Plasticity of the human visual brain after an early cortical lesion.


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Abstract:

In adults, partial damage to V1 or optic radiations abolishes perception in the corresponding part of the visual field, causing a scotoma. However, it is widely accepted that the developing cortex has superior capacities to reorganize following an early lesion to endorse adaptive plasticity. Here we report a single patient case (G.S.) with near normal central field vision despite a massive unilateral lesion to the optic radiations acquired early in life. The patient underwent surgical removal of a right hemisphere parieto-temporal-occipital... atypical choroid plexus papilloma of the right lateral ventricle at age 3 months. Very detailed psychophysics investigations (e.g. measuring visual acuity and contrast sensitivity) and neuroimaging (structural and functional) reveal surprisingly good residual vision, including conscious vision (in contrast with blindsight). An impairment in form and contrast vision was observed in the far periphery of the affected visual field. Intriguingly, the middle temporal complex (MT+) and the parieto-occipital sulcus (POS) in the intact hemisphere show responses to both contralateral and ipsilateral field stimulation and strong structural connections between MT+ and the lateral geniculate nucleus (LGN) were noted on diffusion measurement. This study reveals that strong thalamo-cortical projections may serve as the neurobiological basis of plasticity in such cases.

Disclosures

None declared

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