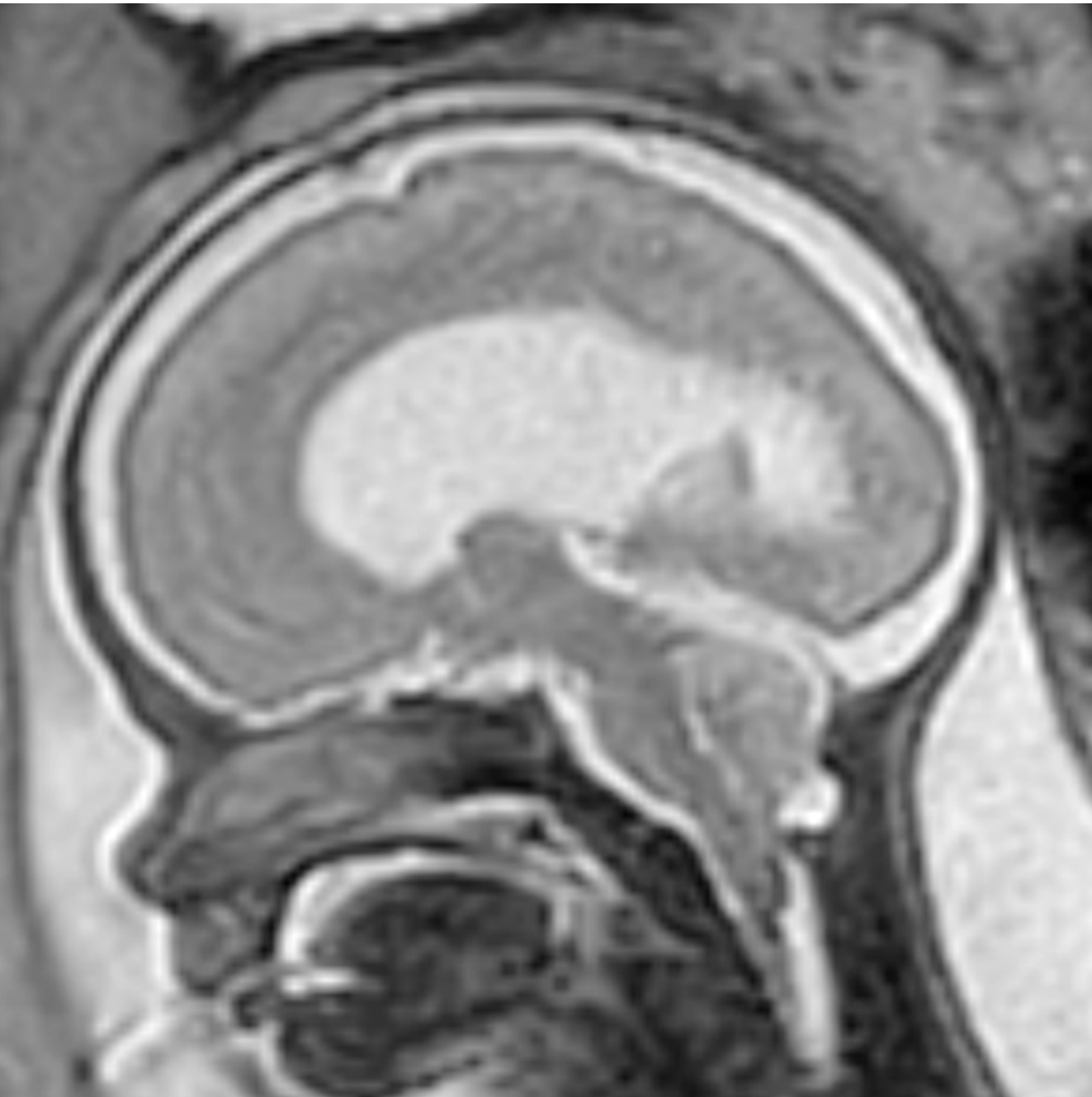


Background



Hindbrain herniation (HBH)
Chiari II deformation



Inclusion criterion for
prenatal MMC repair

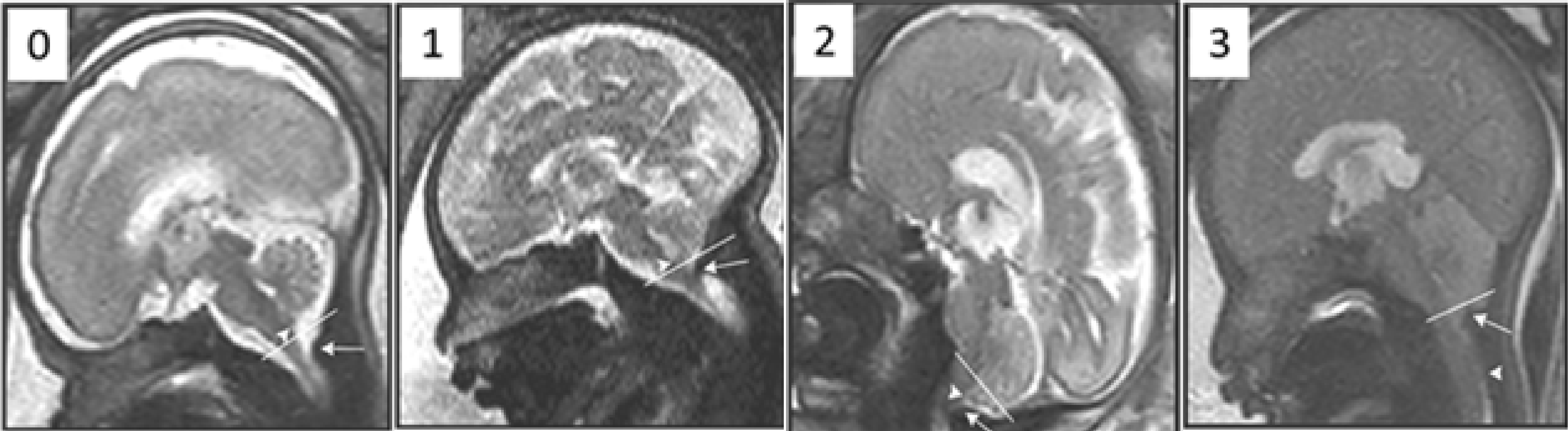
Fetal HBH assessment is challenging, as current grading systems are based on postnatal anatomy.

Objective: to evaluate the reproducibility of the HBH grading classification on fetal MRI

Methods

Retrospective analysis of 86 fetuses who underwent prenatal MMC repair at Texas Children's Hospital (2011–2020), with pre- and 6 week post-op T2-weighted fetal MRI scans.

HBH was graded using a modified version of the Sutton's classification.



Grade 0: cerebellar tonsils were seen above the level of the foramen magnum; **grade 1:** effacement of the 4th ventricle and/or cisterna magna without HBH; **grade 2:** HBH above the Cervical one (C1) posterior arch; and **grade 3** as HBH bellow C1 posterior arch.

Two experienced fetal imaging specialists assessed the degree of HBH finding consensus if there were discrepancy and repeated same evaluation 2 months later, blinded to the initial results.

