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Placental Migration in Mid Trimester Low-lying Placenta

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Abstract:
Objective: *To asses the migration of low-lying placenta under routine antenatal ultra sound at 20 weeks of gestation are subjected to transvaginal ultra sound for the diagnosis of placenta previa during third trimester and evaluate the factors affecting placental migration,its management based on placental localization.*
Methods: *in this prospective study all the cases of low-lying placenta (lower margin of placenta within 3cms from the internal os) detected on routein ultra sound at 18-22 weeks of gestation were selected and follow-up on serial transvagial sonography predicting the placental migration during 3rd Trimester for conformation and typing of placenta previa 2 weekly TVS was performed until migration of lower edge to a distance of more than 3cm from internal os- and planning management of placenta previa. The study was included women with prior C-section.*
Results:
In the prospective study total 800 cases were taken in a year period,400 were post caesareab pregency and 400 cases pregency following normal vaginal delivery.In the present study 78 cases of lowlying placenta were identified in the routine transabdominal scan at18-22 weeks of gestation were takenup to analyse the placental migration orpersistence as placentaprevia at term, was confirmed by transvaginal sonography which is the gold standered for the diagnosis of placental pathology. The prevalance of low lying placenta was 78(9.75%) in the midtrimester period of pregnancy, of which 47(60.25%)had migrated at term and 31(39.74%) cases persist as placentaprevia. In this present study 35 cases (44.5%) belongs to 25 to30 years of age. The total low lying placenta was identified in 78 cases in mid trimester and 41 cases 52.56% after pervious vaginal delivery of which 34 cases (82.9%) were migrated at term the remaining 37 cases (47.43% identified in previous caesarean pregency in which 13 (35.13%) cases migrated at term.Placental migration was 39.28% where the edge of placenta was 1.5-2cm distance from internal os and 87.80% when the distance was2-3cms.No migration inwhich1.5cms of distance of placenta from internal os.Placental migration in previous vaginal delivery was82.92%was more in relation to previous caesarion section. The P' value in the present study of placental migration among PCD & PVD is 0.029 is significant.Placental migration in 46 anterior placed placenta was71.73%and43(75%) in posteriorly situated placenta.
Conclusion:
Placenta migration is more significant when placenta is located 2-3 from internal os is (87.80%). Its P value is 0.008 is significant. Placenta migration in related to position of placenta, 46 cases were diagnosed as anterior placenta previa at mid trimister in which 33 (71.73%) cases were migrated at term. In 32 cases of posterior Placenta of previa in mid trimester (43.75%) 14 cases migrated at term. It shows placental migration is more in anterior placental of previa than posterior placenta previa. In this study complications in placenta of previa, (87%) presented with APH and 45% had preterm delivery, (45.1%) at premature babies, (38.6%) were NICU admissions.
Key words: *Placenta previa, placental migration, low laying placenta ,previous vaginal delivery, prior caesarean section.*

I. Introduction:

Placenta previa is a condition in which placenta is situated partially or completely with in the lower uterine segment of the uterus at or after 28 wks gestation. The term previa (Latin „ in front of) denotes the position of the placenta in relation to the presenting part. Prior to 28 wks placenta may be situated in or close to the developing lower segment and is described as low-lying. Most low-lying placenta will not become placenta previa. The incidence of low-lying placenta, sonographically diagnosed in the second trimester, ranges from 6%-46%.This rate, however, decreases to as low as 0.5% at delivery. The high rate of false-positive diagnoses of placenta previa in early pregnancy is explained by the false impression of a low-lying placenta. This is due to the compression of the lower part of the uterus by the overdistended bladder required during abdominal ultrasound examination. It is also explained by the concept of "migration." The prevalence of low lying placenta in the midtrimester where the placenta is lying within 3 cm from the internal os diagnosed sonographically in the second trimester ranges from 6-46% and reduces to as low as 0.5% at term due to placental migration (1) Placental migration was used to describe the apparent movement of the placenta away from the internal os.

Obviously, the placenta does not move per se, and the mechanism of apparent movement is not completely understood. To begin with, migration is clearly a misnomer, because decidual invasion by chorionic villi on either side of the cervical os persists.a low-lying placenta is less likely to "migrate" within a uterus with a prior cesarean hysterotomy scar.Among the placenta covering the internal os at mid pregnancy, 40% persist as previa at term.Rate of placental migration is,

0.1mm/week when it covered the os.

4.1mm/week when placental edge was 3cm away from os.

