

Apparent diffusion coefficient levels in fetuses with brain magnetic resonance T2 Hyper-intense signal

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Objective

Fetal brain MRI (fbMRI) has been increasingly used in recent years as a means of tracking normal and pathological fetal brain maturation. One of the perplexing findings of fbMRI is white matter T2 hyper-intense signal. The aims of our study are initially to determine the main aetiologies associated with white matter T2 hyper-intense signal, then to examine whether the different aetiologies have different ADC values, and lastly to assess the association of white matter T2 hyper-intense signal with developmental outcome.

Methods

A prospective cohort study of 44 fetal brain MR scans performed for suspected brain pathologies at a tertiary medical center during 2011–2015. Clinical data was collected from electronic medical charts. ADC values were measured and averaged in the frontal, parietal, occipital, and temporal lobes. Neurodevelopmental assessments were done by Vineland Adaptive Behavior Scales (VABS-II).

Results

Half of the fbMRI hyper-intense T2 signal cases were associated with congenital CMV infection. The other half of the cases were mainly idiopathic. Thus, the study group was divided to CMV positive and negative sub-groups. Both groups had hyper-intense signal in the temporal lobe. The CMV positive group had involvement of the parietal lobe. Only the CMV positive group had increased ADC values in the temporal and parietal lobes. There was no association between the neurodevelopment outcome and the etiologies or to ADC values.

Conclusion

T2 hyper-intense signal in fbMRI associated with positive for CMV infection has increased ADC values in the temporal and parietal lobes, suggestive of brain oedema in these areas. However, the association between this finding and neurodevelopment outcome requires further evaluation.