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Role of Fetal Imaging in Diagnosing Congenital Anomalies of the Kidney and Urinary Tract

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PURE
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BACKGROUND

- Prenatal diagnosis of congenital anomalies of the kidney and urinary tract (CAKUT) is critical for counseling about appropriate interventions and potential postnatal outcomes
- A second trimester fetal screening US is completed for all gravid mothers and is the current gold standard for prenatal diagnosis of CAKUT
- MRI has been increasingly used for complex congenital anomalies, but the diagnostic accuracy of fetal MRI for CAKUT is unknown

METHODS

- Retrospective review of gravid mothers evaluated at a tertiary fetal care center with US and MRI for potential CAKUT between 2012-2020
- Prenatal imaging and postnatal diagnoses categorized into kidney, ureteral, and/or bladder anomalies
- Anatomic categories stratified based on concordance between prenatal image findings and subsequent postnatal diagnosis (concordant, incomplete, discordant) and diagnostic accuracy of fetal US and MRI evaluated

CONCLUSIONS

- Fetal MRI should be considered complementary to fetal US, particularly for kidney and ureteral anomalies as it may provide more accurate and detailed information

Fetal MRI has greater *sensitivity* and *NPV* for kidney and ureteral anomalies and significantly *lower rates of incomplete results* than fetal US,

suggesting that fetal MRI may *aid in accurate prenatal diagnosis* of CAKUT and allow for more comprehensive counseling on postnatal outcomes.

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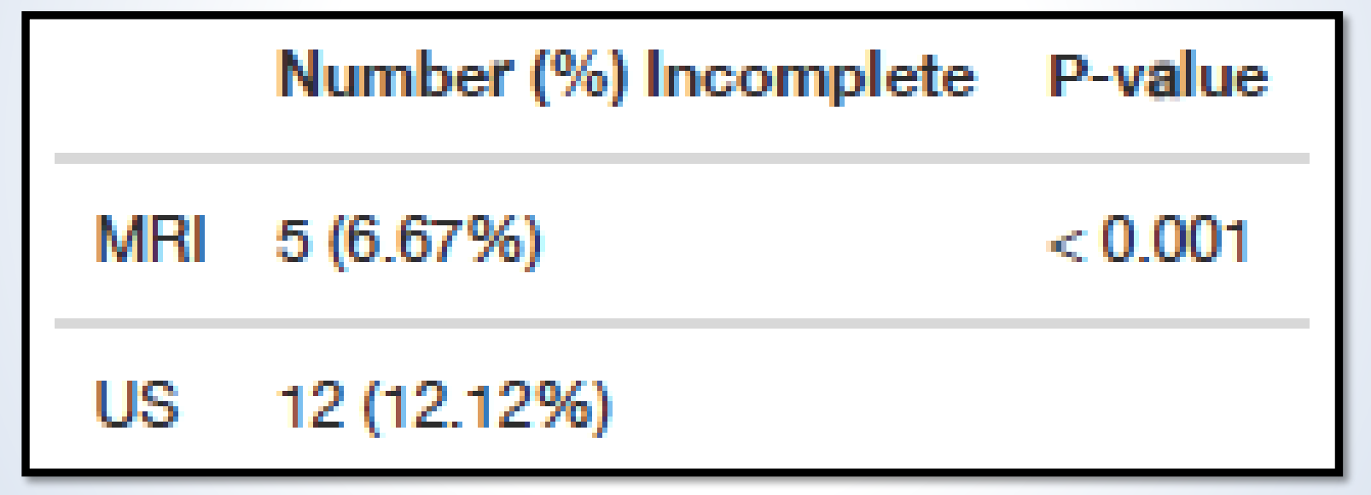
RESULTS