Placental migration is less likely if placenta is, Posterior, Thick

Lower edge is < 2cm from the os

II. William's classification:

1) Total placenta previa: The internal os is covered completely by placenta.

2) Partial placenta previa: The internal os is partially covered by placenta.

3) Marginal placenta previa: The edge of placenta is at the margin of the internal os.

4) Low lying placenta: The placenta is implanted in the lower uterine segment such that the placental edge does not reach the internal os,but in close proximity to it.

Rumack's classification :)

Complete placenta previa: describes the situation in which the internal cervical os is totally covered by the placenta.

Marginal placenta previa: denotes placental tissue at the edge of or encroaching on the internal cervical os. A

low lying placenta: one in which the placental edge is within 2 cm, but not covering any portion, of the internal cervical os.

Clinical classification,

Minor degree placenta previa: Type -1 and Type 2 anterior

Major degree placenta previa : Type -2 posterior,Type-3 and Type-4

DIAGNOSIS:

- Painless and recurrent vaginal bleeding in the second half of pregnancy should be taken as placenta previa unless proved otherwise.
- The diagnosis may be confirmed either clinically or by placentography.

1 out of every 16 vaginal examinations produces a major hemorrhage and 1 out of every 25 examinations result in hypovolemic shock. Also the accuracy of digital pelvic examination in the diagnosis of placenta previa is only 69%. A gentle speculum examination may be carried out, although the diagnostic yield is low. Speculum examination is not associated with increased risk of hemorrhage

1) Clinical:

1. **By internal examination (double set up examination):** A cervical digital examination is done with the woman in an operating room and with preparations for immediate cesarean delivery. Even the gentlest examination can cause torrential hemorrhage.
2. **Direct visualisation during caesarean section**.
3. **Examination of the placenta following vaginal delivery**.

2. Placentography:

1.Ultrasound:

1. Transabdominal
2. Transvaginal
3. Transperineal
4. Color Doppler

2. Soft Tissue Radiography

3. Air Cystography

4. Magnetic resonance imaging

Transvaginal scans improve the accuracy of placental localisation and are safe, so the suspected diagnosis of placenta praevia at 20 weeks of gestation by abdominal scan should be confirmed by transvaginal scan. In the second trimester transvaginal sonography (TVS) will reclassify 26–60% of cases where the abdominal scan diagnosed a low-lying placenta,46,47 meaning fewer women will need follow-up. In the third trimester, TVS changed the transabdominal scan diagnosis of placenta praevia in 12.5% of 32 women.48 Leerentveld et al.49 demonstrated high levels of accuracy of TVS in predicting placenta praevia in 100 women suspected of

having a low-lying placenta in the second and third trimester (sensitivity 87.5%, specificity 98.8%, positive predictive value 93.3%, negative predictive value 97.6% and false negative rate 2.33%).
Numerous prospective observational trials have used TVS to diagnose placenta praevia and none has experienced any haemorrhagic complications, thus confirming the safety of this technique.46–50 There is still only one small randomised controlled trial (n=38)51 comparing transabdominal scan and TVS for placenta praevia, which supports this safety profile and reports superior views, especially for posteriorly situated placentas.

All women require follow-up imaging if the placenta covers or overlaps the cervical os at 20 weeks of gestation. Women with a previous caesarean section require a higher index of suspicion as there are two problems to exclude: placenta praevia and placenta accreta. If the placenta lies anteriorly and reaches the cervical os at 20 weeks, a follow-up scan can help identify if it is implanted into the caesarean section scar. Placental 'apparent' migration, owing to the development of the lower uterine segment, occurs during the second and third trimester smigration is less likely to occur if the placenta is posterior or if there has been a previous caesarean section. In one study, only five of 55 women with a placenta reaching or overlapping the cervical os at 18–23 weeks of gestation (diagnosed by TVS) had placenta praevia at birth and in all cases the edge of the placenta had overlapped 15 mm over the os at 20 weeks of gestation. A previous caesarean section influences the placental migration.In women with placenta praevia found that even with a partial 'praevia' at 20–23 weeks (i.e. the edge of the placenta reached the internal cervical os), the chance of persistence of the placenta praevia tobe more requiring abdominal delivery . Conversely, although significant migration to allow vaginal delivery is unlikely if the placenta substantially overlaps the internal os by over 23 mm at 11–14 weeks of gestation, over 25 mm at 20–23 weeks of gestation lowlying placenta by over 20 mm at 26 weeks of gestation such migration is still possible and therefore follow-up scans should be taken.

