

Localized bi-nasal macular edema in optic chiasmal syndrome

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A 28-year-old healthy male complaining of vision loss in his right eye was discovered to have localized bi-nasal macular edema in the presence of a pituitary adenoma. The presence of a junctional scotoma composed by a central scotoma in the right eye associated with superior temporal quadrantanopia in the fellow eye was seen. The pattern detected in the visual field suggested the presence of an expansive mass at the level of the optic chiasm. Optical coherence tomography findings also revealed subtle macular thickness beyond normal in the superior and nasal quadrants of both maculae. This report illustrates the importance of suspecting a pituitary adenoma in the light of uncharacteristic retinal alterations.

Key words: Macular edema, optical coherence tomography, pituitary adenoma

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The optic chiasmal syndrome (OCS) has distinct ophthalmologic features such as a visual field deficit, optic disc changes, decrease in visual acuity, ocular motor disturbances, and exophthalmos.^[1] Optical coherence tomography (OCT) is a device that uses near-infrared light to produce cross-sectional images of the retinal structures. Macular thickness could precisely be estimated using this technology. Moreover, the retinal nerve fiber layer (RNFL) thickness around the optic disc can also be determined. The former directly represents retinal ganglion cells (RGCs) axonal populations and constitutes the neural rim in the interior of the optic nerve. Thus, any process involving the latter, or other related structures, may influence the morphology or appearance of the macular area. We herein describe an unusual retinal manifestation in a patient diagnosed having a pituitary adenoma.

Case Report

A 28-year-old healthy male was seen in our clinic complaining of vision loss in his right eye (OD). Best-corrected visual acuity (BCVA) was OD: 20/200 and left eye (OS): 20/20. Anterior segment examination revealed a relative afferent pupillary defect in the OD. Fundus examination disclosed localized bilateral temporal pallor in the optic nerve. The rest of the ophthalmologic examination was found to be within normal limits. Fundus pictures and fluorescein angiogram (FA) were performed during the first visit. Mild vascular abnormalities were detected in the temporal aspect of right optic nerve, but no conclusive information was obtained. The OS was deemed to be normal. OCT using the Stratus OCT 3 model (Carl Zeiss Meditec, Jena, Germany) was indicated for the evaluation of the macular areas, RNFL thicknesses, and optic nerves. The fast macular protocol revealed subtle macular thickness beyond normal in the superior and nasal quadrants of both maculae. No visible alterations in the internal microarchitecture of the retina were observed using several retinal lines and optic disc protocols. The RNFL thickness was near the superior normal limit in OD. A slight incremental thickening of the RNFL was observed in the superior and nasal quadrants of the OS.

In order to evaluate the patient's visual field (VF) and retinal sensitivities, a frequency doubling technology perimetry (FDT), using the commercially available (Matrix[®]) device, was

performed in both eyes. The threshold 30-2 strategy revealed the presence of junctional scotoma composed by a central scotoma in OD associated with superior temporal quadrantanopia in the fellow eye. The pattern detected in the VF suggested the presence of an expansive mass at the level of the optic chiasm [Fig. 1]. Magnetic resonance imaging (MRI) was performed which disclosed the presence of a tumor, compatible with the diagnosis of pituitary adenoma [Fig. 2]. After a complete neurological evaluation, medical treatment with Cabergoline (a dopamine agonist), once a week, was recommended. After 8 months, a significant reduction of tumor volume was achieved. Moreover, the patient experienced a full recovery of BCVA and VF [Fig. 3]. Functional normalization was accompanied with restoration of macular thickness.

Discussion

Visual loss associated with a junctional scotoma is a well-known clinical sign related with the presence of a compressive mass in the chiasmatic area.^[1] Monteiro described a generalized reduction of the RNFL thickness in the retinas of patients with band atrophy secondary to pituitary tumors.^[2] Lederer and colleagues reported on the usefulness of the macular map thickness, while studying patients with glaucomatous optic nerve alterations.^[3] Due to a relative incremental change in the ganglion cells axonal concentration within the macular area, its study may disclose early pathologic signs related with this retinal layer.^[4] Interestingly, the patient described here showed a thickening in the nasal and superior and nasal aspects of both maculae. This tomographic sign, not visible on the biomicroscopic fundus examination and in the FA, was interpreted as an early retinal manifestation produced by the presence of the tumor. The physiopathology of this localized, incremental thickness is merely speculative, but could be produced by an alteration in the axonal transport in ganglion cells. After obstruction of the axoplasmic flow, an early enlargement (intracellular edema) of the nerve fibers followed by a chronic atrophy could occur.^[5] Though no direct evidence exists corroborating this phenomenon, at least three indirect clinical issues support this theory: (1) The retinal thickness increment was revealed anatomically by the OCT, but no evidence of dye leakage was seen in the FA. (2) The presence of a topographic correlation between the junction scotoma and the macular thickening. (3) The visual loss was ipsilateral to the main tumor location. Furthermore, the macular thickness enlargement was symmetric while the visual alteration was roughly asymmetric. This most likely could be indicative of the potential for intracellular edema preceding the visual function alteration and this thickening could be an early sign that could be detected before consolidated fiber atrophy occurs. Thus, early detection and treatment may improve visual prognosis in these cases.

