

Placental Abruption in a Patient with Suspected Placenta Accreta: The Critical Role of Imaging

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Abstract

Case Report

Background: Placenta accreta spectrum (PAS) disorders are increasingly prevalent, particularly in women with prior cesarean deliveries. Concomitant placental abruption in the context of PAS presents a unique diagnostic and management challenge. **Case Presentation:** We report the case of a 32-year-old gravida 5, para 5 woman with a history of three cesarean deliveries, who presented with third-trimester vaginal bleeding. MRI demonstrated an anterior, low-lying placenta with preserved myometrial-placental interface in most areas, but a markedly thinned isthmic myometrium measuring 1.4 mm. A 5 cm heterogeneous T2 hyperintense collection consistent with hemorrhage was identified between the placenta and uterine wall, compressing the amniotic sac and fetus—findings suggestive of a coexisting placental abruption. No signs of extra-uterine invasion or bladder involvement were seen. **Conclusion:** This case underscores the vital role of MRI in evaluating suspected PAS, particularly in complex presentations with overlapping placental pathologies. MRI provides essential anatomical detail, enabling comprehensive prenatal assessment, multidisciplinary planning, and optimal peripartum management to minimize maternal-fetal morbidity.

Keywords: Placenta Accreta Spectrum (PAS), Placental Abruption, MRI, Cesarean Delivery, Third Trimester Bleeding.

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INTRODUCTION

Placental implantation abnormalities, grouped under the term *placenta accreta spectrum (PAS) disorders*, include placenta accreta, increta, and percreta, classified by the depth of trophoblastic invasion into the myometrium. Although rare, their incidence has significantly increased, making them a growing public health concern due to high maternal morbidity and mortality [1].

While 2D obstetric ultrasound with Doppler remains the first-line diagnostic tool, its sensitivity is variable (60–88%). Magnetic Resonance Imaging (MRI) has been proposed as a more accurate and sensitive imaging modality, especially for preoperative assessment. MRI allows for better delineation of placental invasion and surrounding structures, thereby helping to guide management decisions and referring patients to appropriately equipped and experienced medical teams [2].