Imaging at 32 weeks therefore seems timely in enabling a fairly definitive diagnosis to be made alongside a plan for further care, including follow-up imaging for possible accreta, counselling for delivery and planning delivery[8]

When the placental edge lies between 20 mm away from the internal os and 20 mm of overlap after 26 weeks' gestation, ultrasound should be repeated at regular intervals depending on the gestational age, distance from the internal os, and clinical features such as bleeding, because continued change in placental location is likely. Overlap of 20 mm or more at any time in the third trimester is highly predictive of the need for Caesarean section (CS).[11]

The os–placental edge distance on TVS after 35 weeks' gestation is valuable in planning route of delivery. When the placental edge lies > 20 mm away from the internal cervical os, women can be offered a trial of labour with a high expectation of success. A distance of 20 to 0 mm away from the os is associated with a higher CS rate, although vaginal delivery is still possible depending on the clinical circumstances.[12]
Transperineal sonography: value to be 98 percent, whereas the negative-predictive value was 100 percent.

III. Results:

1. Age distribution

Age	Group	
	PVD(n=400)	**PCS(n=400)**
< 20 yrs	12 (3%)	8 (2%)
20-25 yrs	124 (31%)	106 (26.5%)
25-30 yrs	173 (43.25%)	182 (44.5%)
> 30 yrs	91 (22.75%)	104 (26%)

The incidence of lowlying placenta is observed during 25-30 years of age, of which 44.5%observed in post caesarean section group.

2. Prevalence of low lying placenta at mid trimester and at term:

Tri mester(n=800)	No of cases low lying	Prevalence
Mid trimester	78	7.8%
term	31	3.1%

Prevalence of low lying placenta at mid trimester is 7.8% and is 3.1% at term.

3. Rate of placental migration.

No of mid trimester low lying placenta	No of LL Placenta at term / delivery	Rate of Placental migration
78	31	60.25%

Total numbers of low lying placenta at mid trimester are 78. Number of low lying placenta at term are 31 hence 47 cases are migrated near term. So rate of placental migration is 60.25% which is significant and 39.74% persistent as placentaprevia at term.

4. Relation between previous pregnancy events and placental migration

Previous pregnancy event	No of mid trimester low lying placenta	No of placenta migrated at term	% of migration
PVD(n=400)	41	34	82.92%
PCD(n=400)	37	13	35.13%
TOTAL(n=800)	78	47	60.25%

Chi square = 4.78; DF = 1; p = 0.029; S

Placental migration in previous vaginal delivery is 82.92% whereas in previous cesarean section delivery is 35.13%.Migration rate is decreased in case of PCD.The p value for placental migration among previous cesarean delivery and previous vaginal delivery is 0.029 which is significant for the study. Hence there is significant association between placental migration and previous cesarean delivery.

5. Placental migration in relation to initial distance from internal OS.

Initial distance from OS	group	No of mid trimester low lying placenta		No of placenta migrated at term		Total cases migrated (n=47)	Total % of migration
			TOTAL (n=78)	group	cases		
< 1.5	PVD	3	9	PVD	0	0	0.00%
	PCS	6		PCS	0		
1.5-cm -2cm	PVD	11	28	PVD	8	11	39.28%
	PCS	17		PCS	3		
2 cm – 3cm	PVD	22	41	PVD	21	36	87.80%
	PCS	19		PCS	15		

Chi square = 9.64; DF = 2; p = 0.008; S

Placental migration is 0% if placenta is located <1.5cm from internal os in mid trimester whereas it is greater that is 87.80% if it is located 2-3cm from internal os. It shows that migration occurs in maximum number cases if located 2-3cm from os.p value is 0.008 which is significant. There is strong association between rate of placental migration and initial distance from internal os. There is almost no migration if placenta is within 1.5cm from internal os at mid trimester.Migration in case of previous cesarean section cases is lower than the previous vaginal deliveries

CS for placenta previa at delivery. An average migration rate of > 1 mm per week was highly predictive of a normal outcome. An overlap of > 20 mm after 26 weeks was predictive of the need for CS.27 Predanic et al.28 have subsequently

