

Visual function recovery post decompression surgery in meningioma: a case report



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ABSTRACT

Background: Meningiomas represent about 20% of intracranial tumors. Due to these tumors' proximity to the optic nerve, typically progressive unilateral vision loss, over several months to years, is the classic clinical presentation.

Case Presentation: A 23 y.o. male presented with a progressive monocular visual loss of the right eye since 4 months. Visual acuity on the right eye was 1/300 and 6/6 on the left eye. Color vision and contrast sensitivity of the left eye was excellent. Fundus examination showed papilledema on right eye and left eye was within normal limit. MRI reveals a strong enhancing mass along the right and left sphenoid wing, measuring approximately 3.9 x 5.5 x 3.3 cm, extending into the parasellar region, compressing optic chiasm and encasing right and left N.III, N.IV and N.V. Patient were diagnosed with compressive optic neuropathy on the right eye due to meningioma. Following the decompression surgery, visual acuity on the right eye improved to 6/24, color vision 25/38 and contrast sensitivity was 5%. The patient was discharged 4 days after surgery and scheduled for routine follow-up at the polyclinic.

Conclusion: Vision loss due to the compressive effect of meningioma may be reversible. The severity and the duration of vision loss due to compression may affect the final visual recovery. Early detection and prompt multidisciplinary approach are necessary to obtain a better outcome.

Keywords: visual, surgery, meningioma, outcome.

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INTRODUCTION

Compressive optic neuropathy (CON) is caused by injury to the optic nerve by an extrinsic lesion. Any lesion that produces associated mass effect can cause CON, including infectious (e.g., aspergilloma), inflammatory (e.g., inflammatory pseudotumor), vascular (e.g., aneurysm), traumatic (e.g., fracture, hematoma), and neoplastic (e.g., meningioma, glioma) etiologies. The optic nerve is particularly vulnerable to injury by a compressive force adjacent to bone or in a small confined space (e.g., orbital apex, optic canal).¹

The annual incidence of symptomatic meningiomas is approximately 2 cases per 100,000 individuals. Meningiomas of the anterior skull base constitute 40% of all intracranial meningiomas, and sphenoid wing meningiomas constitute 11-20% of intracranial meningiomas.²

Various outcomes have been reported regarding visual outcomes after decompression surgery in meningioma.³ Although rare, visual acuity improvement

after tumor resection was reported despite long-term blindness associated with tumor invasion into the optic canal.⁴

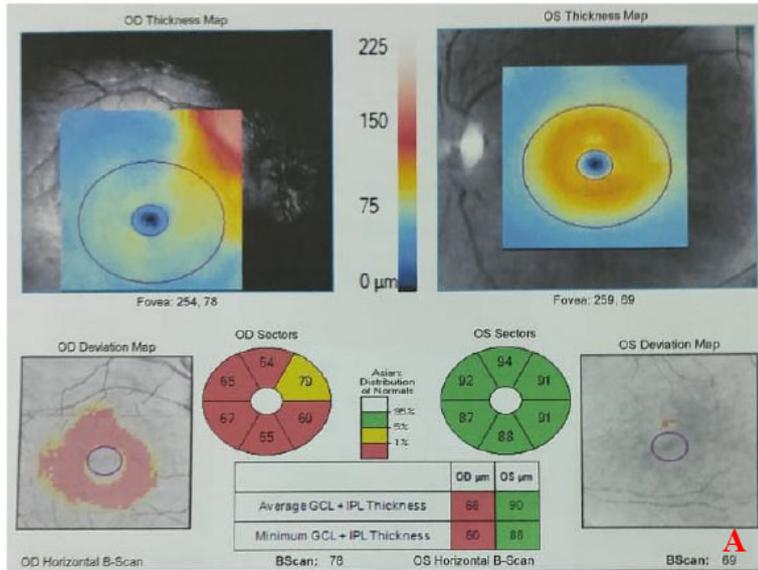
This case report presents a marked visual function recovery after a decompression surgery procedure in a suggestive meningioma patient.

CASE PRESENTATION

A 23-year-old man presented with a painless unilateral progressive visual loss for 4 months along with an intermittent pulsatile pain of the right eye and headache. Two weeks before admission, the right eye's visual acuity became worsen



Figure 1. Optic nerve head: (a) edematous ONH of the right eye and (b) normal appearance of ONH of the left eye.



1). The fellow eye was normal, the visual acuity was 6/6. The anterior and posterior segment revealed unremarkable result upon examination.

Optical Coherence Tomography (OCT) showed a thinning on macular ganglion cell layer (GCL) and inner plexiform layer (IPL) of the right eye with average thickness 68 μm. OCT also revealed a surge on ONH retinal nerve fibre layer (RNFL) with average RNFL thickness of 225 μm. The OCT result of the left eye was within normal limit (Figure 2).

Magnetic resonance imaging (MRI) demonstrated a strong enhanced solid mass in the left and right sinus cavernous region with a broadbase convexity on the right and left sphenoid wing (approx. AP 3.9 x LL 5.5 x CC 3.3 cm). The mass was extended to the right and left parasellar region, encasing the right and left internal carotid artery, pressing the optic chiasm and adhering to the right and left optic nerve (N.II), trochlear nerve (N.IV) and trigeminal nerve (N.V). The finding was consistent with meningioma. There was no sign of increase in intracranial pressure (Figure 3).

Craniotomy was performed to decompress the surrounding nerve and tissue by optic nerve canal decompression. Significant visual recovery was noted during follow-up. The visual acuity of the right eye improved to 6/24, contrast sensitivity was 2.5%, color sensitivity was 25/38 on the Ishihara plate. The edema on ONH was also improved, the obscuration was noted only at the nasal border of the disc. The patient was discharged 4 days after surgery and scheduled for routine follow-up at the polyclinic.

