

When is MRI Indicated?

Placenta Accreta Spectrum

Brett D. Einerson, MD MPH



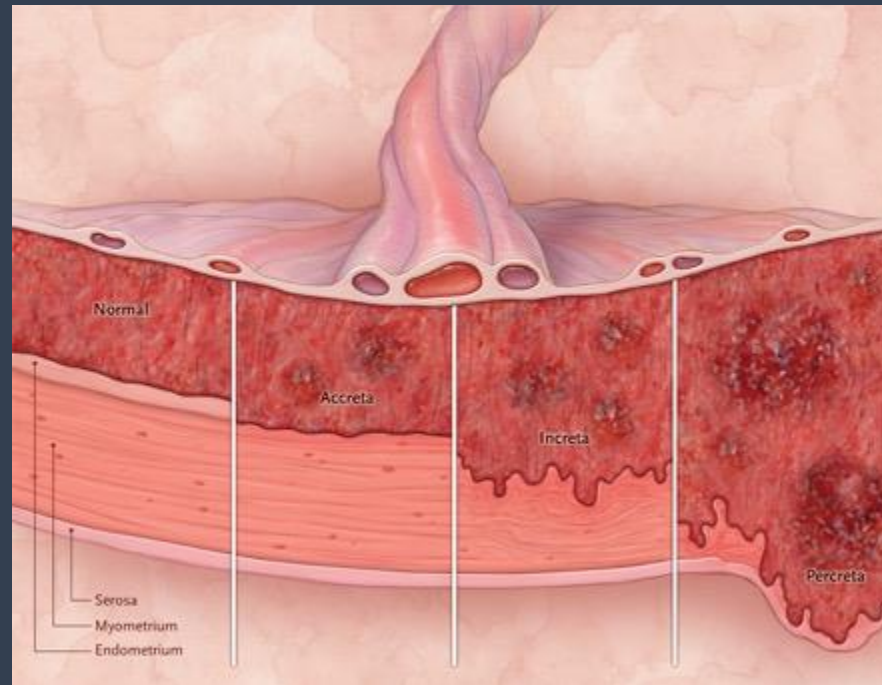
HEALTH
UNIVERSITY OF UTAH



Intermountain[®]
Healthcare

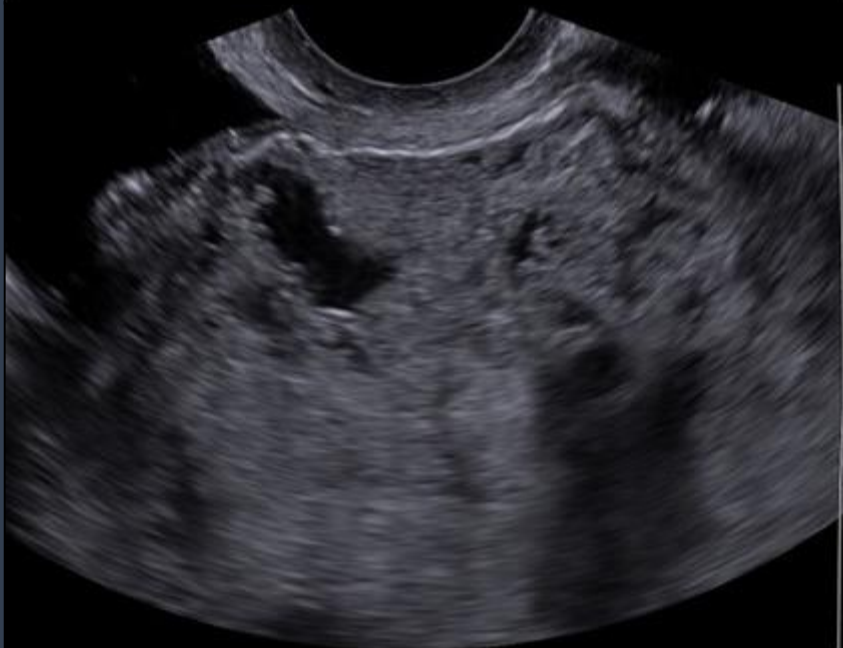
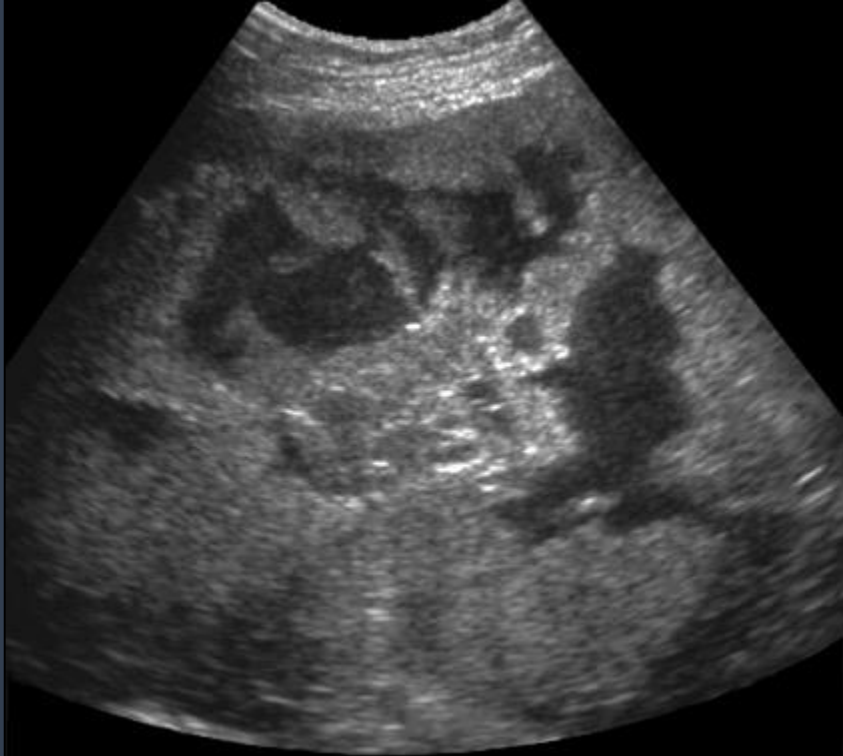
Objective