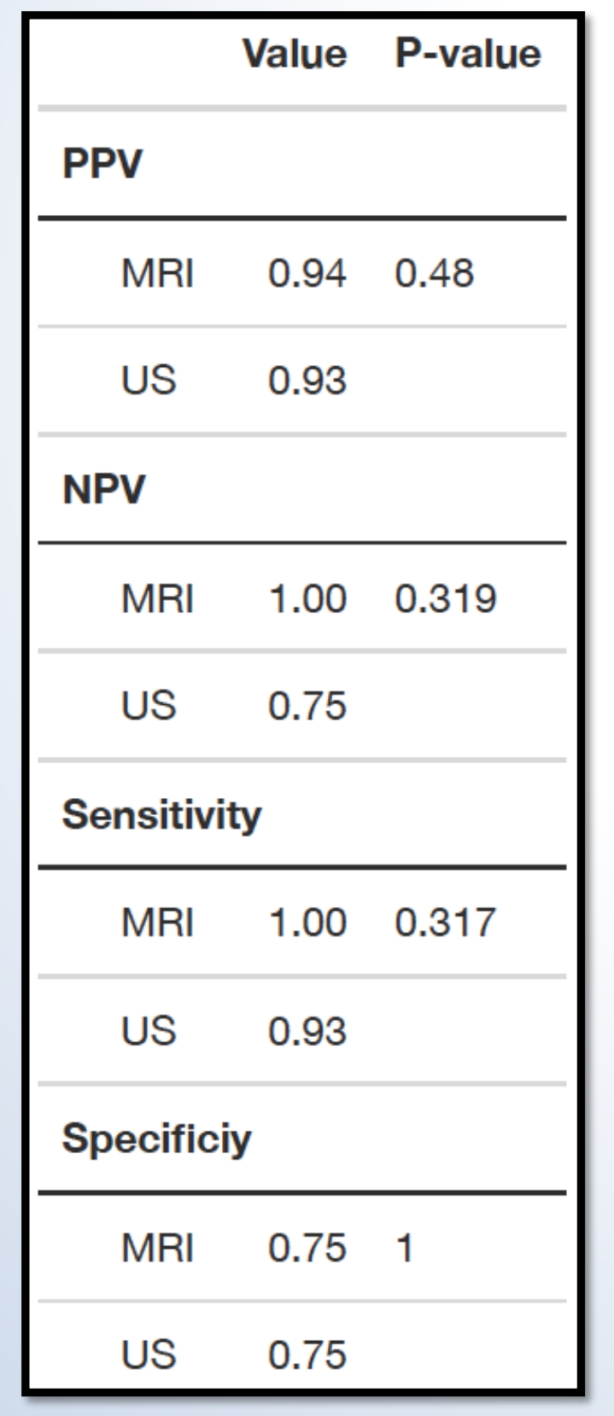
Table 1: Comparison of prenatal MRI and US rate of incomplete results



	Number (%) Incomplete	P-value
MRI	5 (6.67%)	< 0.001
US	12 (12.12%)	

