PLACENTAL MIGRATION AND MODE OF DELIVERY IN PLACENTA PREVIA: TRANSVAGINAL SONOGRAPHIC ASSESSMENT DURING THE THIRD TRIMESTER

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Background: The objective of this study was to assess the role of serial transvaginal sonography (TVS) in predicting placental migration and mode of delivery in pregnancy complicated by placenta previa during the third trimester.

Patients and Methods: In this prospective observational study, all the cases had confirmed diagnosis of placenta previa before 32 weeks' gestation. TVS was performed between 28 and 32 weeks' gestation for 287 patients with either clinical suspicion or previous sonographic diagnosis of placenta previa. The lower placental edge was found to cover the internal cervical os, or was found to be within 3 cm from it in 63 patients. A two-weekly TVS was performed for every patient until delivery, or until migration of the lower placental edge to a distance of more than 3 cm from the internal cervical os was observed. Detailed information on the placental postion, its distance from the internal cervical os, and its relation to the presenting part were recorded at each examination.

Results: Placental migration to a distance of more than 3 cm from the internal cervical os occurred in 24 patients (38%) by 36 weeks' gestation. Of the 63 patients, 19 (30.2%) delivered vaginally. The last scan of these patients revealed that the distance between the internal cervical os and the lower placental margin were more than 2 cm and 3 cm in the anterior and posterior placenta previa, respectively, and the presenting parts were below the placental margin. Placental migration was not observed sonographically in any of the eight patients with posterior placenta previa when its lower edge was initially located within 1 cm from the internal os. It was also not observed in either the 16 patients with total placenta previa, or in any of the other patients beyond 36 weeks' gestation.

Conclusion: Posterior placenta previa 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 mode of delivery 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.

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Transabdominal, transperineal and transvaginal sonography (TVS) have been used to localize the placenta with variable success rates.[1-3] Sonographic diagnosis of placenta previa has an excellent record of accuracy and safety.[1-8] Vaginal ultrasound is the most accurate method for localizing and diagnosing placenta previa because it can utilize higher frequencies of ultrasound and provide a better resolution of the lower edge of the placenta.[2]

The incidence of low-lying placenta, sonographically diagnosed in the second trimester, ranges from 6%-46%.[1] This rate, however, decreases to as low as 0.5% at delivery.[9] 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 over-distended bladder required during abdominal ultrasound examination. It is also explained by the concept of "migration," the term used in the literature to describe the positional changes of the lower margin of the placenta previa in relation to the internal cervical os. Placenta previa appears to migrate to a more fundal position in advancing pregnancy due to more rapid growth of the lower uterine segment. Furthermore, this phenomenon is more pronounced in the anterior than in the posterior low-lying placenta.[10-12]

The aim of this article is to report the incidence of placental migration and mode of delivery in cases of placenta previa diagnosed by transvaginal sonography in the early third trimester (i.e., between 28-32 weeks'

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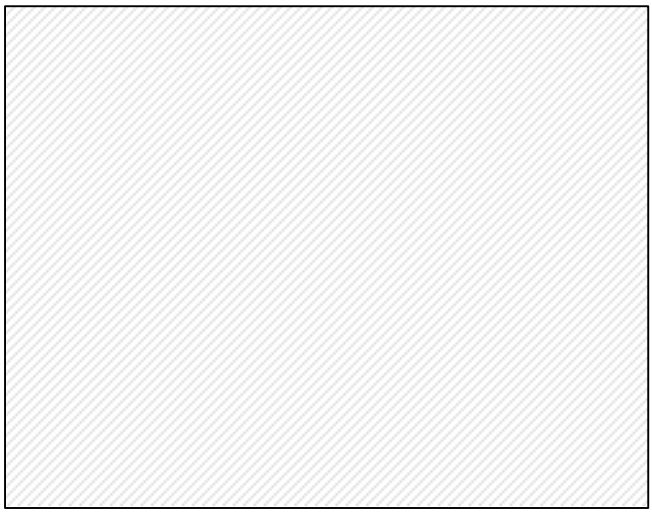

FIGURE 1. Anterior placenta previa at 37 weeks' gestation. The distance from the lower placental edge to the internal cervical os is 3 cm (it was 2 cm at 31 weeks). PL=placenta, B=bladder, P=ultrasound probe, H=fetal head, CX=cervix).