- To consider the rationale for obtaining MRI in the diagnostic workup of placenta accreta spectrum disorders.



Disclosure

I (like you?) have been burned by incorrect and misleading imaging results.

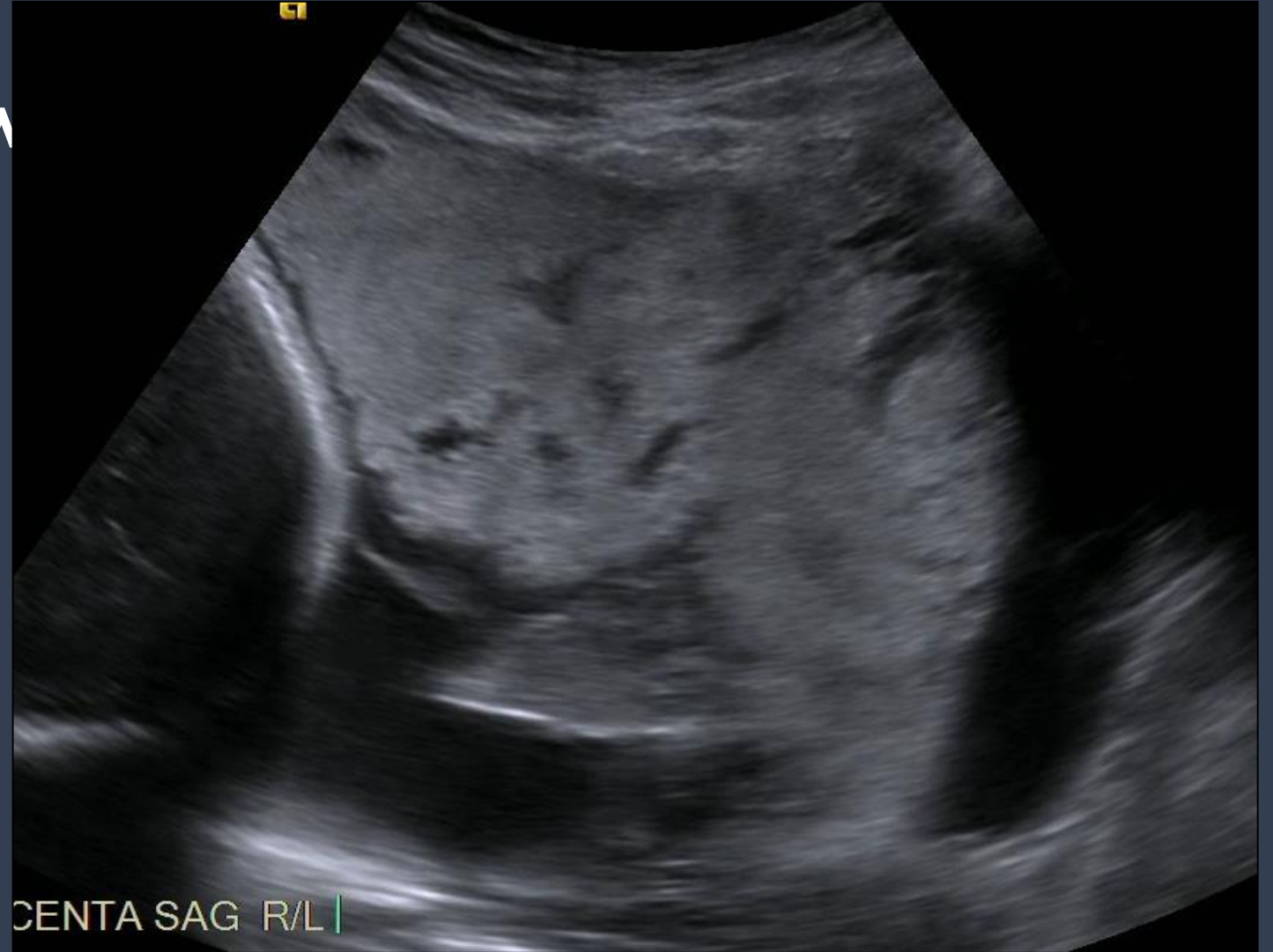
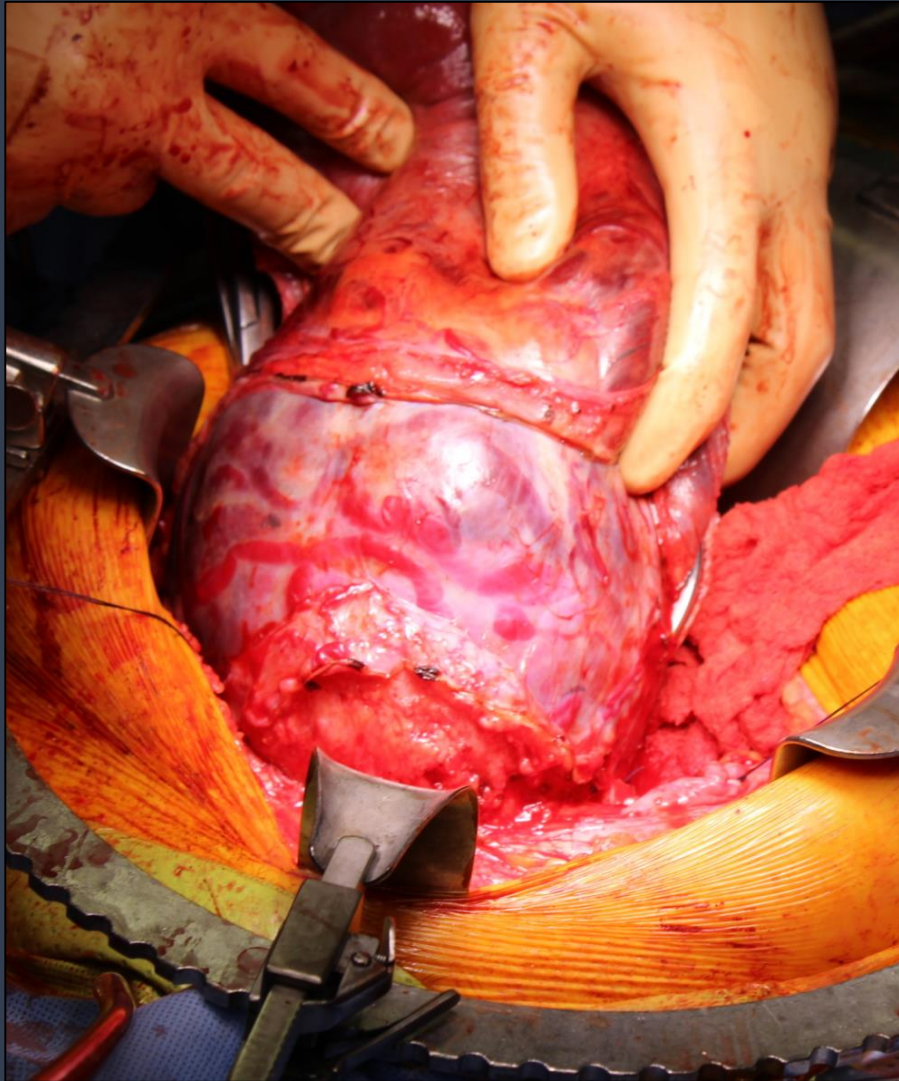


