Ocular Manifestations of Sphenoid Meningioma : A Case Report

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Abstract

Background: Approximately 46.8% to 88.6% patient with brain tumor experienced ophthalmology manifestations and most patients went to ophthalmologist in the first time with ocular symptoms. Sphenoid meningioma are often asymptomatic in the early stage of the disease. The ocular manifestations mentioned above could appear as the disease progresses, therefore a careful clinical evaluation is needed in order to retain neurological function.

Case: A 40 years old female patient was presented with main complaint of headache. This symptom was felt since 6 months ago on the left side of the head accompanied by visual disturbance on the left eye since 3 months ago. Head magnetic resonance imaging (MRI) with contrast showed broad base meningioma on the left sphenoid wing measuring about 3,62 x 3,08 x 2,24 cm. The mass extended to left cavernous sinus and encased left carotid artery as well as pushing the right carotid artery laterally; the mass also extended to left sphenoid sinus and encased left optical nerve; the mass also extended to intrasellar and compressed the hypophysis. Optical coherence tomography (OCT) examination showed retinal nerve fiber layer (RNFL) thinning on the temporal quadrant of the left eye, reduced macular thickness of the left eye, and optic papilla atrophy of the left eye.

Conclusion: Ophthalmic examinations and evaluation could assist in early diagnosis of tumor in order to adequately treat the disease. The prognosis is better if the cranial lesion could be recognized early and hence managed well, therefore decreasing morbidity and mortality.

Keywords: Meningioma, visual disturbance, optic papilla atrophy

Introduction

Meningioma is the most common intracranial tumor. The afferent and efferent visual paths are spread all around the central nervous system.(Cappabianca et al. 2020) The afferent visual path counted for 50% of all sensory input to the central nervous system so that it is not uncommon for meningioma to involve the visual system. The involvement of visual afferent paths could manifest as visual disturbance, visual fields defect, or diplopia.(Lee 2009)

Approximately 46.8% to 88.6% of patients with cerebral tu mors experienced several ophthalmology manifestations hence neuro-ophthalmology manifestations could assist in diagnosing tumors because 60% of patients went to an ophthalmologist for the first time with ocular symptoms.(Saurabh Deshmukh, Dipankar Das 2018)

Sphenoid meningioma is often asymptomatic in the early stage of the disease(Magill et al. 2020). The ocular manifestations mentioned above could appear as the disease progresses, therefore a careful clinical evaluation is needed to retain neurological function.(Leroy et al. 2016) This case report was made to explain the importance of clinical manifestations to assist the diagnosis of sphenoid meningioma.

Case Report

A 40 years old female patient with the chief complaint of headache. This symptom appeared six months ago on the left side of the head that worsened one month before hospitalization with a numeric rating scale (NRS) of 7. The patient also complained of visual disturbance on the left eye since three months ago that worsened one month before hospitalization, but not gradually. The patient also complained of ptosis of the left eyelid three months ago. No double vision was reported. There was no one-sided limb weakness, no speech difficulties, no one-sided face drooping, no convulsion, no nausea and vomiting, no numbness, and no urinary and defecation disturbance reported.

The patient has no history of diabetes mellitus, hypertension, stroke, head trauma, or head tumor. There was no family history of a similar disease. The patient is on hormonal contraception injection which is given every three months since 8 years ago.

On Neurological examination showed Glasgow coma scale (GCS) of E4V5M6; meningeal sign (-), nuchal rigidity (-), Brudzinski I-IV (-), Kernig (-); motoric strength of right extremities 5/5 and left extremities 5/5; physiological reflexes biceps reflex +2/+2, triceps reflex +2/+2, knee reflex +2/+2, ankle reflex +2/+2; pathological reflexes Babinski -/-, Chaddock -/-; no abnormalities on sensory, autonomy, and cerebellum examination.