CLINICAL CASE

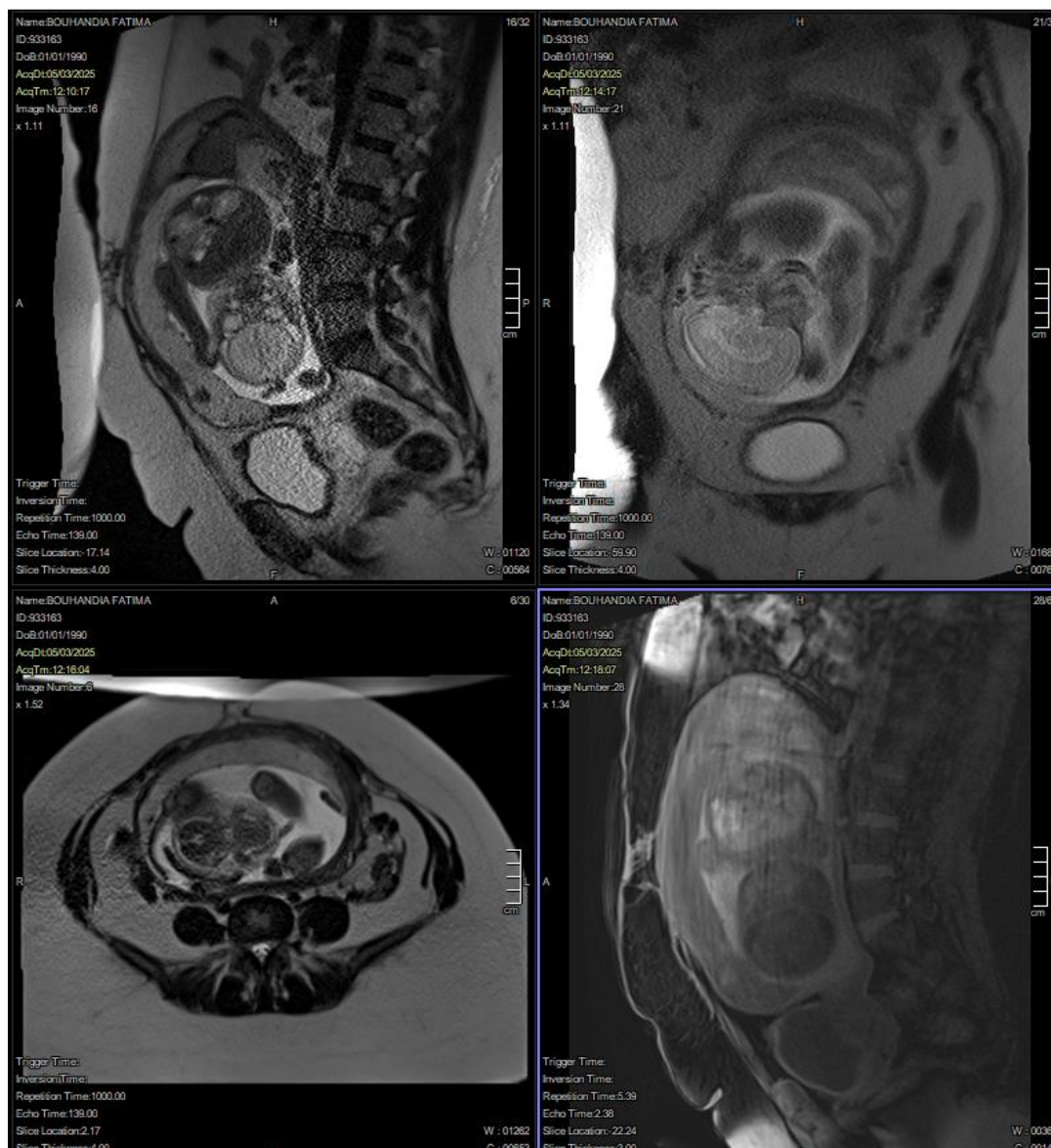
The patient is a 32-year-old woman, G5P5 (gravida 5, para 5). She has had one vaginal delivery and three cesarean sections.

She is currently presenting with metrorrhagia of the third trimester, and has been addressed for clinical and sonographic suspicion of placenta accreta.

MRI Findings

- The placenta is anterior, low-lying, grade II, and does not cover the internal cervical os, remaining at a distance of 2 cm from it.
- It shows intermediate signal intensity on T2-weighted images (image 1) and low signal intensity on T1-weighted image (image 4).
- A heterogeneous T2 signal collection, (image 3) measuring up to 5 cm in maximal thickness, is noted. Its appearance suggests hemorrhagic content of varying age. This collection exerts mass effect, displacing both the amniotic sac and the fetus inferiorly.

- The remainder of the placenta–myometrium interface appears regular, although there is a marked thinning of the residual isthmic myometrium, measuring 1.4 mm.
- No evidence of extra-serosal extension is observed.
- The bladder is partially filled, maintaining its normal T2 hypointense wall signal.
- The uterovesical interface is preserved. A subcentimetric nodular image is noted, though it cannot be characterized on this examination.
- Single intrauterine pregnancy is confirmed.



Images 1-4: T2/T1 Truffi and Haste sagittal, coronal and axial sequences

DISCUSSION

Placental implantation abnormalities have been increasing steadily and significantly in recent years, with a reported prevalence of placenta accreta raised to 1 in 533 deliveries [3].

This rising trend appears to be directly correlated with an increase in uterine mucosal damage over the reproductive lifespan of women—particularly due to the rising number of cesarean sections over the past five decades [4].

Not only is the cesarean delivery directly incriminated in the risk of placenta accreta but their number is a key risk factor in the increase of it, a study has shown that the risk of placenta accreta increases 3–4 times with two or more cesarean deliveries compared to just one [5, 6], the occurrence of placenta accreta spectrum jumped from 0.3% in women with one cesarean to 6.74% in women with five or more cesareans [7]. In our case, our patient has undergone 3 cesarean deliveries, which implements the results of the previous studies.