“The primary diagnostic modality for antenatal diagnosis [of accreta spectrum] is obstetric ultrasonography.”



“It is unclear whether MRI improves diagnosis of placenta accreta spectrum beyond that achieved by ultrasound.”

In this situation, how will MRI help?



In these situations, how will MRI help?



Reported MRI Strategies

- Routine use as a diagnostic test
- For cases when US is uncertain
- For posterior/lateral placentation
- To assess depth of invasion
- To plan for surgery
- For atypical cases (e.g. post-ablation)

“Order an MRI

...for surgical planning.”

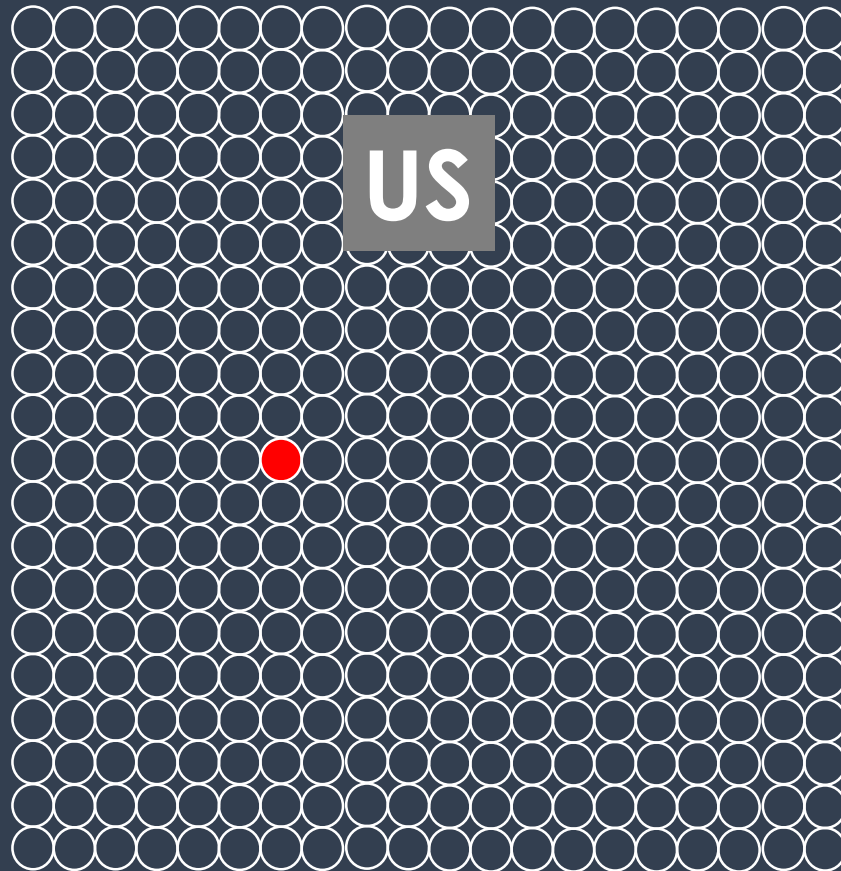
MRI versus Ultrasound

- Comparable accuracy

	US	MRI	p
Sensitivity	88 % (76-94)	93 % (82-97)	0.24
Specificity	96 % (74-100)	94 % (82-98)	0.91

MRI versus Ultrasound

- Incomparable cohorts

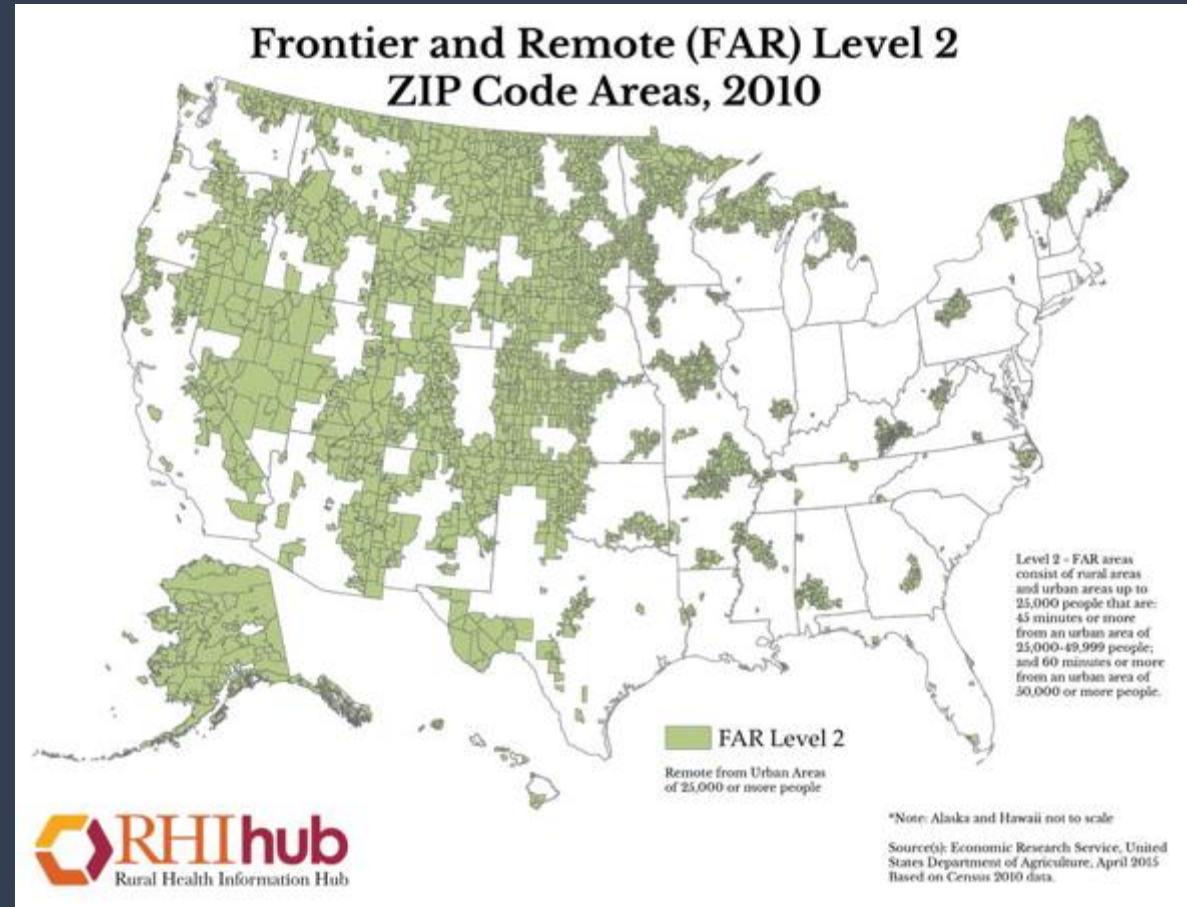


MRI



MRI versus Ultrasound

- Incomparable availability
- Incomparable expertise
- Incomparable cost



**An adjunctive diagnostic test,
one done as follow-up test,
should provide a distinctive advantage
in predictive accuracy and specificity
or should provide insight
to change clinical management.**

MRI Often Changed the Dx

MRI changed US diagnosis in

36%

and only

50%

were

correct

changes

of those...