Neuro-ophthalmology examination showed right visual acuity of 6/6 and left visual acuity light perception (-), intraocular pressure (IOP) of right and left eyes are 17.3 mmHg and 16.5 mmHg respectively, no restriction on eye movement examination, orthophoria eye position, mild ptosis on the left eye, nystagmus (-/-), and eye convergence (+/+). Anterior segment of eye examination showed no conjunctiva abnormalities, translucent cornea with no arcus senilis, deep anterior chamber, radial iris, circular isochoric pupils with diameter of 3mm/3mm and light reflex (+/+), relative afferent pupillary defect (RAPD) (-/+), clear lens, and clear vitreous. Posterior segment of eye examination using fundoscopy showed right eye fundal reflex (+), optic nerve disc with well-defined border with normal color; left eye fundal reflex (+), optic nerve disc with well-defined border with pale color suggesting atrophy; aa:vv ratio of 2/3, no bleeding or exudate, optociliary shunt (-). Confrontation visual fields examination showed normal results on the right eye, and hard to evaluate on the left eye. Perimeter examination was not performed

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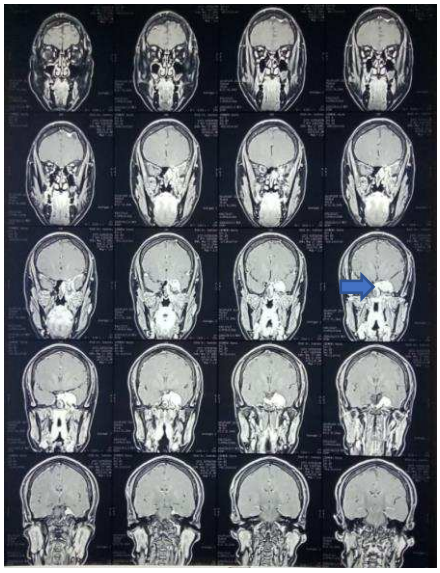
Magnetic resonance imaging (MRI) head spectroscopy with contrast showed broad base meningioma on the left sphenoid wing measuring about 3,62 x 3,08 x 2,24 cm. The mass extended to left cavernous sinus and encased left carotid artery as well as pushing the right carotid artery laterally; the mass also extended to left sphenoid sinus and encased left optical nerve; the mass also extended to intrasellar and compressed the hypophysis.



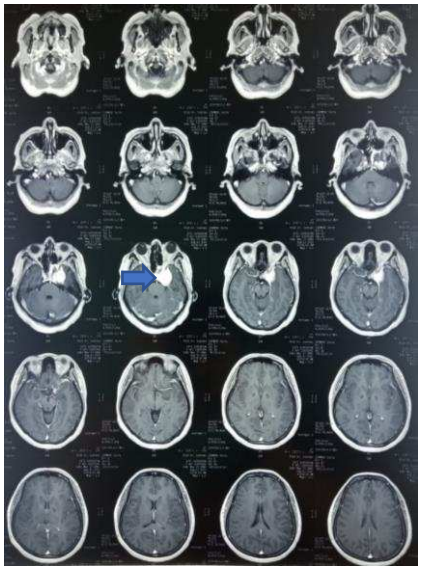


Figure 1 **Figure 2**

Figure 1 and 2 MRI of the head Coronal and axial view shown broad base meningioma on the left sphenoid wing