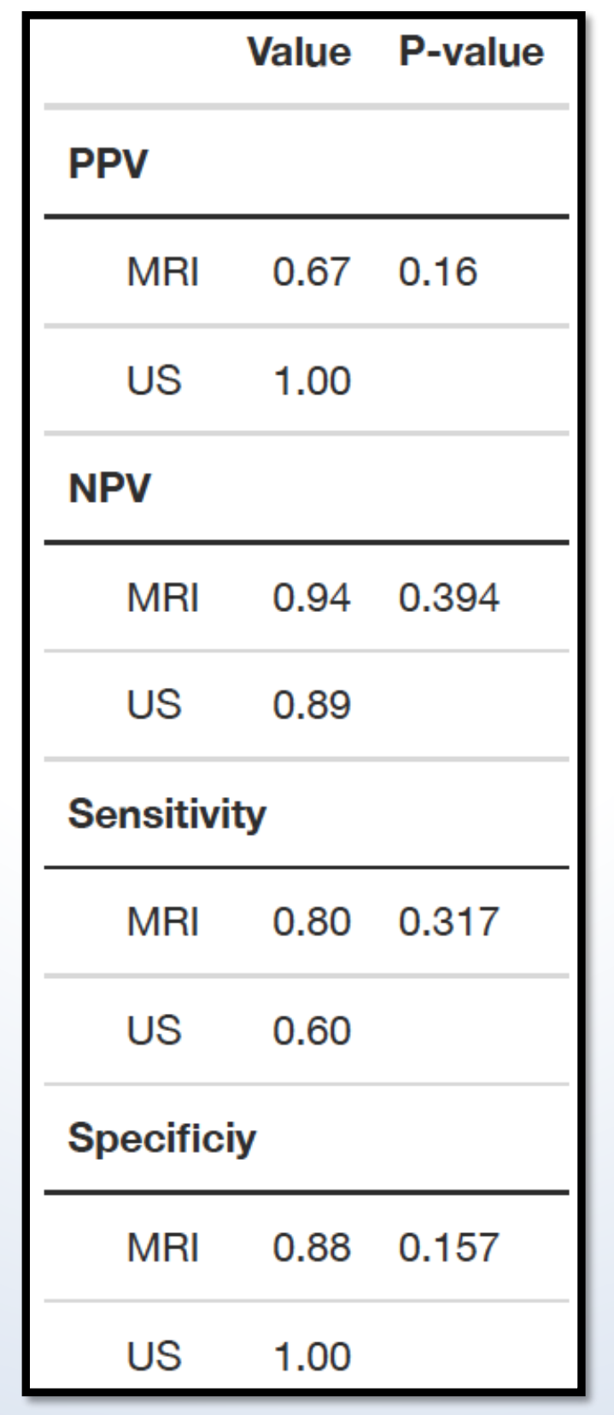
Comparison of prenatal MRI and US diagnostics in each anatomic category:

Table 2: Kidney (N=19)



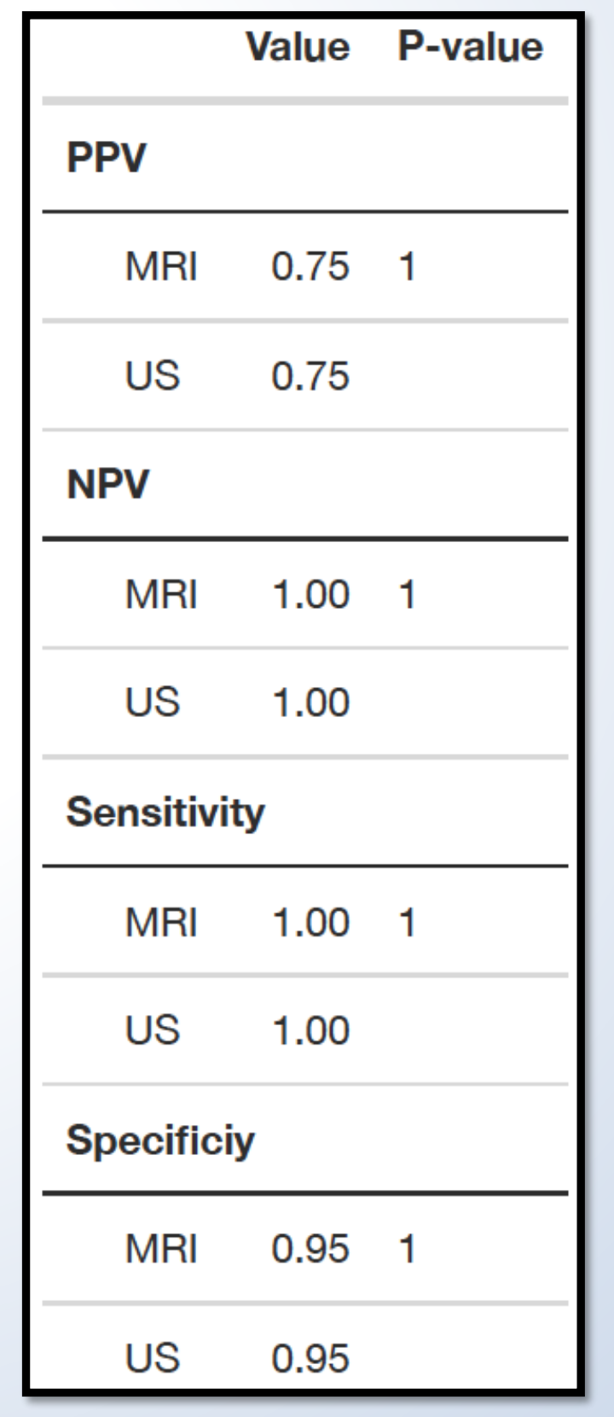
	Value	P-value
PPV		
MRI	0.94	0.48
US	0.93	
NPV		
MRI	1.00	0.319
US	0.75	
Sensitivity		
MRI	1.00	0.317
US	0.93	
Specificiy		
MRI	0.75	1
US	0.75	

