

Evaluation of Report Characteristics and Patient Outcomes in Cases of Missed Diagnosis of Placenta Accreta Spectrum on MRI

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Purpose and Clinical Relevance

- Placenta Accreta Spectrum (PAS) is a range of clinical conditions in which the placenta is pathologically adherent to the uterine myometrium, increasing the risk of serious peripartum hemorrhage.
- When a placentation anomaly is identified or suspected based on ultrasound findings, MRI may serve as an adjunct tool in diagnosis.
- Missed diagnosis of PAS on MRI can affect patient outcomes by preventing proper operative planning and care coordination.
- Studying relationships between missed PAS and patient outcomes has the potential to improve the quality of patient care.

Materials and Methods

- IRB-approved, retrospective, single-institution study. An institutional OB database was accessed to identify all patients with an operative diagnosis of PAS between 2008-2022.
- Inclusion criteria: (a) post-operative pathology report with a diagnosis of PAS (b) history of surgical cesarean delivery.
- Chart review was conducted to identify the rate of discordance between MRI findings and operative and pathologic diagnoses in patients undergoing cesarean delivery for suspected PAS.

Definitions of Concordance

- Missed diagnosis was defined as an MRI diagnosis of none or no evidence of PAS when PAS was diagnosed at surgery or pathology.
- Under-diagnosis was defined as an MRI diagnosis of placenta accreta or increta when a diagnosis of placenta percreta was made on an alternate diagnostic modality.
- Over-diagnosis was defined as an MRI diagnosis of PAS when no diagnosis was made on an alternate diagnostic modality, or an MRI diagnosis of placenta percreta when a diagnosis of placenta accreta or increta was made at the time of surgery or pathology evaluation.

Of 112 patients meeting inclusion criteria, 59 (52.7%) underwent MRI.

Imaging Modality	n (%)
Maternal Fetal Medicine Ultrasound	107 (95.5)
Ultrasound with Radiology	12 (10.7)
CTA	2 (1.8)
MRI	59 (52.7)
Uterine Artery Embolization with IR	32 (28.6)

Table 1 Type of Preoperative Imaging Performed

Concordance Rates Among Imaging Modalities

Among the 59 patients who underwent MRI, the final diagnosis was compared among MRI, Ultrasound (US), Operative notes, and Pathology notes. Comparing MRI to US, the final diagnosis was found to be concordant among 39 (66.1%) of patients. Of the 20 that were discordant, 6 were missed on MRI, 4 underdiagnosed, and 10 over-diagnosed. Comparing MRI to Operative notes, the final diagnosis was found to be concordant among 40 (67.8%) of patients. Of the 19 that were discordant, 9 were missed on MRI, 8 were underdiagnosed, and 2 were over-diagnosed. Comparing MRI to Pathology notes, the final diagnosis was found to be concordant among 36 (61.0%) of patients. Of the 23 that were discordant, 12 were missed on MRI, 4 were underdiagnosed, and 7 were over-diagnosed.