Frequency doubling technology perimetry (Matrix – FDT) has shown to be a suitable method for studying and detecting abnormalities in patients with neurological visual field deficits.^[6] During the functional evaluation of this patient, the FDT revealed the presence of a junctional scotoma compatible with the tumor location. If the tumor continues growing, bitemporal hemianopia may be seen in these cases.^[7] Even with an asymmetric VF defect, the OCT was able to show symmetric involvement, with respect to macular thickness. We speculate that the anatomical alteration revealed by the OCT precedes the functional deficit found in the VF. Thus, we propose that detection of bi-superonasal macular edema (ME) could be

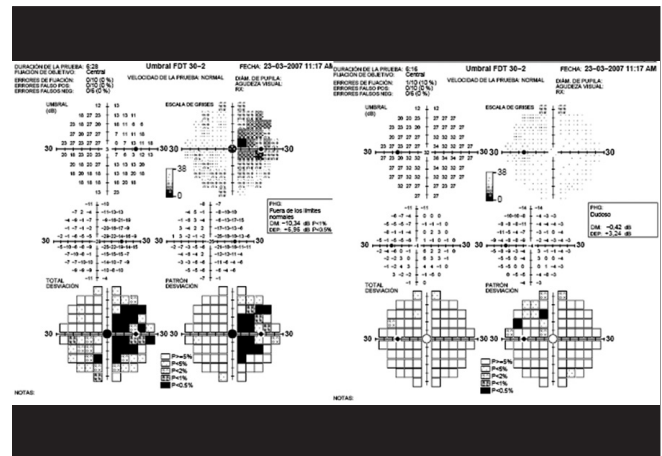


Figure 1: Threshold 30-2 visual fields. Left: Presence of junctional scotoma composed by a central scotoma in OD. This was suggested of an expansive mass at the level of the optic chiasm. Right: Superior temporal quadrantanopia in OS

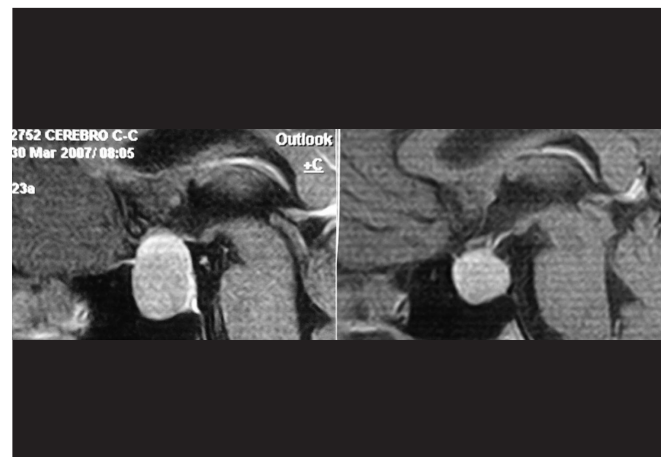


Figure 2: Central nervous system MRI. Left: Pituitary dependent macroadenoma. Right: Important volume reduction after medical treatment

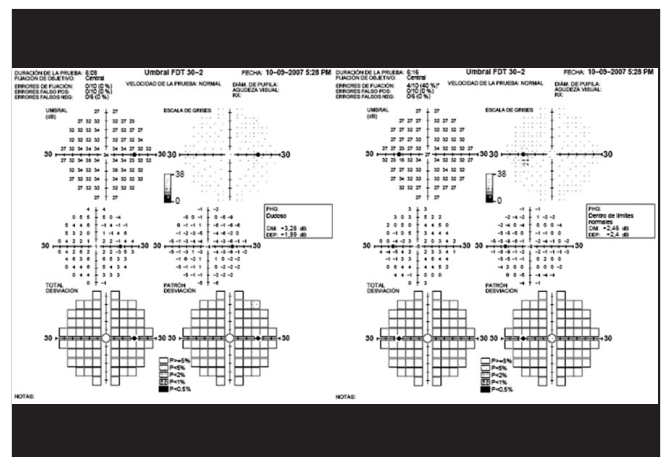


Figure 3: Threshold 30-2 visual fields. Full visual field recovery experienced after 8 months

an early sign of chiasmal pathology. With an early diagnosis and subsequent treatment, a complete restoration of visual function was achieved in this case, stressing the importance of early recognition of the disease. We are unaware of previous reports regarding localized bi-superonasal ME secondary to a pituitary adenoma and could find no references to it in the medical literature. Studies including a cohort of patients are warranted for the evaluation of these tomographic findings. In conclusion, it is important to suspect pituitary adenoma in cases of VF deficit and OCT macular alterations.

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