu HM. Previous caesarean delivery and risks of placenta previa and placental abruption. Am J Obstet Gynaecol 2006;107. https://pubmed.ncbi.nlm.nih.gov/16582111/.
15. Leung WC. Placenta previa and previous caesarean section. Int J Gynaecol Obstet 1995; 51:25–31. https://pubmed.ncbi.nlm.nih.gov/8582514/.
16. Taylor V, Kramer M, Vaughan T, Peacock S. Placenta previa in relation to induced and spontaneous abortion: A population-based study. Obstetrics & Gynecology 1993; 82:88–91. https://journals.lww.com/greenjournal/abstract/1993/07000/Placenta_Previa_in_Relation_to_Induced_and.16.aspx.
17. Jyotsna SC, Hema DA, Bellad MB. Assessment of placental migration in mid-trimester low-lying placenta. J Obstet Gynecol India 2009; 59:317–9. https://jogi.co.in/storage/files/assessment-of-placental-migration-in-mid-trimesterlow-lying-placenta.pdf.
18. Pradhan S, Tuladhar A, Shrestha A, Amatya NB, Pradhan P. Sonographic assessment of placental migration in second trimester low lying placenta. Nepal Med Coll J. 2012;14(4):331-333. https://pubmed.ncbi.nlm.nih.gov/24579546/.
19. Babinszki A, Kerenyi T, Torok O, Grazi V, Lapinski RH, Berkowitz RL. Perinatal outcome in grand and great-grand multiparity: effects of parity on obstetric risk factors. Am J Obstet Gynecol 1999; 181:669–74. https://doi.org/10.1016/s0002-9378(99)70511-9.

ISSN (O): 2687-5365; ISSN (P): 2753-6556