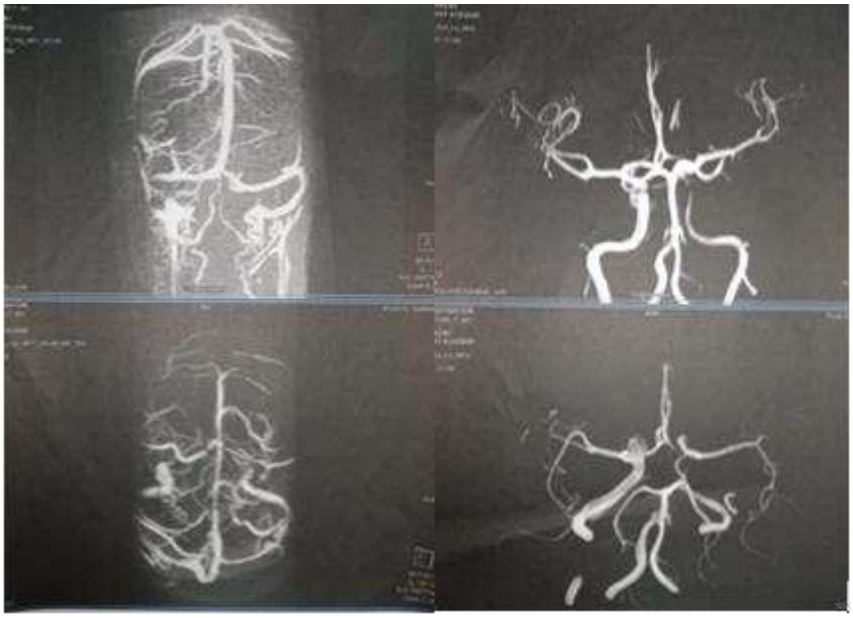


Figure 3. **MR Angiography**

Figure 3 MR Angiography showed patent Circulus Willisi with no aneurism or vascular malformation.

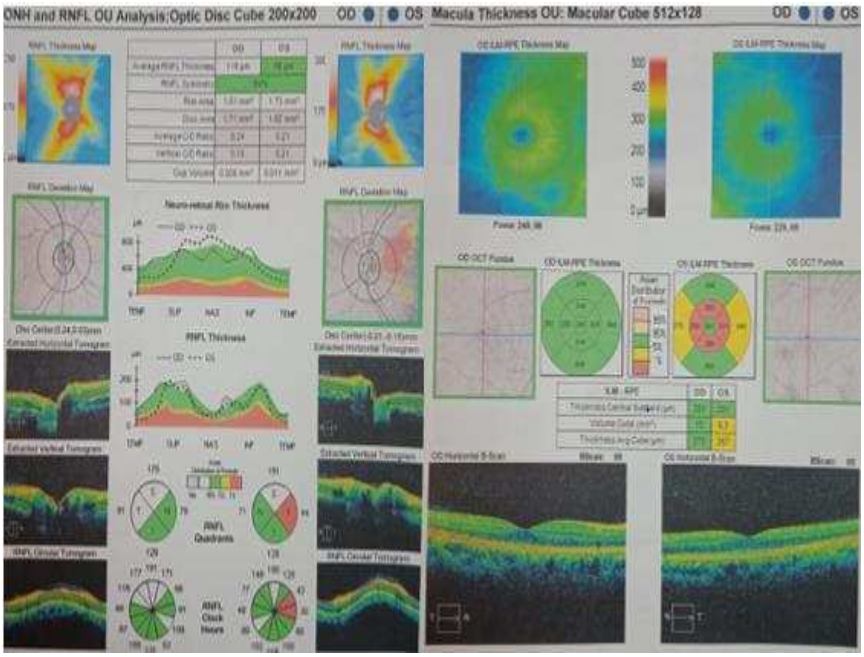


Figure 4. Optical coherence tomography (OCT)

Figure 4 Optical coherence tomography (OCT) examination showed retinal nerve fiber layer (RNFL) thinning on the temporal quadrant of the left eye, reduced macular thickness of the left eye, and optic papilla atrophy of the left eye.

The clinical diagnosis of this patient were chronic-progressive headache, left ocular ipsilateral blindness, left optic papilla atrophy, and left ptosis. The topical diagnosis of this patient were left anterior frontal lobe, afferent visual path, and cranial nerve III. The etiological diagnosis of this patient was primary cerebral tumor suspected of meningioma.

The patient was given Paracetamol 500 mg/Diazepam 1 mg 2 x 1 via oral for headache, Vitamin B1 and B6 2 x 1 via oral, Mecobalamin 2 x 500 mcg via oral, and Dexamethasone 3 x 0.5 mg. The patient was told to not push. The patient was managed in outpatient Neurology clinic of Dr. Soetomo Regional Hospital Surabaya and the condition continued to improve, the headache is less severe showed by a decreased in scale from 6 to 3 after medication.

