Placenta and Transvaginal Sonography

Ashok Khurana

ABSTRACT

In recent years, transvaginal evaluation of the placenta has completely changed the way obstetricians need to perceive and assess a low-lying placenta. Additionally, the number of negative ultrasound examinations in morbid placental adherence has reduced. This article presents the evidence on the safety and accuracy of transvaginal placental evaluation and goes on to discuss the manner in which transvaginal findings should alter clinical protocols to optimize maternal and fetal outcomes. It also answers a very pertinent clinical question: How low is low?

Keywords: Low-lying placenta, Magnetic resonance imaging, Safety and accuracy of transvaginal sonography.

How to cite this article: Khurana A. Placenta and Transvaginal Sonography. Donald School J Ultrasound Obstet Gynecol 2018;12(2):137-144.

Source of support: Nil

Conflict of interest: None

SAFETY AND ACCURACY OF TRANSVAGINAL ULTRASOUND

Transabdominal scans are associated with a false-positive rate of diagnosing placenta previa in about 25% of cases.1,2 This is consequent to multiple factors including a posterior location,3 shadowing from the fetal head,4 maternal abdominal obesity,5 and underfilling or overfilling of the fetal urinary bladder.6,7 Transvaginal scanning is now an unarguably accurate method for localizing a low placenta.8-11 As many as 60% of patients will have a reclassification of placental position on a transvaginal evaluation1 and a representative study reports a sensitivity of 87.5%, a phenomenal specificity of 98.85%, a positive predictive value of 93.3%, and a negative predictive value of 97.6%.12 A randomized control study13 has also confirmed the accuracy of transvaginal studies. In fact, transvaginal scanning has greatly reduced the incidence of placenta previa9,14 because of its better delineation of the internal os and inferior placental margin; three-dimensional (3D) transvaginal evaluation of the placenta and cervix holds great promise as shown in recent preliminary studies.15

The safety of transvaginal scanning is also not in doubt1,10,16 and the technique, in spite of initial skepticism, now has widespread acceptance.1

As a consequence, the clinical presentation of placenta previa has changed and most low-lying placentas are diagnosed during the second trimester anomalies scan.

MAGNETIC RESONANCE IMAGING EVALUATION

The diagnostic accuracy of magnetic resonance imaging (MRI) and ultrasonography for placenta accreta is comparable.16 The MRI serves as an adjunctive modality if there are ambiguous ultrasound findings or a suspicion of a posterior placenta accreta.

Controversy surrounds the use of gadolinium-based contrast enhancement, even though it increases the specificity of a diagnosis of placenta accreta. Gadolinium crosses the placenta and readily enters the fetal circulatory system. The Contrast Media Safety Committee of the European Society of Urogenital Radiology reviewed the literature and determined that no effect on the fetus has been reported following the use of gadolinium contrast media.17 The American College of Radiology guidance document for safe MRI practices recommends that intravenous gadolinium should be avoided during pregnancy and should be used only if absolutely essential.18

PLACENTA PREVIA

The confusion that existed in the “classification” and nomenclature of placental location has undergone significant clarification over the past decade, and a clinically relevant understanding of placental location is now apparent. Terms, such as “low-lying placenta,” “marginal placenta previa,” “partial placenta previa,” and “total placenta previa” all refer to an abnormally low placenta. A total placenta previa completely spans across the internal os (Fig. 1). A partial placenta previa partially spans across the internal os (Fig. 2). A marginal placenta previa down to the internal os, but does not span across it (Fig. 3). It is appropriate to specify the distance between the lower margin of the placenta and the internal os.1 A placenta that extends down to the internal os is 0 mm away from the internal os. The amount of placenta that overlaps the internal os should also be measured and the distance reported in mm.1

It is also now clear that changes in placental location occur throughout gestation and are consequent to two phenomena, formation of the lower uterine segment and...
placental trophotropism.11,19,20 “Trophotropism” is the term used to describe preferential proliferation of trophoblastic villi in regions of better endometrial supply along with atrophy of villi in areas with a poorer blood supply.19,20 Placental position and shape can therefore, change as pregnancy progresses. Trophotropism explains resolution of placenta previa, increase in pathologic extent of placenta previa, the development of succenturiate lobes or a bilobed placenta, odd-shaped placentas and abnormal cord insertions. Over 90% of placentas that are low lying at 20 weeks of gestation will achieve a normal position at term.11,21 A low placenta is evident in about two-fifths of patients at 11 to 14 weeks, in about 1 in 25 patients at 20 to 24 weeks, and about 1 in 50 patients at term.22 Predisposing factors for placenta previa include previous cesarean section, previous cavitary surgery, previous vigorous curettage, multiparity, and advanced maternal age.19,23,24

Serial evaluation demonstrates placental migration25 and it is possible to predict which cases will persist to term.7,9,14,22,26-28 A review of these studies indicates that placentas that overlap the cervix by a distance greater than 10 to 15 mm in the second trimester are likely to be persistently low at term. Most placentas that do not overlap the internal os are likely to “resolve” at term. Vaginal delivery is generally possible once the placenta is 20 mm superior to the internal os. A significant number of pregnancies with placentas between 10 and 20 mm can also be delivered vaginally. Another ultrasound feature that also influences placental migration is the morphology of the inferior edge of the placenta.29 Placentas with a thin inferior edge (Fig. 4) are more likely to persist till term. The cervix should be measured in all low placentas. The chances of bleeding are higher with a short cervix.
placenta from the internal os, most patients who do have antepartum bleeding, will not have episodes which are life-threatening or require premature delivery. It must be emphasized, however, that pregnancies with a placenta that is within 40 mm of the internal os do have a higher risk of postpartum hemorrhage. The distance of a low-lying placenta from the internal os does not seem to influence the risk of antepartum bleeding. This is more influenced by cervical length and the presence of an echo-free space (Fig. 6) in the lower edge of the placenta overlying the internal os (Fig. 7). Both these factors increase the possibility of the need for an emergency delivery prior to 34 weeks of gestation. Most patients without these two features can be managed expectantly without hospitalization. Cervical cerclage for a short cervix with a low placenta is not justified. Placenta accreta and vasa previa are intimately associated with placenta previa. Accurate prenatal identification of affected pregnancies allows optimal management because timing and site of delivery, availability of blood products, and recruitment of a skilled anesthesia and surgical team.

