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Fetal exposure to magnetic resonance imaging: neonatal and developmental outcome

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Objective

To evaluate perinatal, short-term outcomes and long-term neurodevelopment of fetuses exposed to Magnetic Resonance Imaging (MRI) during pregnancy.

Methods

This longitudinal cohort study was conducted between 2011 and 2017. During that time, 131 pregnant women exposed to 1.5T MRI and 775 unexposed controls were matched. Long-term neurodevelopment was assessed via Vineland-II Adaptive Behaviour Scale telephone questionnaire when the child was between the ages of 2.5 and 6 years. Five short perinatal outcomes were assessed: (1) birth weight percentile, (2) APGAR score at birth, (3) hearing screening result, (4) neonatal morbidity, and (5) days of hospitalization.

Results

Regarding short-term outcome, after matching the control group by date, mode of delivery, and medical personnel shift we found a difference only in days of fetal hospitalization in favour of the controls (mean 3.95 vs. 2.47, $p<0.001$). Regarding long- term outcome, when comparing the effects of different MRI protocols, trimester exposure, and number of MRI exposures during the same pregnancy on long-term neurodevelopment, no significant difference was found (Adaptive Behavior composite, mean 111.02 vs. 109.22, $p=0.368$) between exposed and unexposed groups. In subgroup analysis a slightly lower but still normal motor score was found in first trimester exposed fetuses compared to second or third trimester exposed (Motor skills, mean 94.5 [1st], 106.28 [2nd], 105.91 [3rd]; $p=0.037$).

Conclusion

We found that exposure to 1.5T MRI during pregnancy is not associated with long-term adverse effect on neurodevelopmental outcome; however, the effect of first trimester exposure on motor development remains unclear. Our study raises questions regarding perinatal increased risk for decreased birth weight, urogenital findings, and PFO findings.