Clinical detection of placenta accreta and its complications relies mainly on recognizing risk factors, especially in cases of second- or third-trimester bleeding, and when the placenta is low-lying. Serious complications such as uterine rupture may occur, often leading to hemoperitoneum and hemorrhagic shock [5].

The first line of radiological examination is sonography, which often shows highly suggestive signs of placenta accreta such as [14]:

- The presence of intraplacental lacunae,
- The absence of a hypoechoic line between the placenta and the myometrium,
- Interruption of the hyperechoic interface between the uterine serosa and the bladder,

Or its complications: [8]

- Retroplacental hematoma, which often appears as a hypoechoic or poorly defined collection behind the placenta.
- Anechoic or cystic areas within the placental tissue, indicating intraplacental bleeding.
- Separation and contouring of the placental margins, suggesting partial detachment.
- Placental thickening, typically exceeding 5.5 cm, which may reflect underlying hemorrhage or edema.
- Increased thickness of the retroplacental myometrium, normally 1–2 cm, unless altered by a localized myometrial contraction.
- Interruption or absence of the normal retroplacental blood flow, visible on Doppler imaging.

Although highly suggestive, it remains insufficient in some cases to confirm the diagnosis [8].

MRI provides greater anatomical and topographical precision in assessing the extent of invasion and involvement of adjacent organs in cases of placenta percreta [9].

The superiority of MRI has been demonstrated in evaluating the depth of placental invasion in cases of placenta accreta and its complications [10].

Several MRI features suggestive of abnormal placental implantation are well-documented in the literature and were considered during image interpretation:

- Disruption of the myometrial-placental interface: Normally seen as a thin T2 hypointense line on multiple slices, its loss is correlated with the absence of the retroplacental clear zone on ultrasound. However, this sign has a high false-positive rate due to limitations in MRI spatial resolution, image angle, and compression artifacts related to the pressure of the surface coil during scanning [11].

- Myometrial thinning or focal placental bulge: Also referred to as “placental bulge”, this sign is seen when the placenta protrudes focally into an overlying myometrium that appears thinned or even imperceptible due to the bulging effect [12].
- Abnormal uterine bulging: In cases of abnormal placentation, the normal pear-shaped contour of the uterus is replaced by a “hourglass” shape due to the expansion of the lower uterine segment by a bulky, low-lying placenta and associated thinning and remodeling of the myometrium conforming to the placenta’s contour [11].
- Intraplacental T2 hypointense bands: These appear as linear or nodular hypointense areas >1 cm in thickness on T2-weighted images. They correspond histologically to fibrin deposition, often a sequela of prior hemorrhage or infarction [11].
- Retroplacental hematoma: On MRI, hemorrhage due to placental abruption appears as an area of intermediate to high signal intensity on T1-weighted images and high signal on T2-weighted images, located between the placenta and the uterine wall.

CONCLUSION

Abnormal placental implantation, particularly within the placenta accreta spectrum (PAS), represents a growing obstetrical challenge due to its increasing incidence and associated maternal morbidity and mortality. This rise is strongly linked to the surge in cesarean deliveries and other uterine surgical interventions over recent decades.

Early and accurate prenatal diagnosis is essential to optimize patient management and outcomes. While ultrasound remains the first-line imaging modality for screening, MRI has emerged as a valuable complementary tool, offering superior anatomical detail and improved assessment of the depth and extent of placental invasion, particularly in suspected cases of placenta increta or percreta.

MRI enables better surgical planning by identifying critical signs such as myometrial thinning, disruption of the placental-myometrial interface, abnormal uterine contour, and potential invasion of adjacent organs. Thus, integrating MRI into the diagnostic pathway enhances the multidisciplinary management of high-risk pregnancies and contributes significantly to maternal safety.

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