**PLACENTA ACCRETA**

The term “placenta accreta” is the generic term for abnormal adherence of the placenta to the uterus. It is consequential to a defect in the fibrinoid (Nitabuch’s) layer of the decidua underlying the placenta. The term “placenta accreta vera” is used when the placenta is adherent to the myometrium, but does not invade it (Fig. 8). When myometrial invasion takes place, the term “placenta increta” is used (Fig. 9). Placenta percreta refers to the situation where invasion extends beyond the uterine serosa and into the urinary bladder (Fig. 10) or rectum. The placenta does not separate after delivery and can result in a situation of retained placenta, life-threatening hemorrhage or uterine rupture, not infrequently requiring an emergency hysterectomy. Risk factors include previous cesarean section, previous curettage, previous morbid adheren, a low-lying placenta, advanced maternal age, submucous fibroids and anomalies of uterine structure, such as uterine horns. Accurate prenatal identification of affected pregnancies allows optimal management because timing and site of delivery, availability of blood products, and recruitment of a skilled anesthesia and surgical team.

---

**Fig. 5:** Low placenta with a round lower edge. This type is more likely to migrate away from the internal os as pregnancy progresses to term.

**Fig. 6:** Note the echo free fluid space between the placenta and the internal os. Low placentas with such a morphology are more likely to bleed.

**Fig. 7:** Note the echo free fluid space between the placenta and the internal os. Low placentas with such a morphology are more likely to bleed.

**Fig. 8:** Placenta accreta. Note the extensively obscured interface that should have been seen as a hypochoic zone between the basal extent of the placenta and the subplacental myometrium.
can be arranged in advance. Cesarean section is planned at 36 weeks gestation to minimize the risk of spontaneous labor and surgical planning of the site of incision and need for uterine artery balloon occlusion can be individualized. Detailed maternal and family counseling, including issues of future fertility, can be taken into consideration during delivery planning and an option of conservative management may be offered.

With high-risk patients, a targeted transabdominal evaluation of the anterior myometrium and bladder wall is performed using the highest-frequency transducer that can produce an adequate image (with a “full” bladder). Transvaginal ultrasound is always performed when the placenta is low lying.

A multifeature ultrasound evaluation enhances the accuracy of detecting the diagnosis, although these are by no means very sensitive. These include loss of the retroplacental clear space, reduced myometrial thickness, placenta previa, placental lacunae, abnormal color Doppler imaging patterns, an irregular urinary bladder wall and abnormal 3D power Doppler vascular mapping.
The normal retroplacental complex is thinned out (2 mm or less) or obliterated in placenta accreta. The retroplacental complex refers to the hypoechoic space behind the placenta that is normally 10 to 20 mm thick. A retroplacental hypoechoic line is usually seen with normal placentation. Absence of this hypoechoic line or clear space has been described with placenta accreta. However, absence of the hypoechoic line has also been seen in normal pregnancies and absence of the clear space alone is not predictive for placenta accreta.

Reduced myometrial thickness is tricky to evaluate, overly subjective, difficult to replicate, and reports in literature are scant. This sign has, therefore, never been reliable.

Placenta previa significantly increases the risk for placenta accreta: 6.8 to 10% among affected women. However, only 88% of cases of placenta accreta are associated with placenta previa.

Multiple hypoechoic or anechoic lacunae are often evident in the placenta (Fig. 11). These may give it a Swiss-cheese appearance.

Invasion of the bladder or rectum may be evident (Fig. 12).

Color Doppler features include interruption of myometrial vessels, hyperemia of myometrial vessels, and turbulent flow in lacunae (Fig. 13).

![Fig. 11: Multiple anechoic spaces are often evident in an invasive placenta. These can enlarge and be more extensive giving it a swiss-cheese appearance. Note the extensively obscured retroplacental decidual stripe and the extension of the placenta up to the wall of the urinary bladder](image)

![Figs 12A and B: Complete placenta previa with a Swiss cheese morphology extending through the myometrium and into the urinary bladder](image)

![Figs 13A and B: Color Doppler features of placenta accreta include interruption of myometrial vessels, hyperemia of myometrial vessels and turbulent flow in lacunae](image)
The 3D power Doppler studies have helped to identify a new reliable sign. Normal placentas show vessels that run parallel to the long axis of the uterus. Invasive placentas show branches that run perpendicular to these main vessels and show a course running through the myometrium (Fig. 14).

Recent MRI reports are encouraging. The most useful findings are uterine bulging, heterogeneous signal intensity within the placenta, and dark intraplacental bands on T2-weighted images. The MRI protocols are, however, cumbersome and demand a meticulous technique.

CONCLUSION

Ultrasound is currently the finest tool for assessing the placenta. Recent advances in imaging have reduced the gap between negative ultrasound examinations and critical placental disease.

REFERENCES


