A Case of Optic Neuropathy Treated by Percutaneous Trans-coronary Angiography

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There are many risk factors involved in the development of ischemic optic neuropathy such as diabetes mellitus, hypertension, arteriosclerosis, and vascular incompetence. Therefore, the treatment of ischemic optic neuropathy should not be solely based on proper diagnosis but should also involve a thorough and systemic investigation to identify those multifactorial possibilities, which may contribute to the pathogenesis of the disease. We report upon a patient who developed non-arteritic ischemic optic neuropathy following treatment of a sphenoid mucocele, which lead to recovered vision and a satisfactory improvement of visual field defects, after percutaneous trans-coronary angiography with stent insertion of the coronary arteries.

Key words: non-arteritic ischemic optic neuropathy, percutaneous trans-coronary angiography, sphenoid mucocele

INTRODUCTION

Anterior ischemic optic neuropathy (AION) is a segmental or generalized infarction within the prelaminar or laminar portion of the optic nerve. If not associated with giant cell arteritis (GCA), it is referred to as non-arteritic (idiopathic) ischemic optic neuropathy (NAION) and is the most common acute optic nerve disease of the middle-aged and elderly. NAION is the result of a compromised watershed microcirculation with associated genetic, mechanical, or vasculopathic risk factors and is based on a clinical diagnosis involving sudden painless vision loss, optic disc edema, and visual field defects. The optic disc appearance of the normal fellow eye of patients with NAION is known to have a smaller cup than is normal and in those with arteritic ischemic optic neuropathy. Also, optic disc filling delay is common in typical NAION by fluorescein angiography and altitudinal rather than sector shaped, central, or centrocecal visual field defects are more common than in those with vascular pathologies.

We report upon a case of ischemic optic neuropathy which occurred following the removal of a sphenoid mucocele, with recovered vision and improved visual field defects, soon after receiving percutaneous trans-cutaneous angiography (PTCA) with stent insertion of the coronary arteries.

CASE REPORT

On April 28, 1999, a 48-year-old man visited the ophthalmology department complaining of sudden vision loss and noticeable visual field decrease OD.

Two years previously, on August 26, 1997, he had first visited the ophthalmology department with complaints of decreased vision and pressure pain in
the right eye, of two-days duration. Initial examination revealed corrected visual acuity of hand motion OD and 20/30 OS with normal intraocular pressures. Moderate lid edema and conjunctiva injections were noted OD. The pupils were anisometric with a relative afferent pupillary defect existent in the right eye. Extraocular movements revealed moderate motion limitations during lateral, superior, and inferior gaze OD without diplopia. The cornea and the anterior chambers were clear, and fluorescein angiographies of the fundus were benign.

Extraocular movements were further aggravated limiting motion in all directions and coupled with the appearance of upper lid drooping OD. This prompted a computed tomographic (CT) scan, which demonstrated a large lesion involving the right ethmoid and sphenoid sinuses compressing the optic canal (Fig. 1). The clinical and radiographic findings were consistent with an impression of sphenoidoid mucocele and two days later, emergency radical maxilloethmoidectomy and sphenoidectomy were performed. The patient then presented with improved status in terms of upper lid drooping and extraocular movement, which became normal after a postoperative three days. His vision improved to 20/30 OD before he was discharged.

However, upon re-admission in April of this year, ocular examination revealed a relative afferent pupillary defect, pale optic disc, and complete visual field loss sparing the central upper field OD (Fig. 2). His visual acuity was 20/100 OD. A computed tomographic (CT) scan revealed soft tissue density in the maxillary, ethmoid, and sphenoid sinuses, but this was not viewed as a recurrence or a remnant of the previous mucocele and no definite signs of optic nerve compressions were noted (Fig. 3). Follow up fluorescein angiography was not possible due to the severe dye sensitivity of the patient. The patient’s incidental complaint of chest tightness and dizziness on walking up stairs prompted a cardiologic evaluation, which resulted in the diagnosis of coronary artery obstructive disease (2-vessel disease). He had no prior history of cardiology symptoms nor did his routine systemic examinations reveal such problems. On May 12, 1999, he underwent percutaneous trans-coronary angiography with stent insertion of the left anterior descending and obtuse marginalis artery. His ocular symptoms began to immediately improve and 1 week after the procedure this resulted in a recovered visual acuity of corrected vision of 20/30 OD and improved visual fields as determined by the Goldmann visual field examination (Fig. 4). Two and a half months after receiving PTCA, he maintains good visual function.
DISCUSSION

