

Fetal exposure to magnetic resonance imaging and neuro-developmental outcome

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Objective

To evaluate long-term neurodevelopment of fetuses exposed to magnetic resonance imaging (MRI) during pregnancy.

Methods

This longitudinal cohort study was conducted between 2011 and 2017 in a single tertiary medical center. During the study period, pregnant women exposed to 1.5T MRI for maternal or fetal indications were matched to unexposed controls in a 1: 6 ratio. The primary outcome was assessed by Adaptive Behaviour Composite Score that is summarized from four long-term neurodevelopment domains: communication, daily living skills, socialization and motor skills. Evaluation was conducted via Vineland-II Adaptive Behavior Scale (VABS) telephone questionnaire for subjects between the ages of 2.5 and 6 years in a 1: 1 ratio. Exposed and unexposed matched subjects were compared using paired sample t-test, Wilcoxon signed-rank test, McNemar's test, generalized estimating equations (GEE), or conditional logistic regression, as appropriate.

Results

A total of 131 exposed women matched our inclusion criteria. No significant difference was identified between exposed and unexposed groups when comparing the composite score (mean 110.79 vs 108.18; $p=0.098$). In addition, no significant differences were noted between exposed and controls in communication score (108.84 vs. 109.10; $p=0.888$), daily living skills score (109.51 vs. 108.28; $p=0.437$) or motor skills score (105.09 vs. 104.42; $p=0.642$). However the socialization score was significantly different in the exposed group (112.98 vs. 106.47; $p<0.001$). In a subgroup analysis a normal but statistically lower motor score was found in first trimester exposed fetuses compared to second or third trimester exposed (94.5, 106.28 and 105.91, respectively; $p=0.037$).

Conclusion

This study contributes to the currently limited understanding of long-term adverse effect of MRI on neurodevelopmental outcome. We proved that exposure to 1.5T MRI during pregnancy had no harmful effects on communication, daily living or motor skills. Moreover, we found favorable socialization scores in exposed fetuses; The effect of first trimester exposure on motor development remains unclear.