Table 3: Ureter (N=22)



	Value	P-value
PPV		
MRI	0.67	0.16
US	1.00	
NPV		
MRI	0.94	0.394
US	0.89	
Sensitivity		
MRI	0.80	0.317
US	0.60	
Specificiy		
MRI	0.88	0.157
US	1.00	

Table 4: Bladder (N=25)



	Value	P-value
PPV		
MRI	0.75	1
US	0.75	
NPV		
MRI	1.00	1
US	1.00	
Sensitivity		
MRI	1.00	1
US	1.00	
Specificiy		
MRI	0.95	1
US	0.95	

Figure 1:
Representative Images from each Anatomic Category

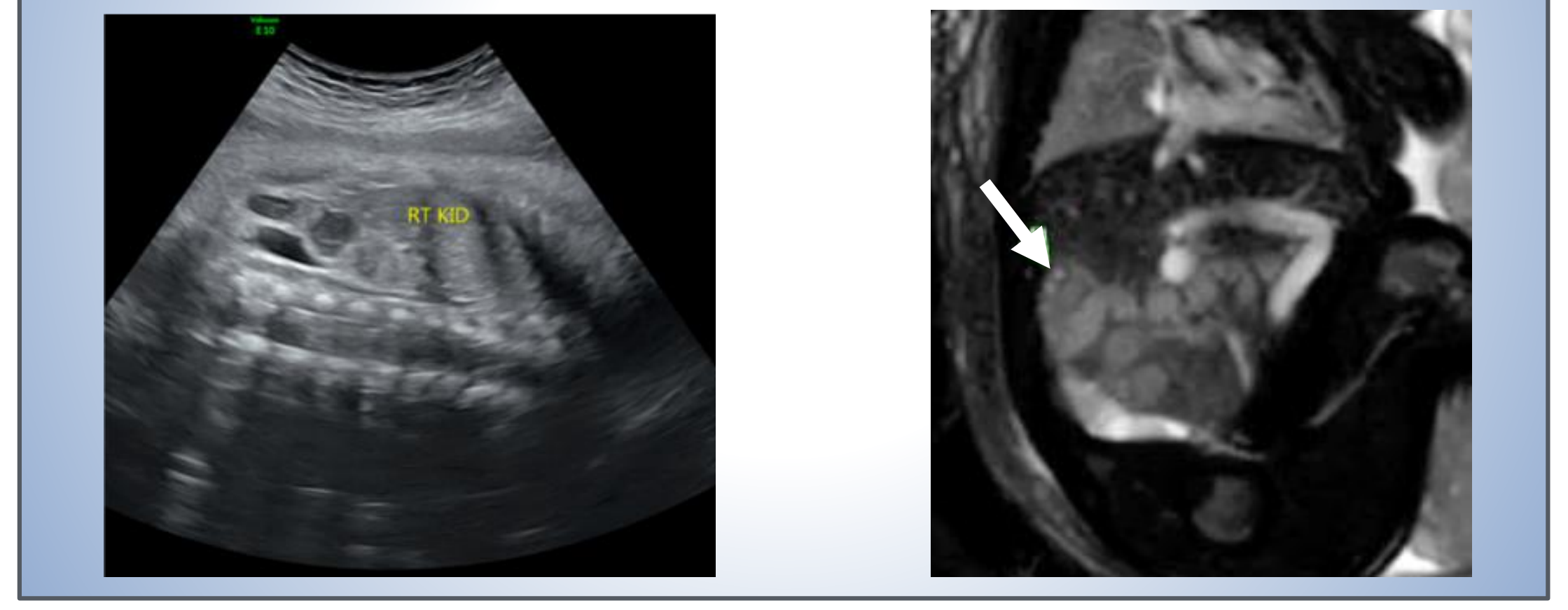


Figure 2:
Right ureter anomaly from the same fetus on fetal US (left) and fetal MRI (right)