The etiologies of optic neuropathy may be classified as being ischemic, compressive, inflammatory, and idiopathic. The most common type of NAION is idiopathic, which results from a secondary microvascular disease of the anterior optic nerve head. Risk factors include hypertension, ischemic heart disease, diabetes mellitus, and a small cup to disc ratio.5

Of the many compressive etiologies, a sphenoid mucocele is a histologically benign, slowly developing lesion of the sinusal cavities, which becomes noticed because of its rather serious functional symptoms induced by the anatomical compression of adjacent tissues and the gradual destruction of their bone walls.6,7 According to Nugent et
nal, headache and visual loss are the most common symptoms associated with visual field defects, ophthalmoplegia, and proptosis. Studies by Moriyama et al. showed that patients with mucocele have generally undergone previous nasal surgery and that the degree of improvement in visual acuity after the operation, depends on preoperative visual acuity, the mode of development of the mucocele, and duration from onset of the disease until the time of operation.

Our patient presented with a rather sudden onset of visual loss and pain of the right eye, which was accompanied by lid drooping and limitations of motion, which corresponded well with what was expected of the compressive effects of a sphenethmoid mucocele. Removing the compressive lesion produced a prompt improvement in the symptoms and previous ocular abnormalities. The favorable outcome in this case may have been due to the relatively short duration of symptoms and immediate surgery upon diagnosis. However, two years later, the patient returned with symptoms of vision loss and visual field decrease, coupled with findings of the optic disc and pupil, this lead to the diagnosis of recurrent optic neuropathy. The patient did not manifest symptoms suggestive of temporal arteritis, such as headache, scalp tenderness, jaw claudication, or polymyalgia rheumatica, which suggested a new NAION rather than a recurrent compressive optic neuropathy. Amazingly, coincidental PTCA with stent insertion due to cardiologic problems also resulted in a dramatic ocular improvement.

In this case, the presence of the sphenethmoid mucocele and the occurrence of ischemic optic neuropathy may either be two quite different entities or may be the result of a defective vascular auto regulation in the optic nerve head as proposed by Hayreh et al. In this case, the pre-existing mucocele or its treatment may have provoked a defect in the vascular auto regulatory system, which in turn caused the optic neuropathy. However, the exact etiology is not known. In any case, NAION is presumably a vascular disease associated with systemic disorders. Therefore, existing treatment modalities include the use of anticoagulants, vasodilators, vasopressors, phenytoin, corticosteroids, and optic nerve sheath decompression but overall results are less than satisfactory. The importance of the cardiovascular circulation in the maintenance of optic integrity can be appreciated from articles, which detail visual loss and AION after coronary artery bypass surgery and the postoperative improvement of ocular ischemia and external carotid revascularizations in patients with internal carotid artery occlusions. Such an observation was made in our case, which showed an improvement of vision and visual field after the patient underwent PTCA with stent insertion of the coronary arteries.
No universally effective treatment has been established for NAION. Although most cases are idiopathic, ocular and systemic risk factors have been identified, which lead to an increased incidence of this disease. Whether the progression of the disease is pre-determined or is triggered by an environmental cause, it is without doubt that it is multifactorial. Thus, when it comes to the treatment of NAION, a thorough and systematic vascular investigation is mandatory to achieve good optimal outcomes.

REFERENCES