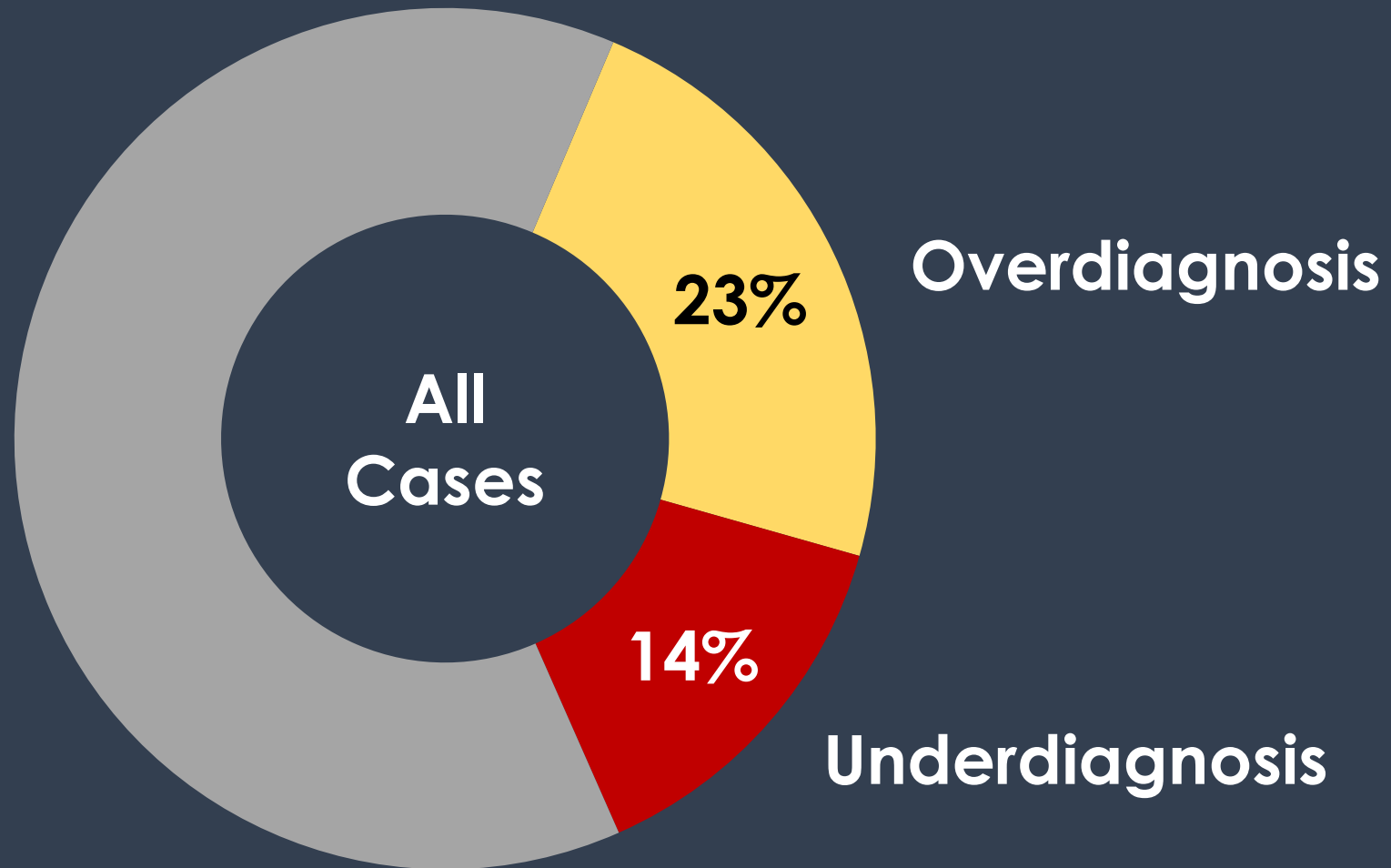
Upgrade to Percreta 61%

Upgrade to PAS 7%

Downgrade to PAS 7%

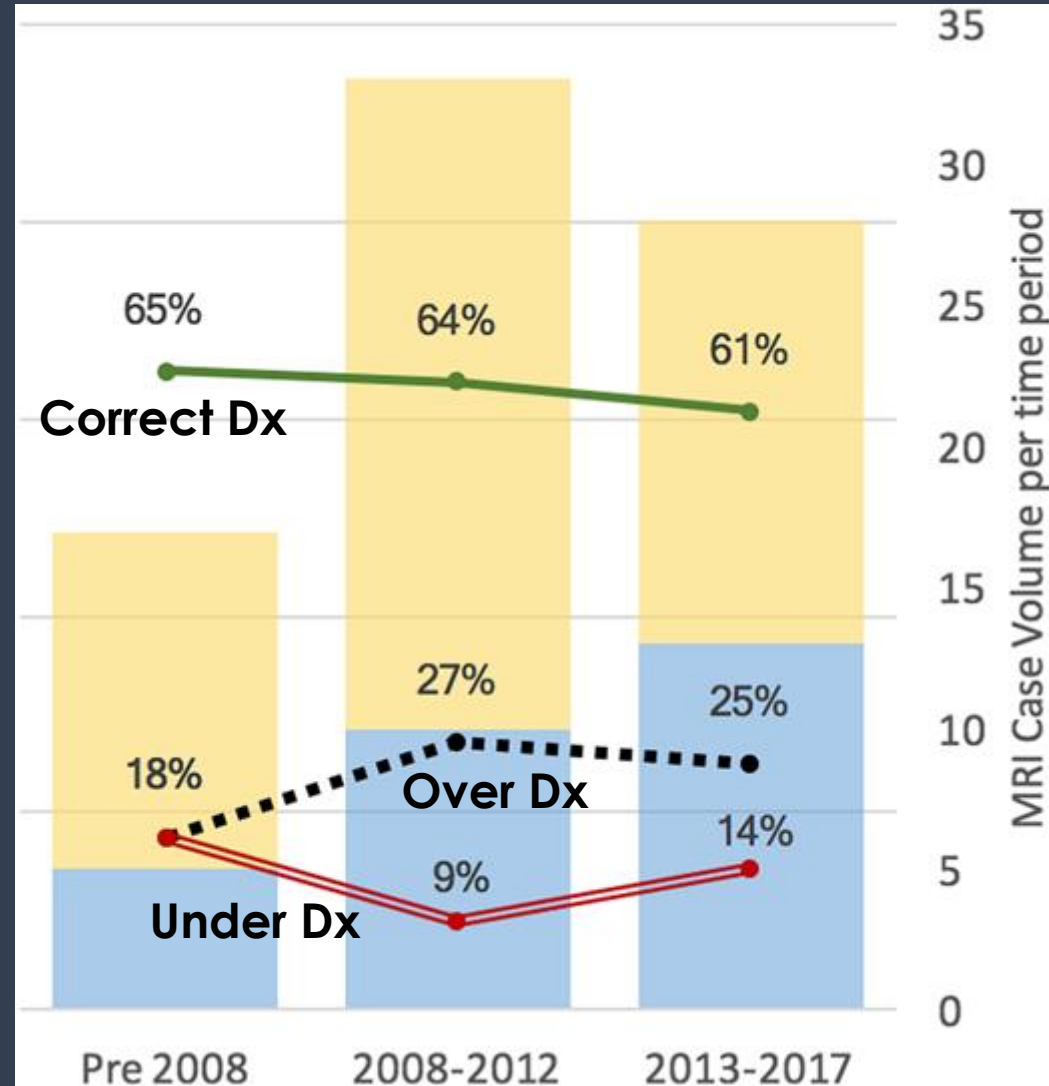
Downgrade to No PAS 25%

MRI was Often Incorrect



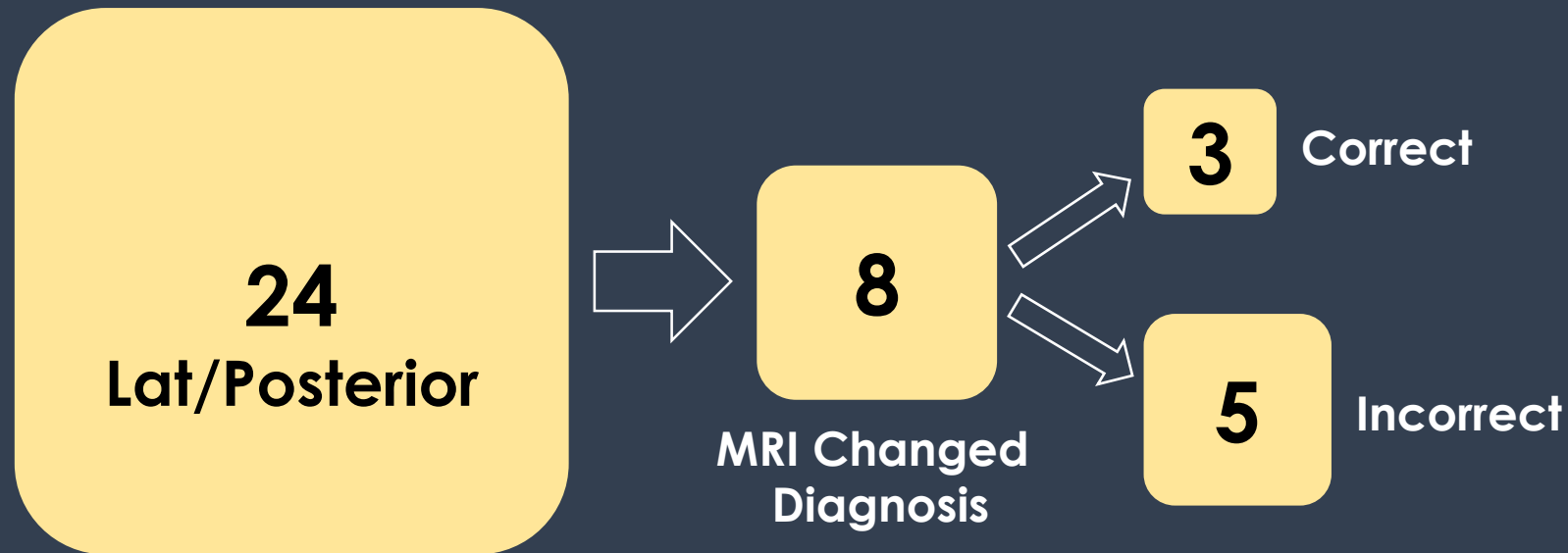
MRI Accuracy Over Time

■ Change Dx
■ No Change Dx



MRI for Lateral/Posterior Previa

- MRI not more likely to change the diagnosis (33% vs 37%, $p=.84$)



Prevalence of MRI Markers for Placenta Accreta Spectrum in a Low-Risk Cohort

Matthew Givens, MD; Paula Woodward, MD; Anne Kennedy, MD; April Griffith, MD; Michelle Debbink, MD, PhD; Christine Warrick, MD; Amanda Allshouse, MS; Robert Silver, MD; Brett Einerson, MD

1. Department of Obstetrics and Gynecology, University of Utah Health, Salt Lake City, Utah
 2. Department of Radiology and Imaging Sciences, University of Utah Health, Salt Lake City, Utah

Objective

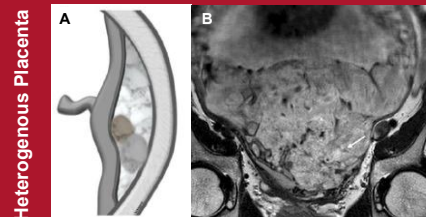
- Ultrasound markers of PAS are often seen in unaffected individuals but the prevalence of MRI markers in unaffected pregnancies is unknown.

Methods

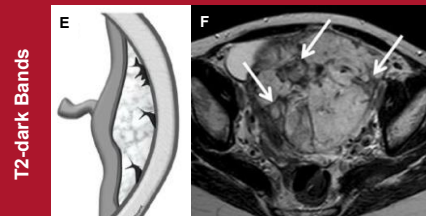
