

Introduction

T2 brain hyperintensity → seen in MMC and may reflect:

- edema
- impaired cerebrospinal fluid circulation,
- altered brain maturation.

Diffusion-weighted imaging (DWI) and ADC values could provide insight on this.

Objective: To investigate the relationship between brain T2 hyperintensity and ADC values in fetuses following prenatal MMC repair.

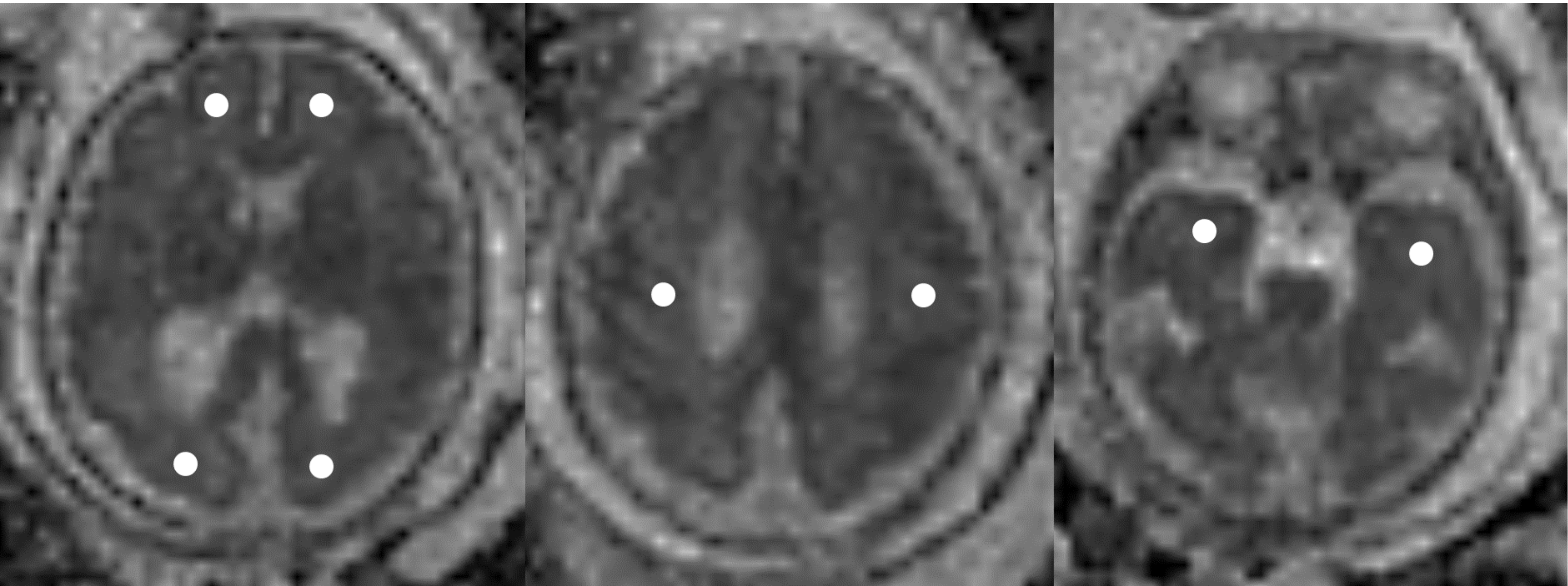
Methods

Retrospective analyze of fetal MRI scans performed 6 weeks after in utero MMC repair at the Texas Children's Hospital. T2 hyperintensity was defined subjectively as an area of signal intensity higher than that of the surrounding brain parenchyma.



T2 hyperintensity

ADC values were measured in the frontal, temporal, parietal, and occipital lobes on axial brain DWI sequences (b=700 s/mm²).