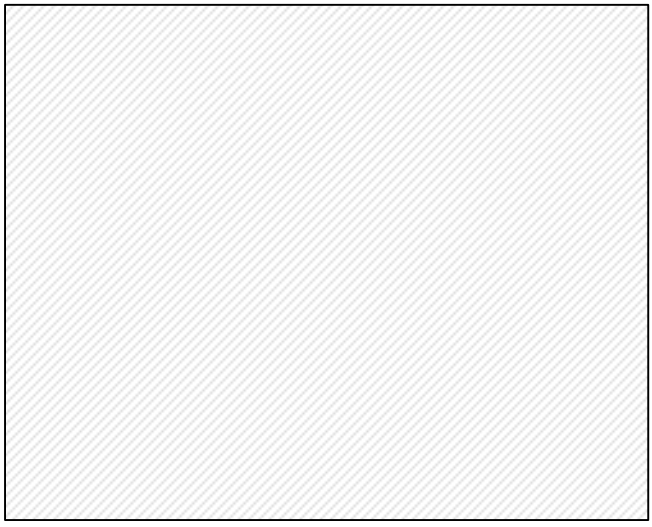

FIGURE 2. Total placenta previa. Placental tissue covers the internal cervical os. Cervical length is 3.5 cm (CX=cervix, PL=placenta, P= ultrasound probe).

Patients and Methods

Between January 1995 and March 1998, 287 patients with suspected diagnosis of placenta previa were referred for confirmation by transvaginal ultrasound. A Kretz Combison 310 Real-time Transvaginal Mechanical Sector Scanner (Kretztechnik GmbH, Zipf, Austria), with frequency ranging from 5-10 Mhz and a 240º sector angle was used.

The transducer was inserted cautiously into the vagina, up to a short distance from the cervix under continuous observation of the image. Sagittal scans for the whole length of the cervix and the lower part of the uterus were first obtained in each patient. The transducer was then rotated 90º in each direction to visualize the four quadrants of the lower uterine cavity. During rotation, adjustment of the transducer was necessary to keep the internal cervical os continuously visualized. The internal cervical os and at least 3 cm of the lower uterine wall were clearly visualized in all cases. Measurements were taken by tracing the distance between the lower edge of placental tissue and the internal cervical os in the absence of uterine contraction (Figure 1). The relationship between the presenting part and the lower placental edge was documented. All vaginal sonographic examinations were performed by the same operator (SG).

The diagnosis of total placenta previa was made when the placental tissue was found to cover the internal cervical os (Figure 2), while placenta lying within 3 cm from the internal cervical os at initial examination was referred to as placenta previa. Transvaginal sonographic examination was initially performed at 28-32 weeks, and repeated every two weeks afterwards to assess placental migration. Major placenta previa was excluded by the accomplishment of vaginal delivery, and in each case of cesarean section, the relationship between the lower placental edge and internal cervical os was digitally assessed and documented.

Chi-squared test was used to assess the statistical significance when the outcome of anterior and posterior placenta previa were compared. Cornfield's odds ratio was used to estimate the relative risk of cesarean section in posterior placenta previa compared to anterior placenta previa.

Results

There were 12,680 deliveries during the study period, and 84 of these (0.65%) had placenta previa. Of these, 63 were confirmed to have placenta previa between 28 and 32 weeks' gestation using TVS, and these were included in the study. The other 21 patients were excluded, as they either presented after 32 weeks' gestation, or had emergency cesarean section at first presentation.

A total of 208 repeat TVS examinations were performed on the 63 patients. Gestational weeks at diagnosis ranged from 28 to 32 weeks (mean 30.3 weeks). Vaginal bleeding did not occur during or within the 24 hours following the examinations. All 16 patients with total placenta previa were delivered either by elective cesarean sections after 36 weeks' gestation (6 patients, 37.5%) or emergency cesarean section because of

antepartum hemorrhage before 36 weeks (10 patients, 62.5%). Six patients had previous cesarean section scar and placenta accreta. They also had cesarean hysterectomy because of intractable intrapartum hemorrhage.

The initial sonographic examination showed that 26 patients had anterior or anterolateral placenta previa. Placental migration to a distance of more than 3 cm from the internal cervical os was observed in 15 patients (57.7%), 11 (73.3%) of whom delivered vaginally. Three out of seven patients (43%), with a distance of 2-3 cm from the lower placental margin to the internal cervical os, had normal vaginal delivery. At the time of labor, the presenting head was below the lower edge of the placenta in all patients who had vaginal delivery. The remaining 12 patients had either emergency cesarian section before 36 weeks' gestation because of antepartum hemorrhage (seven patients), or elective cesarian section at 37 weeks for persistence of the previa (three patients) and cephalopelvic disproportion (one patient). One of these patients developed massive peripartum hemorrhage for which she had cesarean hysterectomy.

Twenty-one patients had posterior or posterolateral placenta previa. Migration of the lower edge of the placenta to a distance of more than 3 cm from the internal cervical os was observed in nine patients (42.8%) by 36 weeks' gestation, of which five (55%) delivered vaginally. The last sonographic examination of these patients showed that the presenting parts were cephalic and below the lower edge of the placenta. The remaining four patients had either emergency cesarean section for antepartum hemorrhage (one patient) or elective abdominal delivery for other obstetric indications, in addition to low-lying placenta.