- Retrospective analysis of MRIs performed at greater than 20 weeks gestation for non-PAS indications at a single institution.
- Individuals with clinical or pathologic PAS or missing delivery data were excluded.
- Three experienced radiologists blinded to patient history, independently assessed for 11 markers of PAS as defined by the Society of Abdominal Radiology and the European Society of Urogenital Radiology guidelines.
- Ten percent of cases were examined by all radiologists for consistency.

Comparison of published MRI markers of PAS v. MRI findings in patients without PAS

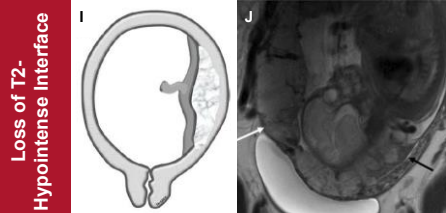
Published Examples of PAS on MRI*



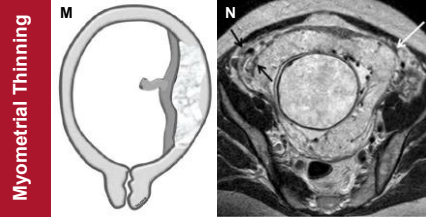
(A) Diagrammatic representation of heterogenous placenta shown as altered background parenchymal signal. (B) Published example of a heterogenous placenta, defined as heterogeneous signal within the placenta, which can be seen on both T1- and T2-weighted sequences. The arrow corresponds to the additional presence of a T2-dark band.