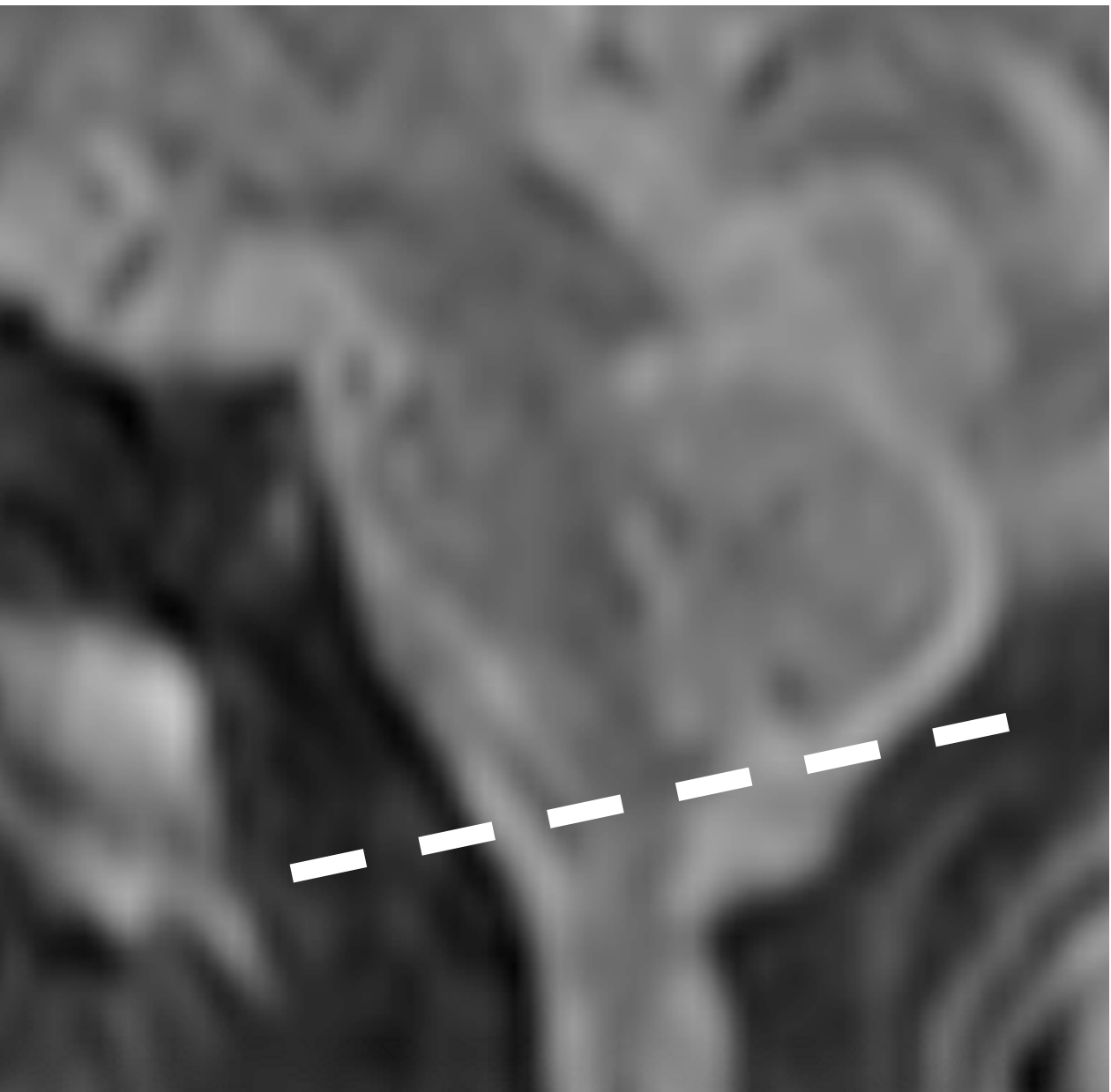


Frontal and Occipital lobes

Parietal lobes

Temporal lobes

Reversal of hindbrain herniation (HBH) was defined when the cerebellum was above the foramen magnum.



Fetuses were grouped by presence or absence of T2 hyperintensity, and ADC values were compared using Mann-Whitney U test (p<0.05).

Results

49 fetuses underwent repair at 25.0[23.3–26.4] weeks. T2 hyperintensity was seen in **71.4%** at 31.2[29.9–33.3] weeks. **ADC values were lower in most studied areas in fetuses with T2 hyperintensity.**

	T2 hyperintensity (n=35)	No T2 hyperintensity (n=14)	p
Anatomical level of lesion below L2 (%)	23/35(65.7)	13/14(92.9)	0.07
Gestational age at MRI (%)	31.2[30.0-33.3]	31.1[29.9-32.6]	0.83
Mean ventricular width (mm)	15.5[8.0-28.0]	16.0[9.0-21.0]	0.58
Apparent Diffusion Coefficient (x10 ⁻⁶ mm ² /s)			
- Frontal lobe (right)	2.97[1.70-8.41]	3.55[2.18-7.87]	0.40
- Frontal lobe (left)	3.09[1.60-8.33]	3.60[2.12-8.11]	0.07
- Parietal lobe (right)	2.68[1.38-7.82]	3.36[2.32-7.05]	0.02
- Parietal lobe (left)	2.80[1.40-7.38]	3.45[1.81-6.93]	0.03
- Temporal lobe (right)	2.75[1.41-6.63]	3.53[1.87-7.58]	<0.01
- Temporal lobe (left)	2.92[1.32-7.54]	3.03[2.15-6.59]	0.05
- Occipital lobe (right)	3.19[1.20-7.86]	4.30[2.18-7.18]	0.04
- Occipital lobe (left)	3.23[0.99-6.99]	3.60[2.03-7.73]	0.19

Complete HBH reversal was more common in those without T2 hyperintensity (100% vs 65.7%, p<0.01).

Conclusion

T2 hyperintensity was associated with lower ADC values in most examined areas, suggesting altered brain microstructure or delayed myelination.