
Impact of intrauterine growth restriction (IUGR) on a Go/No-go task's performances at 6 years of age: an fMRI study

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Abstract

Introduction: Neuropsychological studies showed that children born preterm, and more specifically those with IUGR, exhibit difficulties in inhibition of prepotent responses. Functional Magnetic Resonance Imaging (fMRI) studies confirmed those difficulties in prematurity (e.g. Nosarti et al., 2006) but little is known considering IUGR at a neuronal level. This research aims to study the impact of IUGR on the brain networks involved during a Go/No-go task in children.

Method: Twenty 6-year-old children born preterm performed a Go/No-go task while fMRI data were collected. The performances of 10 children (GA: 30.73 weeks) with IUGR (IUGR group) were compared to 10 children (GA: 29.37 weeks) with normal birth weight (control group). Analyses of successful trials were performed with SPM5 ($p < .005$ uncorrected), after normalization to a paediatric template (created with the Template-o-Matic toolbox, Wilke et al., 2008).

Results: Behavioural differences between groups did not reach significance. However, at a neuronal level, the comparison between groups showed that the IUGR group exhibited significant greater bilateral activation in the precuneus, posterior cingulate cortex and supplementary motor area for both go trials (responses) and no-go trials (inhibition). The control group showed significant greater activation in the right superior and middle temporal gyri and the right insular cortex during go trials.

Discussion: IUGR children showed stronger activations than control preterm children in areas known to be specifically involved in motor control, attention and response selection, suggesting the need of more brain resources to execute or inhibit responses which might be due to a less mature pattern of activation.

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