(E) Diagrammatic representation of T2-dark bands, which are seen as irregular linear T2-dark areas, often contacting the maternal surface of the placenta. (F) Published example of T2-dark bands, defined as defined as one or more areas of hypointensity on T2-weighted images, which are usually linear in configuration and often contact the maternal surface of the placenta (arrows).

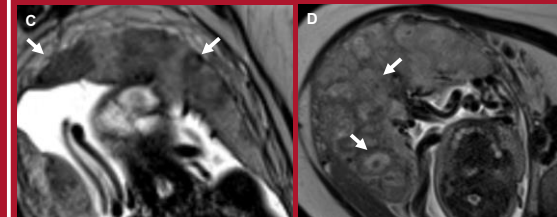


(I) Diagrammatic representation of loss of well-defined T2-hypointense placental-myometrial interface, often contacting the maternal surface of the placenta. (J) Published example of loss of well-defined T2-hypointense placental-myometrial interface, defined as the loss of a thin dark line behind the placental bed (white arrow), as seen on T2-weighted images. Normal T2-hypointense placental-myometrial interface is seen on the left (black arrow).

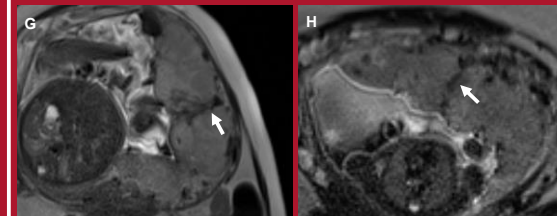


(M) Diagrammatic representation of myometrial thinning. (N) Published example of myometrial thinning, defined as thinning of the myometrium over the placenta to less than 1 mm or even invisible (white arrow). Normal appearance of the myometrium is seen on the right (black arrows).