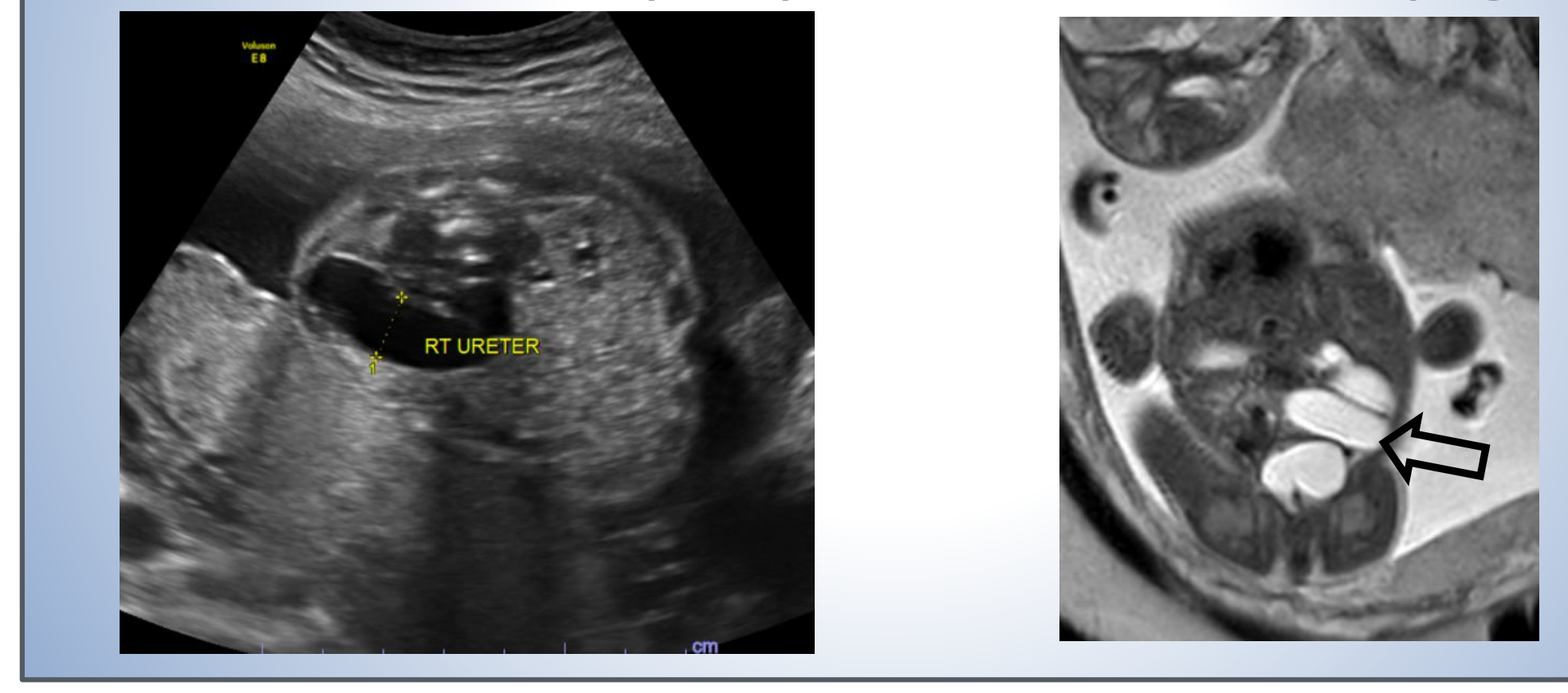


Figure 3:
Bladder anomaly from the same fetus on fetal US (left) and fetal MRI (right)