No migration was observed at delivery in eight patients with posterior placenta previa when its lower margin was within 1 cm from the internal cervical os at initial sonographic examination. However, placental migration to a distance of 2-2.6 cm from the internal cervical os was observed in the remaining four patients with posterior placenta previa when the placental edge was 1-1.9 cm away from the internal cervical os at initial TVS. Of these 12 patients, seven had emergency cesarean section for severe antepartum hemorrhage before 36 weeks, and the remaining five had elective cesarean section at 37-38 weeks because of placenta previa, high fetal presenting part and/or abnormal presentation.

No significant placental migration was observed in either anterior or posterior placenta previa after 36 weeks. Placental migration occurred more frequently in anterior than in posterior placental previa (15 out of 26 cases [57%] vs. 9 out of 21 cases [42.%] P=0.311). The difference was not statistically significant, however, the odds ratio was 1.82. When anterior and posterior placenta previa were compared with regards to mode of delivery, vaginal delivery was achieved more in the anterior than in the posterior placenta previa (14 out of 26 cases in anterior and 5 out of 21 cases in posterior placenta previa). The difference was statistically significant (P=0.037). Posterior placenta previa had an increased risk of cesarean delivery by 2.26 folds when compared to anterior placenta previa of a similar grade.

Cesarean hysterectomy was required in seven cases (11.1%) in our study, and all developed severe intrapartum hemorrhage, and had previous lower segment cesarean scar and anterior placenta previa accreta.

Discussion

Sonographic observations of changes in the distance between the lower placental edge and internal cervical os occurring during the second trimester and early third trimester are well documented in the literature.[13-15] King proposed the concept of a dynamic placenta that mobilizes itself from the lower uterine segment by a process of lower segment disattachment synchronous with the formation of new upper segment attachment.[16] However, no histo-pathological evidence of such migration has ever been confirmed. Although it is widely accepted now that the placenta does not actually move from its attachment, the term "placental migration" is still used to describe positional changes of the lower placental edge towards a more fundal position and away from the internal cervical os. This placental migration is due to the fact that the lower segment grows faster than the placenta, and the net result of this differential growth rate is that the lower placental edge appears to move away from the internal cervical os.[1,14,17,18] While some studies have claimed that the type and degree of placenta previa may indicate the type of delivery and clinical outcome,[13,15,19] other studies have shown that the degree of placenta previa is not predictive of clinical outcomes.[4,14,20]

Our study shows that the implantation site (whether anterior or posterior), the distance of the lower placental margin from the internal cervical os, and the relationship between the presenting part and the placental margin are important sonographic findings. These findings may predict clinical outcome in placenta previa. None of our patients had vaginal delivery if the presenting head was above the lower placental edge at the time of delivery.

In our study, total placenta previa diagnosed early in the third trimester did not migrate at all. This finding supports the suggestions of Townsend et al.[1] and Ancona et al.,[10] that dynamic placentation does not occur, and that once the placenta is implanted over the os, it remains fixed in that position. The 62.5% of the total placenta previa cases that were studied had severe antepartum hemorrhage and required immediate cesarean delivery before 36 weeks' gestation. Other studies have reported similar findings.[10] In this study, placental migration and the likelihood of vaginal delivery were observed more often and with more statistical significance in anterior than in posterior placenta previa. This finding is similar to the study by Ruparelia and Chapman,[11] who stated in their

correspondence that they found no placental migration in their patients with posterior placenta previa.

The cesarean delivery rate was significantly higher (76.2%) in posterior placenta previa than in anterior placenta previa (46.1%), (P<0.03). The rate of cesarean hysterectomy in our study was comparable to that reported by Nielson et al.,[21] who showed that the cesarean hysterectomy rate was as high as 16% due to placenta accreta. Therefore, counselling these patients on the possibility of major surgery such as hysterectomy is highly recommended, especially in patients with anterior placenta previa and previous cesarean section.

In conclusion, we believe that repeat transvaginal sonographic examination is not required in patients with total placenta previa, or in patients with posterior placenta previa lying within 1 cm from the internal cervical os, or in patients after 36 weeks' gestation, as migration of the placenta is not likely to occur in these patients. This is contrary to the recommendations of Farine et al.[22] that marginal placenta previa diagnosed before 36 weeks should have a scan close to term to exclude placental migration.

Placental site (anterior or posterior) and the distance of its lower margin from the internal cervical os are important sonographic findings in predicting the mode of delivery in patients with placenta previa when detected early in the third trimester. Operative delivery is indicated in all patients with placenta previa covering the internal cervical os and in posterior placenta previa when its lower margin is within 1 cm from the internal cervical os. However, normal vaginal delivery can be expected in other patients with placenta previa, especially if it is situated anteriorly, if its lower margin is more than 2 cm away from the internal cervical os, and if the fetal head is lower than the placental edge. As the number of patients presented in this study is small, further studies are necessary to validate our conclusions.

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