

ABSTRACT

POSTER TITLE: Regional thalamic dysrhythmia and connectivity abnormalities relate to motor performance in children with perinatal stroke

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FUNDING SOURCE(S) CHILD-BRIGHT Network

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Objective: To use resting-state functional MRI to identify differences in brain activity and characterize the relationship with clinical symptoms in children who have had a periventricular venous infarct (PVI).

Methods: Twenty-three children with left PVI (13M; mean age = 11.9y) and 22 age, sex-matched typically developing children (TDC) (11M, mean age = 12.7y) completed resting-state functional MRI scans. Brain activity was assessed using: 1) Amplitude of Low Frequency Fluctuation (ALFF), 2) Regional Homogeneity (ReHo), and 3) Degree Centrality (DC). Using the Box and Block Test (BBT), motor function in the affected (BBTA) and unaffected (BBTU) hands was evaluated. Non-parametric permutation testing (5000 iterations) identified brain regions that showed group differences between PVI and TDC. Subsequent regions were masked and regressed against BBTA and BBTU scores.

Results: Children with PVI showed greater oscillatory activity (ALFF) in the ipsilesional thalamus, lower bilateral thalamic connectivity (DC) to the rest of the brain (DC) ($p < 0.05$, FWE-corrected) but no ReHo differences compared to TDC. Greater oscillatory activity in the dorsomedial thalamus was highly correlated with BBTA ($\rho = -0.65$, $p < 0.05$ FWE-corrected) but not BBTU ($p > 0.05$).

Conclusion: This work suggests that altered connectivity between the thalamus and the rest of the brain, as well as thalamic dysrhythmia, may be functionally relevant to unilateral motor impairments in children with PVI.