Prenatal Diagnosis of Adherent Placenta

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Abstract
Abnormal placentation is a life-threatening obstetric condition that requires a multidisciplinary team in management. There are many factors involved in abnormal decidualization, especially in cases with previous uterine surgery. The incidence of this pathology has increased due to higher rate of caesarean delivery. The antenatal diagnosis is very important as it allows a planned, multidisciplinary approach in order to minimize the risks to the mother and the fetus. Clinicians should be aware of the clinical issues, risk factors, and imaging findings associated with abnormal placentation to facilitate optimal case management.

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1. Introduction

Abnormal adherence of the placenta is caused by a defect in the decidualisation usually determined by a pre-existing damage in the uterine wall. There are 3 types of abnormal adherence: placenta accreta (attachment to the myometrium), placenta increta (placenta penetrates the myometrium) and placenta percreta (placenta passes the myometrium and attach the serosa or adjacent organs.)
There are many factors involved in the pathogenesis of abnormal placentation. A thin, absent or dysfunctional decidua leading to abnormal decidualization in a scar from previous uterine surgery determines the attachment of the placenta directly to the myometrium (1, 2), secondary to excessive extravillous trophoblastic invasion in an area of scarring (3). The caesarean scar defects associated with incomplete healing of the uterine scar (isthmocele or niche) is a risk factor for abnormal placentation (4). There are cases when abnormal decidualization are not related to previous uterine interventions but rather from uterine pathology like bicornuate uterus, fibroids or adenomyosis that may associate tiny defects in the endometrium that interfere with the normal function (5).

In rare cases when the scar is partial or complete dehiscent, the placenta penetrates the deeper myometrium, serosa and the organs nearby (2). Some suggest that depth of invasion evolve with advancing gestation, but on the other hand, there are cases with confirmed placenta percreta at 16 weeks of pregnancy (3). The incidence increases in the last decades because of the higher prevalence of the caesarean delivery. Usually the first clinical symptom is represented by the life-threatening and massive haemorrhage at the attempting of the manual separation of the placenta from the uterus. On the contrary, the expulsion of the placenta does not occur and the whole placenta (or part or it) remains strongly attached to the myometrium, without any separation plane.

The importance of the pathology is represented by the haemorrhage that appears after attempts of removing the placenta. The lack of the plane between the myometrium and the basal layer of the placenta results in massive bleeding due to increased vascularity at the placental site. The haemorrhage is severe, and it can lead to disseminated intravascular coagulopathy, renal failure and even death. Peripartum hysterectomy is usually the best treatment in these cases. The severity is increased with the higher grade of invasion of the placenta. In cases of antenatal diagnosis, the management includes cesarean hysterectomy with the placenta left undisturbed in situ (6, 7). Thus, antenatal diagnosis is very important as it reduces the maternal and fetal morbidity and mortality. It gives the chance to a multidisciplinary approach and thus to minimize potential maternal or neonatal morbidity and mortality.

2. Imaging in abnormal placentation
The most important tools in evaluating the placenta in antepartum period are ultrasound, MRI and in selected cases, cystoscopy.

The ultrasound
There are some sonographic features in the second and third trimester associated with abnormal placentation.

Placental lacunae represented by multiple hypoechoic spaces, large, irregular located in the lobule adjacent to the involved myometrium, aspect known as a “moth eaten” or Swiss cheese appearance (8, 9). These lacunae contain turbulent flow, are indistinct and often appear to be parallel linear vascular channels extending from the placental parenchyma into the myometrium (10).
**Loss of the retroplacental space** – the normal hypoechoic line between the uterus and the placenta may be missing in cases of abnormal adherent placenta. Difficulties in evaluating this space appear in cases of posterior location of the placenta or in cases of advanced gestational age. Its sensitivity and positive predictive are very low, only 7% and 6% (10). It is not an useful sign when it is used alone and it is not recommended to take decisions bases only on the loss of the retroplacental space, but instead, it requires further and detailed investigations for a better diagnosis (5).

**Disruption or loss of bladder line** – the continuous white line that represents the interface between bladder wall and uterine serosa might be lost of disrupted. In cases of abnormal placental adherence, this is due to the invasion of the placenta into the bladder wall, or due to the neovascularity (11). The Doppler examination shows confluent anarchic vessel that can protrude into the bladder (12).

**Myometrial thinning.** The myometrial thickness measured between the echogenic serosa and the retroplacental vessels less than 1 mm was related to be predictive for abnormal placentation (13). The myometrium can be thin from a prior hysterotomy scar or from a placental invasion. The evaluation of the myometrium thickness can sometimes be difficult and instead is recommended the evaluation of the presence and contour of the myometrium (10).

**Placental bulge** represented by the protruding of the uterine wall attached to the adherent placenta into the bladder is not a specific sign in cases of adherent placenta. It is displacement of the uterine serosa from the expected plane due to bulging of the placental tissue into nearby organs. The uterine serosa appears intact, but the shape is modified (8). It requires further investigations as it does not represent diagnosis criteria.

**The Doppler examination** adds other important features and confirms the diagnosis when used with other ultrasound findings. Vascular lakes with turbulent flow, diffuse or focal intraparenchymal lacunar flow or hypervascularity of serosa-bladder interface are some characteristics seen with adherent placenta. The bridging vessels that arise in the myometrium and pass into the bladder that appear secondary to the peritoneal neovascularity caused by the dilatation of the large and deep subplacental myometrial vessels. The high vascularity may be due to different levels of expression of vascular endothelial growth factors and their receptors in the placentas of patients with this pathology (10, 11). Some studies demonstrated that the presence of color flow in the venous plexus underlying the placenta was statically significant in predicting placenta accrete (11).

The utility of ultrasound is also important in the first trimester in patients with previous uterine scar. The location of the gestational sac next to or near the uterine scar or niche in the isthmus, rather than the fundus should rise the suspicion of a scar pregnancy (4, 14).

**MRI**

Recently, there has been an interest in the use of MRI in pregnancy in evaluating different types of pathology. The indication of the MRI in assessing the placenta is important in ambiguous ultrasound findings or in a posterior placenta (15). The bladder can be no longer used in identifying the retroplacental space in posterior location of the placenta and MRI is basically more useful in these cases.

Another advantage of the MRI is in assessment of the depth of the myometrial, parametrial and bladder involvement. (8, 16, 17)

MRI findings in placenta accrete are heterogeneous signal intensity within the placenta, presence of intraplacental bands on the T2-W imaging, uterine bulging into the bladder, abnormal placental vascularity and focal interruption of the myometrium (18, 19).
In cases of suspected placenta percreta with bladder invasion, cystoscopy frequently shows posterior bladder wall abnormalities, but fulguration and biopsy of the suspect areas should be avoided since they may precipitate massive hematuria (20).

3. Conclusions
Abnormal placentation is a major obstetric complication and it is one of the main causes of peripartum hysterec-tomy and maternal and perinatal morbidity and mortality. The incidence of abnormal placentation increases in the last decades because of the higher prevalence of the caesarean delivery. The antenatal diagnosis is very important as it reduces the maternal and fetal morbidity and mortality, giving the chance to a multidisciplinary approach. Ultrasound remains an important tool in evaluation of the placenta. It is easily accessible and is the first diagnosis tool used in pregnancy.

There are some ultrasound features that should rise the suspicion of abnormal placentation and in case of doubt, MRI should complete further evaluation. Correlation of the clinical and prenatal imaging is essential in improving prenatal screening, diagnosis and management of the placenta pathology. A standard protocol needs to be developed in order to minimize the risks of this type of pathology.

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