

White matter trajectories in pre- and postoperative DTI examination and fiber tracking for patients with brain stem cavernomas

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Objective: The aim of our study was to verify the possible to reliably visualize the alterations of white matter trajectories in patients with brain stem cavernous angiomas (CCMs) using diffusion-tensor imaging (DTI)-MRI and fiber tracking.

Methods: DTI measures the motion of hydrogen atoms within the water molecules in all three dimensions. This method allows direct, non-invasive examination of white matter fiber tracts *in vivo* and has already a broad range of applications in the clinical neurosciences. Between March 2003 and July 2005 twelve patients (5 males, 7 females, mean age 38.5±5.4, range 18 to 55 years) with brain stem cavernomas were investigated with DTI-MRI (GE, 1.5 Tesla) and fibertracking (NeuroQLab, MeVis, Bremen) in order to calculate the anisotropy maps and to evaluate white matter trajectories pre- and postoperatively.

Results: In cases of brainstem cavernomas, anisotropy maps could well delineate the damage of white matter tracts, which corresponded in all patients to the individual neurological impairment. The elasticity of the nervous tracts dislocated by huge CCMs was documented by fibertracking in 2 cases pre- compared to postoperatively.

Conclusions: According to our experience both DTI and fibertracking visualize white matter trajectories within the brainstem. Such investigation may have an impact in planning of microsurgical approaches to this surgically difficult target area.