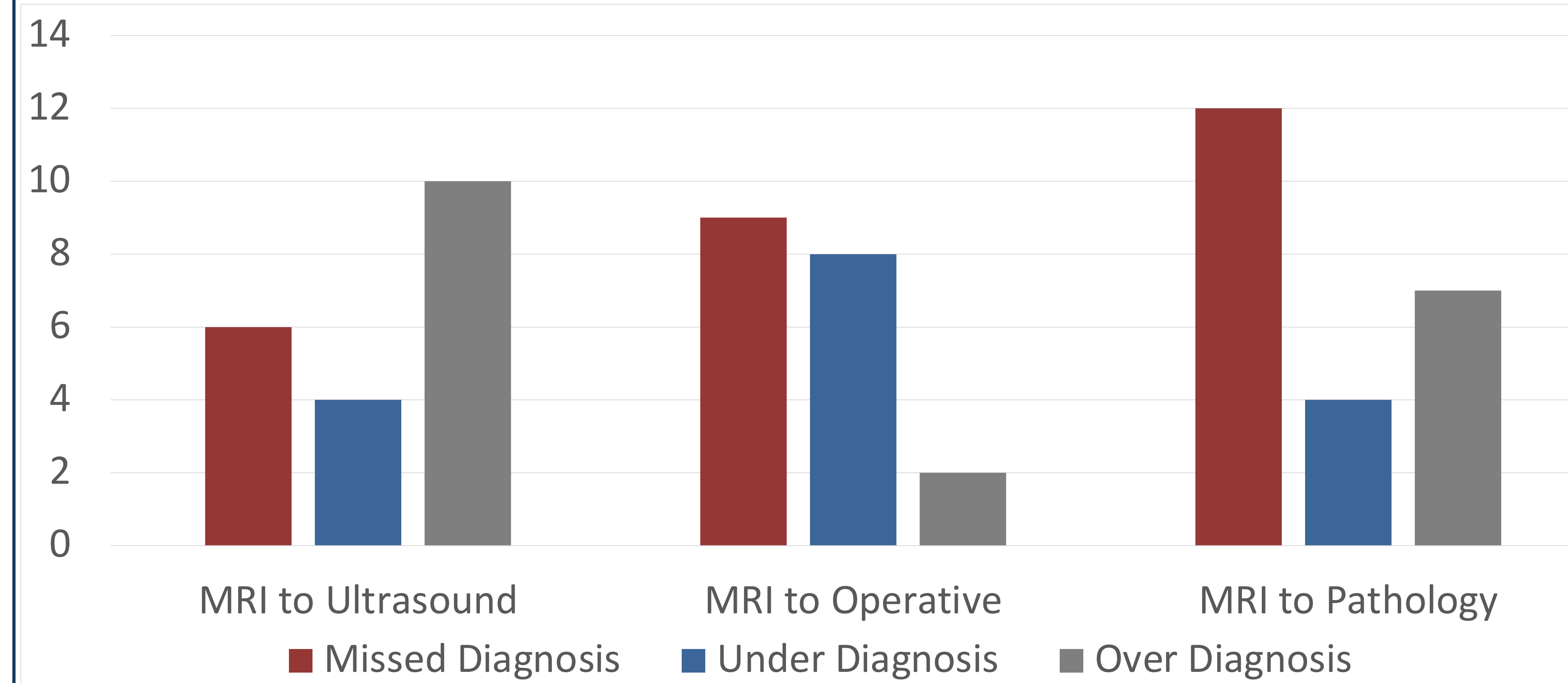


Figure 1 MRI Imaging Concordance Rates When Compared to Diagnosis on Ultrasound, Operative, and Pathology Notes.

Impact of Missed Diagnosis on Clinical Outcomes

Missed PAS on MRI was associated with an increased rate of surgical conversion from c-section to hysterectomy ($p < .001$) and increased postpartum length of stay (LOS) ($p < .001$)

Characteristic	Missed Diagnosis N = 12 (%)	No Miss N = 47 (%)	p-value
Surgery conversion	7 (58.3)	3 (6.4)	<.001
Blood loss	4801 ± 4540	4632 ± 5531	.92
Blood transfused	7.3 ± 10.1	7.0 ± 10.6	.95
ICU Admission	5 (41.7)	14 (29.8)	.49
Postpartum LOS	4.6 ± 1.8	1.9 ± .9	<.001

Table 2 Relationship between missed diagnosis of PAS and clinical outcomes. Surgery conversion is defined as a change from planned cesarean section to hysterectomy.

Clinical Outcomes by Diagnosis

When separated by final Pathology diagnosis, impact on outcomes was no longer significant, although this could be due to small sample size.

Characteristic	Missed Diagnosis N = 12 (%)	No Miss N = 47 (%)	p-value
Pathology - Accreta	8	20	
Surgery conversion	4 (50)	3 (15)	.14
Blood loss	5650 ± 5360	2535 ± 2512	.044
Blood transfused	9.4 ± 11.8	2.9 ± 5.1	.052
ICU Admission	4 (50)	4 (20)	.18
Postpartum LOS	4.6 ± .9	4.6 ± 1.7	.99
Pathology - Increta	3	8	
Surgery conversion	2 (66.7)	0 (0)	.59
Blood loss	2306 ± 621	3204 ± 2280	.53
Blood transfused	1.3 ± 1.1	4.0 ± 4.4	.34
ICU Admission	0 (0)	1 (12.5)	1.0
Postpartum LOS	4.7 ± 3.8	4.5 ± .5	.89
Pathology - Percreta	1	19	
Surgery conversion	1 (100)	0 (0)	-
Blood loss	5500	4968 ± 5573	-
Blood transfused	8	11.1 ± 30.3	-
ICU Admission	1 (100)	9 (47.4)	-
Postpartum LOS	4	5.5 ± 3.2	-

Table 3 Impact of missed diagnosis on clinical outcomes, separated by final Pathology diagnosis. Surgery conversion is defined as a change from planned cesarean section to hysterectomy.

Conclusion

- Missed diagnosis of PAS on MRI can lead to poor patient outcomes including conversion of planned surgery and increased hospital LOS.
- It is of the utmost importance that Radiologists reading placental MRI are trained to recognize PAS, and that patients are cared for by multidisciplinary teams with experience in managing this condition.
- Structured reporting can be a valuable tool to help radiologists identify key features of PAS and improve diagnostic sensitivity.