Reproducibility of HBH grading was assessed with weighted Cohen's Kappa, overall and for pre- and post-op MRIs separately.

Results

Pre- and post-op MRIs were performed at 22.6 [19.1–25.4] and 31.3 [28.9–33.6] weeks, respectively.

11/86(13.6%) fetuses had severe ventriculomegaly (≥15mm) and 63 (77.8%) had lesions below L2.

All measurements (pre- and post-op)		First assessment			
		Grade 0	Grade 1	Grade 2	Grade 3
Second assessment	Grade 0	47	0	8	2
	Grade 1	0	1	0	0
	Grade 2	3	0	9	14
	Grade 3	0	0	1	81
Pre-op MRI n=86		First assessment			
		Grade 0	Grade 1	Grade 2	Grade 3
Second assessment	Grade 0	0	0	0	0
	Grade 1	0	0	0	0
	Grade 2	0	0	7	12
	Grade 3	0	0	1	66
Post-op MRI n=80		First assessment			
		Grade 0	Grade 1	Grade 2	Grade 3
Second assessment	Grade 0	47	0	8	2
	Grade 1	0	1	0	0
	Grade 2	3	0	2	2
	Grade 3	0	0	0	15

Overall reliability for HBH grading was moderate (k=0.70). Agreement was lower for pre-op (k=0.41) than post-op (k=0.62) assessments.

Conclusion

HBH grading classification showed moderate reliability for HBH grading on fetal MRI scans, with lower consistency in pre-op scans. These findings highlight the challenges of hindbrain classification in fetal life.