**Wallerian degeneration in the optic radiation after temporal lobectomy demonstrated in vivo with diffusion tensor imaging**

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<tr>
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<td>Wieshmann, U C [1], Symms, M R [2], Clark, C A [3], Lemieux, L [4], Franconi, Florence [5], Parker, G J [6], Barker, G J [7], Shorvon, S D [8]</td>
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**PURPOSE:** Diffusion tensor imaging allows the quantitative assessment of the microstructural organization of tracts in vivo (MR tractography). We used the new technique of MR tractography to demonstrate the effects of temporal lobectomy on the optic radiation.

**METHODS:** Spatially normalised maps encoding magnitude of the bias (anisotropy) of diffusion of three patients with temporal lobe resections were compared with spatially normalised diffusion maps of 22 control subjects. All three patients were operated on for the treatment of medically intractable temporal lobe epilepsy and had a normal neurologic examination before surgery. One patient had an amygdalocorticectomy. Two patients had standard en bloc resections, one of whom developed a homonymous hemianopia after surgery.

**RESULTS:** In the patient with hemianopia, a significant reduction of diffusion anisotropy (greater than mean+/−2 SD) consistent with wallerian degeneration was demonstrated in the optic radiation on the side of the temporal lobectomy, extending from the temporal to the occipital lobe. In the other patient with standard en bloc resection but clinically no hemianopia, the optic radiation was only marginally affected. In the third patient (amygdalocorticectomy), the diffusion anisotropy was within the normal range in the expected position of the optic radiation.

**CONCLUSIONS:** Our findings show that MR tractography may be a useful tool to demonstrate wallerian degeneration in the optic radiation after temporal lobectomy in patients with hemianopia. This is the first time that this new method has been applied in postoperative imaging; it enables us to visualise the morphologic correlate of dysfunctional pathways after epilepsy surgery in vivo. The potential for using MR tractography to study other aspects of epilepsy is discussed.

**URL de la notice**

http://okina.univ-angers.fr/publications/ua5721 [19]

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