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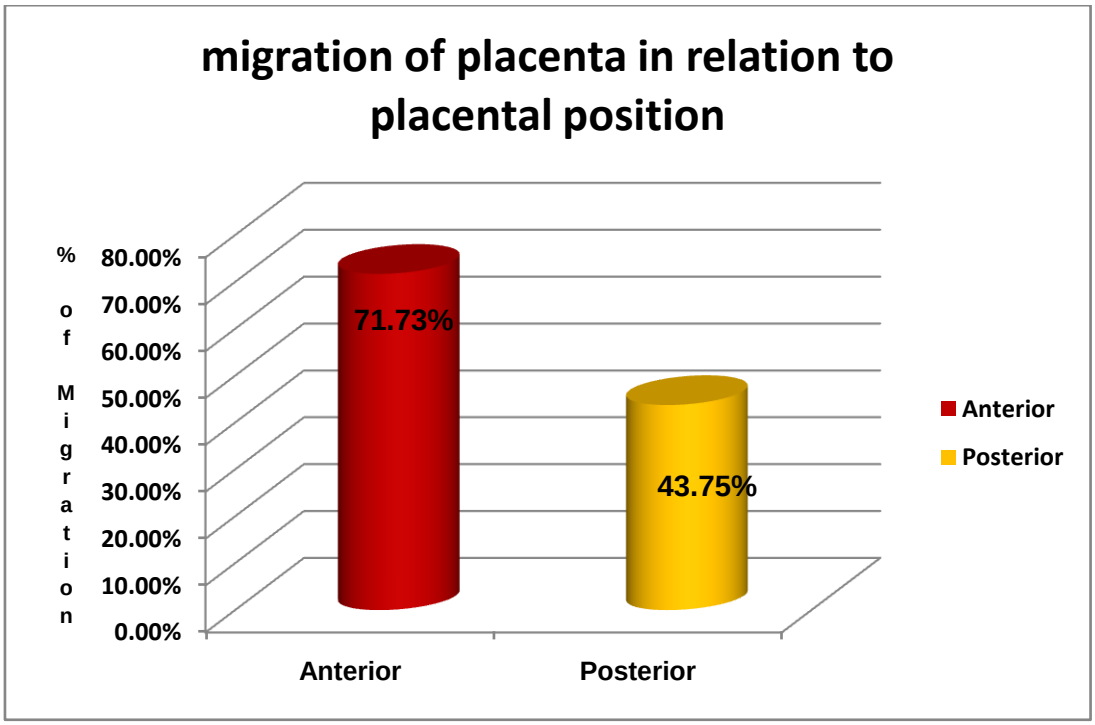
Placental migration in relation to position of placenta:



Placental position	No of mid trimester low lying placenta			No of placenta migrated at term			Total % of migration
	group	**cases**	**total**	**group**	**cases**	**total**	
Anterior	PVD	20	46	PVD	18	33	71.73%
	PCS	26		PCS	15		
Posterior	PVD	19	32	PVD	8	14	43.75%
	PCS	13		PCS	8		

Placental migration in case of anteriorly located placenta is 71.73%.In case of placenta located posteriorly migration rate is 43.75%. This shows placental migration is more in anterior placenta than posterior placenta.

6. Placental Location By Ultrasound In Previous Vaginal And Previous Caesarean Delivery

Group	**Placental Location at term**	
	Placenta Previa	**Normal Placenta**
PVD(n=400)	7 (1.75%)	393 (98.25%)
PCS(n=400)	24 (6%)	376 (94%)
Total(800)	31 (3.875%)	769 (96.125%)

Chi square= 9.52; df =1; p=0.002

7.Gradesof placenta previa among PVD and PCD:

Degree of PP	**No of cases in PVD**	**No of cases in PCD**	**Total**
Minor	4	16	20
Major	3	8	11
Total	7	24	31

Comparison of antenatal complications in placenta previa and normal placenta cases:

Antenatal Complication	Placenta Previa (n=31)	No. of cases with normal placental location (n=769)
1. APH	27 (87%)	12 (1.5%)
2. Mal presentation	6 (19%)	28 (3.6%)
3. Preterm Labour	14 (45%)	19 (2.4%)
4. IUD	1 (3.2%)	5 (0.6%)
5. Blood Transfusion	18 (58%)	26(3.3%)

Antenatal complications are more in cases of persistent placenta previa than in normally located placenta. 87% cases of placenta previa had antepartum hemorrhage, 58% had blood transfusions and 45% had preterm delivery whereas in normally located placenta 1.5% cases had antepartum hemorrhage, 3.3% had blood transfusions, 2.4% had preterm deliveries and 3.6% had malpresentations.

