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A Comparative Assessment of Ultrasonography and Magnetic Resonance Imaging for distinguishing Placenta Accreta, Increta, and Percreta

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Introduction

Placenta accreta spectrum (PAS) disorders, including accreta, increta, and percreta, are associated with severe obstetric complications and remain a major cause of maternal morbidity and mortality. Timely and accurate prenatal diagnosis is critical for planning delivery and reducing adverse outcomes. Ultrasonography is widely regarded as the first-line diagnostic tool, whereas MRI is increasingly used as a complementary modality to refine the assessment of invasion depth. Nevertheless, the comparative performance of these imaging techniques in differentiating PAS subtypes remains uncertain.

Objective

This study aims to evaluate and compare the diagnostic performance of ultrasound and magnetic resonance imaging (MRI) in distinguishing between placenta accreta/increta, and placenta percreta.

Methods

We retrospectively reviewed ultrasonography (US) and MRI findings in 20 cases of PAS, from January 1, 2016, to December 31, 2021, to determine features which assist in identifying the presence and extent of placental implantation abnormality. Pathologic correlation was available in all cases.

Results

- The prenatal diagnosis of placenta percreta was comparatively easier than that of placenta accreta or increta, with a statistically significant difference (p = 0.03).
- Regarding ultrasound findings, the presence of stage 3 lacunae was predictive of placenta percreta, with a significant difference (p = 0.005). In addition, thinning of the myometrium adjacent to the bladder was predictive of placenta accreta or increta, also with a significant difference (p = 0.04).
- With respect to the performance of ultrasound in the prenatal diagnosis of placenta accreta/increta (Group 1), it was found that the combination of multiple ultrasound signs did not improve the diagnostic accuracy for either placenta accreta/increta or placenta percreta.
- For placental MRI, no predictive signs for placenta accreta/increta or placenta percreta were identified with statistical significance, even when multiple features were combined (Table I).

Conclusion

- Ultrasonography exhibits superior diagnostic accuracy compared to Magnetic Resonance Imaging (MRI) in detecting placenta accreta and increta.
- However, MRI's diagnostic performance can be substantially improved for identifying placenta percreta.

Table I. Comparison of Antenatal Diagnostic Modalities in the Study Population

	ACCRETA N = 35	PERCRETA N = 8	P
ANTENATAL DIAGNOSIS	16 (45,7%)	4 (50%)	0,03
• Intraoperative diagnosis – Cesarean			0,08
• Intraoperative diagnosis – Vaginal	18 (51,4%) 1 (2,8%)	4 (50%) 0 (0%)	
ECHOGRAPHIC FEATURES			
• Presence of intraplacental lacunae			0,96
• Stage 3 lacunae	27 (77,1%)	6 (75%)	0,005
• Absence/interruption of hypoechoic line (placenta–myometrium)	2 (22,9%) 14 (40%)	6 (75%) 3 (37,5%)	0,89
• Disruption of hypoechoic interface (serosa–bladder)			0,98
• Myometrial thinning adjacent to bladder	13 (37,1%)	3 (37,5%)	
• Vessels invading bladder			0,04
• Flow within lacunae	18 (51,4%)	1 (12,5%)	
• Abnormal vessels toward bladder			0,29
• Hypervascularity at uterine–bladder interface	2 (5,7%) 4 (11,4%) 2 (5,7%) 6 (17,1%)	2 (25%) 6 (75%) 4 (50%) 3 (37,5%)	0,28 0,19 0,88
PLACENTAL MRI FINDINGS			
• Abnormal bulging of lower uterine segment	5 (41,7%)	2 (66,7%)	0,45
• Heterogeneous placental T2 signal	9 (75%)	3 (100%)	0,35
• Intraplacental dark T2 bands			
• Loss of placenta–myometrium interface	7 (58,3%)	2 (66,7%)	0,79
• Placental extension into adjacent organs (T2 hypointensity)	7 (58,3%)	3 (100%)	0,18
	3 (25%)	2 (66,7%)	0,18
COMBINATION OF ULTRASOUND FINDINGS			
• More than 1 sign	29 (82,8%)	6 (75%)	0,61
• More than 2 sign	26 (74,3%)	4 (50%)	0,18
• More than 3 sign	13 (37,1)	3 (37,5%)	0,98
COMBINATION OF PLACENTAL MRI FINDINGS			
• More than 1 sign	0 (0%)	0 (0%)	0,19
• More than 2 sign	2 (16,6%)	1 (33,3%)	0,18
• More than 3 sign	7 (58,3%)	2 (66,7%)	0,98