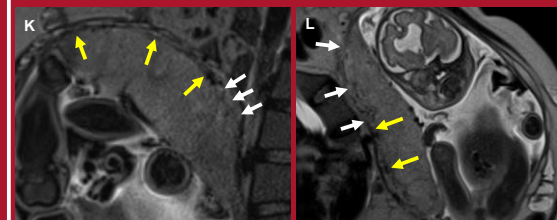
Examples in the Low-Risk Cohort



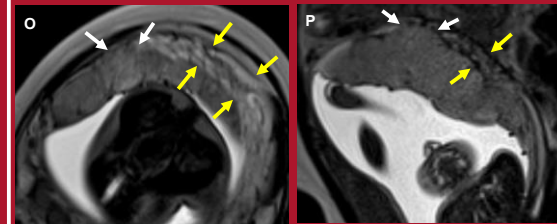
(C & D) Two T2-weighted images through the placenta demonstrating placental heterogeneity in patients without PAS (arrows). Some of the underlying heterogeneity may reflect placenterones, the normal anatomic structure of the placenta.



(G & H) Two T2-weighted images through the placenta demonstrating T2-dark bands in patients without PAS (arrows). In these cases, the T2-dark bands are transplacental, connecting from the maternal surface to the free surface of the placenta.



(K & L) Two T2-weighted images through the placenta demonstrating loss of the well-defined T2-hypointense placental-myometrial interface in patients without PAS. The normal T2-hypointense interface is demarcated by yellow arrows, with the area of loss of the normal T2-hypointense interface is demarcated by white arrows.

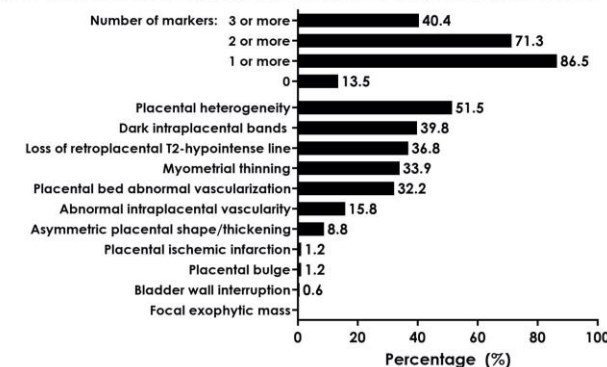


(O & P) Two T2-weighted images through the placenta demonstrating myometrial thinning in patients without PAS. The normal thickness and appearance of the myometrium is demarcated by yellow arrows, with the area of myometrial thinning is demarcated by white arrows.

Results

- 171 MRIs were included. Studies were performed at a median GA of 29 weeks (IQR 6.3 weeks). 3.5% of fetuses were genetically abnormal and 66% had normal aneuploidy testing.

Figure 1. Prevalence of MRI Markers of PAS in Individuals Without PAS



Conclusions

Similar to ultrasound, MRI markers of PAS are frequently seen in patients without PAS. Overreliance upon these markers in isolation is likely to lead to overdiagnosis of PAS.

References

1. Berkley EM, Abuhamad AZ. Prenatal diagnosis of placenta accreta: is sonography all we need? J Ultrasound Med. 2013 Aug;32(8):1345-50. doi: 10.7863/ultra.32.8.1345.
2. Bowman ZS, Eller AG, Kennedy AM, Richards DS, Winter TC 3rd, Woodward PJ, Silver RM. Accuracy of ultrasound for the prediction of placenta accreta. Am J Obstet Gynecol. 2014 Aug;211(2):177.e1-7. doi: 10.1016/j.ajog.2014.03.029. Einerson BD, Gilner JB, Zuckerwise LC. Placenta Accreta Spectrum. Obstet Gynecol. 2023 Jul 1;142(1):31-50. doi: 10.1097/AOG.0000000000005229.
3. Jha P, et al. Society of Abdominal Radiology (SAR) and European Society of Urogenital Radiology (ESUR) joint consensus statement for MR imaging of placenta accreta spectrum disorders. Eur Radiol. 2020 May;30(5):2604-2615. doi: 10.1007/s00330-019-06617-7.
4. Silver RM, et al. Maternal morbidity associated with multiple repeat cesarean deliveries. Obstet Gynecol. 2006 Jun;107(6):1226-32. doi: 10.1097/01.AOG.0000219750.79480.84.

*Reproduced from Jha P, et al. Eur Radiol. 2020. May;30(5):2604-2615.



MRI Summary

- Some prefer it for 'the lay of the land'
- Not superior to say 'yes' or 'no' PAS in equivocal cases
- May be useful for posterior placentas or atypical risk factors
- Expensive
- May not change clinical management

MORE IS
NOT
ALWAYS
BETTER

Don't do an MRI...
...if it won't change your management



MRI Questions

- Does MRI change your management?
- When might MRI be helpful?
- What does it mean to get an MRI for surgical planning?