DISCUSSION

A compressive optic neuropathy's clinical hallmarks include slowly progressive vision loss, reduced visual acuity and/or visual field, dyschromatopsia, a relative afferent pupillary defect, and eventual optic atrophy. Initially, the optical disc may be swollen or normal (retrobulbar optic neuropathy). Up to 75% of patients with intracranial tumors present with a headache.⁵

Meningioma resection has long been considered the primary and definitive treatment for meningioma. Surgery is

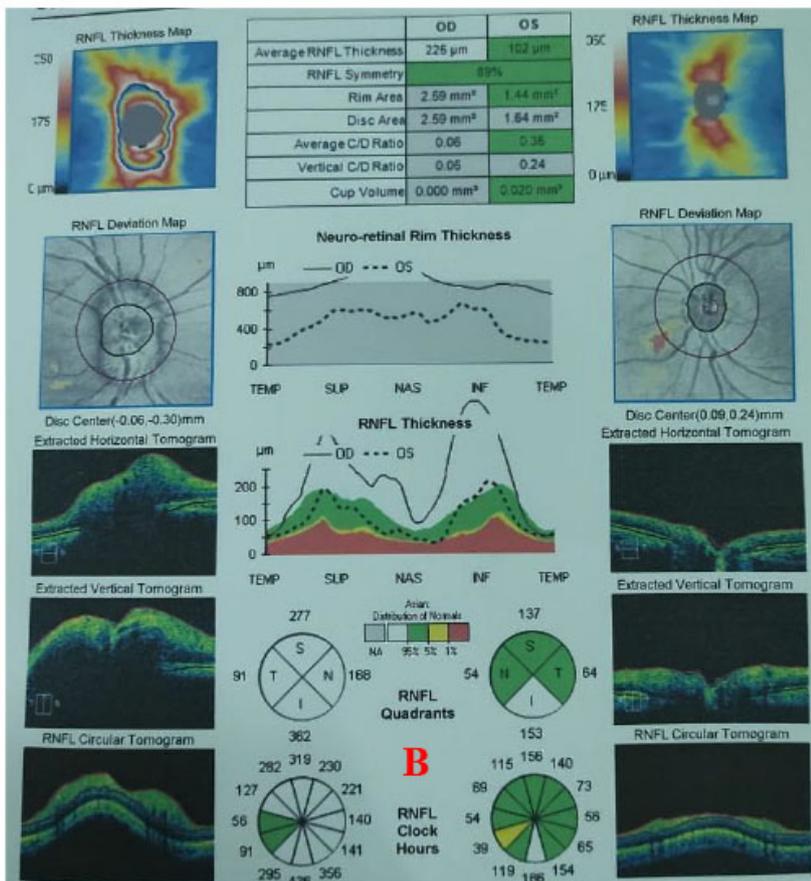


Figure 2. Optical coherence tomography: (a) Significant thinning on right eye macular GCL and IPL and (b) a rise of right eye ONH RFL thickness.

and patient could only identify light. The visual acuity of the left eye remained intact. There was no history of trauma and other illness.

On ophthalmological examination, the visual acuity of the right eye was

1/300, pupil diameter was 3 mm with a depression of pupillary reflect and positive relative afferent pupillary defect (RAPD). Funduscopy examination revealed edematous optic nerve head (ONH) with obscuration of all borders (Figure



Figure 3. MRI revealed a mass lesion consistent with meningioma.

typically performed using multi-stage procedures leveraging the benefits of different approaches (e.g., endoscopic endonasal surgery for anterior skull base lesions). This technique may minimize the morbidity associated with resection of the entire tumor in one operation.⁶ Rates of gross total resection are approximately 50%. Surgical complications range from 1-18%. The 5-year recurrence-free survival for WHO Grade I meningiomas is 88%.⁷

A study of 53 patients with microsurgically treated sphenoid wing meningiomas found that intentional incomplete resection of the tumor had a favorable impact on the postoperative quality of life, primarily due to avoiding neurological defects when the tumor involved neurovascular structures. In these cases of incompletely resected tumors, postoperative radiotherapy or radiotherapy are considered beneficial.⁸

Some studies have been reported the relation between meningioma and visual acuity disturbance. Early diagnosis and tumor resection are necessary for visual function recovery. In general, patients

with meningioma on the lateral and superolateral sphenoid ridge usually have better visual prognosis than the tumors encroaching the optic canal. The prognosis of visual acuity disturbance caused by meningioma depends on preoperative duration of symptoms and extent of visual impairment.⁹

In our presented case, a significant visual recovery was achieved soon after tumor resection despite the macular GCL and IPL thinning, papilledema and the presence of RAPD. We believe the severity and the duration of vision loss due to compression is playing an essential role in the final visual recovery.

One study showed the visual improvement occurred within the first several weeks after operation and further return of vision was not noted after one year.¹⁰ The result in other study of 65 patients who underwent surgery of a medial sphenoid wing meningiomas resection showed that 46 (71%) maintained their preoperative visual acuity, five (8%) had improved vision, and 14 (22%) had worsened vision at last follow-up.³

CONCLUSION

Vision loss due to meningioma's compressive effect may be reversible despite the macular GCL and IPL thinning, papilledema and the presence of RAPD. The severity and the duration of vision loss due to compression may affect the final visual recovery. Early detection and prompt multidisciplinary approach are necessary to obtain a better outcome.

ETHICAL APPROVAL

The patient had received signed written informed consent regarding publication of their medical data in medical journal.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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AUTHOR CONTRIBUTIONS

Supervision, methodology: Yuriz Bakhtiar, Riski Prihatningtias.

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