MR Imaging of the Optic Chiasm and Visual Loss: How and Why

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Purpose
MR imaging of optic anterior pathways (OAP) during visual loss (VL) may disclose optic chiasm lesion, isolated or associated to optic nerves abnormalities. We propose the results of a protocol which aimed to analyze and correlate to clinical data the different lesions of optic chiasm, to emphasize the interest of the whole OAP imaging during visual loss, and present a display of the various lesions found.

Materials & Methods
One hundred seventy-six patients (58 males, 118 females, mean age: 48 years) with VL due to OAP lesion (with exclusion of ophthalmologic cause) were included. They underwent a systematic MR imaging protocol associating at least coronal T2- and T1-enhanced fat-suppression sequences. Analysis of images (signal, enhancement) and comparison with clinical status (visual field and acuity) were performed.

Results
Fifty-one of 176 patients had optic chiasm abnormalities: 19 Hypersignal on T2 sequences, 6 enhancement. Moreover, most patients had abnormal morphology of optic chiasm (atrophy, often asymmetric, hypertrophy, displacement), either isolated or associated to optic nerve lesion. The clinical correlation was good, with only a few cases of disagreement between unilateral visual field alteration and lesion of the whole chiasm. The main etiology of displacement and compression was pituitary adenoma, of atrophy was sequellae after treatment of macroadenoma or long lasting multiple sclerosis, of hypersignal T2 and enhancement was: tumor (glioma, germinoma). Discussion: Isolated optic chiasm lesions may be disclosed by thin study and help to understand the mechanism of visual alteration. Atrophic optic chiasm has a poor visual prognosis. Visual outcome if hypersignal of a normal or hypertrophied optic chiasm is due to compression depending on the duration of compression and efficacy of the treatment of compressive agent. Evolution of tumoral involvement, which may show enhancement, depends on the type of the tumor. Inflammatory lesions with atrophy (i.e., late multiple sclerosis) lead to worsening of VL.

Conclusion
Careful examination of optic chiasm must be performed even when visual deficit is unilateral. This study emphasizes the need for thin T2 coronal study and is useful to understand the mechanism of the visual loss, as well as to help the therapeutic orientation.

References