

Induced brain plasticity after perinatal stroke: Structural and functional

ABSTRACT:

Background

Little is known on the effect of early brain lesion on the acquisition of language in infants. Patients who suffered a left hemisphere injury during prenatal or perinatal periods are of great interest, as they present individual differences in their degree of language recovery. Only few fMRI data collected in children with perinatal left-hemisphere brain lesions have brought evidence that the undamaged right-hemisphere is able to take over language functions as revealed by near to normal linguistic processing, thus supporting a model of recovery based on inter-hemispheric transfer of function. It is still an open question to which extent language reorganization and plasticity processes occurring after an early brain insult is enough for normal language development.

Aims

We aimed at better understanding how functional and structural connectivity during brain maturation is reorganized after perinatal ischemic stroke and its impact in language development.

Method

Neurocognitive development was assessed at 25-42 months of age after perinatal stroke (N=10). Word learning abilities were also assessed using a fast-mapping task. Functional and structural (DTI)-MRI imaging was measured (including intrinsic connectivity).

Results

The combination of functional and structural MRI as well as language and language learning measures, showed that children who had a stroke affecting crucial language areas, including white-matter pathways of the left hemisphere, are especially vulnerable to the negative impact of the stroke on their later language outcomes.

Conclusion

These results suggest that the amount of right lateralized reorganization induced by early left lesion predicts better outcomes in language development.

Keywords

Perinatal stroke, Brain plasticity, Language development, NeuroImaging data, Functional and structural connectivity

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