Fetal complications with normal and abnormal placental location:

Placental Location	**Fetal Complications**			
	IUGR	**Preterm**	**Low APGAR**	**NICU Admission**
Placenta Previa (n=31)	2 (6.4%)	14 (45.1%)	8 (25.80%)	18 (58.06%)
Normal Placental location(n=769)	13 (1.6%)	19 (2.4%)	15 (1.9%)	36 (4.6%)

As hypothesized the incidence of placenta praevia was higher in previous caesarean delivery patients,the other risk factors are multiparity multiple pregnancy,advanced maternal age,abnormal placentae etc. Among 400 previous vaginal delivery patients 41 (52.56%) had placenta praevia of which 34 cases(82.92%) were migrated, where as among the 400 previous caesarean delivery patients37 cases(47.43%) had low lying placenta . This was statistically proven to be significant (p value 0.002). All the patients who had placenta praevia underwent a caesarean delivery. Among the 31 patients with placenta praevia 22.58% had complete placenta praevia and 19.35% had marginal placenta praevia. Among the78 individuals with placenta praevia 46,(58.97%) had anterior placenta and32(41.03) % had posterior placentaOf46 cases of anterior placenta33 cases(71.73%) were migrated,in32 cases of posterior placenta 14 cases(43,75%) were migrated,it reflectes the placental migration observed more in anterior low lying placenta.

Discussion:In recent times,the diagnosis of low lying placenta has increased in midtrimester routine scans due to many factors.In the present study the occurrence of low lying placenta was 78 (9.75%) at the second trimester USG examination, is little higher than 8.08%ofShravage jyotsna C et al,4.5% ofTaipal because of better availability,utilization of USG in mid trimester and usage of TVS for confirmation, which is agold standered in the diagnosis and assessment of migration of low lying placenta. Of total 78 cases,47(60.25%)had placental migration at term which,is less than 7o.73% of the study ofShravage jyotsna et al .persistent lowlying placenta in the present study was 31(39.74%) . Out of the 41 women of pvd, 34(82.92%) had placental migration at term ,7(17.07%) cases persistent withlow lying placenta.,in 37 previous cesaerean section cases the,placental migration was observed in13(35.13%) cases which was comparatively less and 24 (64.86%)have persistent lowlying placenta it reflects the incidence of persistence of lowlying placenta associated with prior cesarean section cases.It has been suggested that previous cesarean section trauma to the endometrium promotes the abnormal implantation or it favours low lying placenta and hinders the placental migration. The placental migration was more in women with previous vaginal delivery in34 (82.92%) casesand 35.13% in the cases of previous cesaerean section,which was comparable with the study of[11] Shravage jyotsna et al.as78.5% placental migration in women with previous vaginal delivery and 40% in women with previous cesarean section. The rate of placental migration in the present study was 60.25%is comparable to 70% ofShravage jyotsna et alshowed in their study as posterior placenta migrates more compared to anterior placenta.Inthe present study the anterior placental migration was more as71.73% and43.75% was in posteriorly placed placenta.Finally the placenta previa observed in the present study at term in 31 cases out of 78 cases of low lying placenta in mid trimester.The rate of persistence of low lying placenta was 39.74% associated with complications.The overall incidence of placenta previa in the present study was 3.9%. Low lying placenta is a matter of concern to the obstetrician. 62.25%% of the mid trimester low lying placenta migrate to the upper segment by term. In others study 92% of the low lying placenta within 1.5 cm from the os continue to persist as placenta previa at term.In the present study the lowlying placenta within 1.5cm from internal os cases were 9and persist as lowlying placenta at term,which is 100%. Factors like previous LSCS and D&C may hinder placental migration,and promotes placenta previa The other factors like multiparity,multiple pregnancy etc,influence the placental implantation.

The present study noted the prevalence of low lying placenta in early mid trimester to be 9.75% which is higher compared to Taipale who reported the prevalence as 4.5% (2),8.08%ofDhumale.A et al.

It has been suggested that damage to the endometrium during cesarean section predisposes to low implantation of the placenta and also impairs the ability of placenta to migrate (3).Placental migration was more in cases following previous vaginal delivery82.92%,where as35.13% in cases of previous cesaerean sectionIn the cases following prior caesarean section the chances of migration was less and continued as placentaprevia at term.

IV. Conclusion:

In this present study refutes that prior C-Section is a major risk factor for the development of placenta previa.

Posterior placenta previa, placenta,lying within 1 cm from the internal cervical os and total placenta previa do not migrate during the third trimester. On the other hand, other types of placenta previa may migrate but not beyond 36 weeks' gestation. The lowlying placenta within 1cms from the internalos continue to persist as placenta previa at term without migration.The mode of deliverand outgome of prgnancy does not depend only on the placental degree but also on the placental position (anterior or posterior), and the relationship between the presenting part and the lower placental edge.60.25%of the mid trimester low lying placenta migrate to the upper uterine segment at term.

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