DISCUSSION

Intracranial tumor usually cause a progressive visual deficit and visual fields loss (up to 95%) in weeks or months before a diagnosis was made. Three types of intracranial tumor that are usually seen in adults are pituitary adenoma, meningioma, and craniopharyngioma.(Sefi-Yurdakul 2015)

The typical ophthalmological signs and symptoms of brain tumor are visual impairment, changes in optic papilla (optical atrophy, papilledema), movement disturbance (cranial nerve II, IV, and VI), exophthalmos, visual fields impairment, acquired color blindness, and loss of somatic sensation (cranial nerve V). The most important visual function test in detecting signs and symptoms of highly suspected brain tumor cases are visual acuity with optimal correction of both eyes, relative afferent pupillary defect (RAPD) examination, perimeter examination, eye movement examination, and fundal examination especially the optic

papilla, comparing one side of the eye with another.

Meningioma accounted for 20% of all intracranial tumor. Meningioma are less seen in children and adolescent; the patients usually aged 50 years old on average, with female predominant. Eighty five percent of meningioma are found on female aged 40 to 60 years old.

The most common subtypes of meningioma including meningothelial, fibrous, and transition. The growth could appear as nodular or en plaque (lamina spreading along the dura surface) and could manifest extracerebrally. In 16% cases, meningioma grow multifocally. Generally, the growth of meningioma occur gradually reaching decades of development, often cause alterations on adjacent bones (osteoblast reaction), malignant transformation (2 to 10%), and metastasis (0.1%). Pregnancy is often linked with rapid-growing meningioma. The correlation between meningioma and breast carcinoma is also a common occurrence.(Leo-Kottler 2007)

The signs and symptoms usually reflects the location and growth pattern of the tumor.(Cohen-Gadol 2016) In this case the patient complaint of several ophthalmic symptoms including ipsilateral blindness and ptosis of the left ocular. Meningioma with ophthalmic manifestations could appear in: meningioma on optical nerve seath, meningioma on the tuberculum sellae, meningioma on the anterior clinoid processes, and meningioma on the sphenoid wing.[k](Leo-Kottler 2007) Tumor located on the medial sphenoid bone typically cause earlier and more specific symptoms due to its closeness to the optical apparatus and cavernous sinus.(Cohen-Gadol 2016)

The result of contrast MRI scan on this patient showed a broadbase meningioma on the left sphenoid wing extended to left cavernous sinus, left sphenoid sinus, and intrasellar. Patient with sphenoid wing meningioma could experience visual impairment, visual fields disturbance and optical atrophy. The visual manifestations could appear as a result of direct compression on the optical apparatus or suggesting the growth of tumor ino and surrounding the optical foramen or canal. Visual manifestations due to optical atrophy and intracranial hypertension could be found on a very large tumor. The Foster-Kennedy syndrome (ipsilateral optical atrophy and contralateral papilledema) is linked to a very large meningioma on the frontotemporal cranial base.(Walia et al. 2012)

Approximately 25% of all meningioma arised near the clinoid processes or along the sphenoid wing. Female (66%) aged 30 to 50 years old are the most affected group. Exophthalmos could be seen in 50% cases, and optical disk edema (mostly bilateral) could be seen in more than a half of this meningioma. Tumor expanding through the superior orbital fissures into the eye is a common occurrence and usually related to protruding hyperostosis on the sphenoid wing, as seen on the CT can. The typical manifestations shown on visual fields examination including central ipsilateral scotoma, unilateral hemianopia, and hemianopia homonym (due to a damaged tract).(Leo-Kottler 2007)

Meningioma could involve cavernous sinus either primary or secondary. Clinoidal, medial sphenoid wing, and petroclivus meningioma could extend to the cavernous sinus secondarily. Patients with tumor in cavernous sinus may be presented with manifestation related to the compression or congestion of anatomical structure inside or near the cavernous sinus. Proptosis, headache, face pain or numbness, and eye function disturbance (diplopia, ptosis, anisocoria, complete ophthalmoplegia), ore eye movement disorder are some of the most common manifestations due to paralysis of cranial nerve III, IV, and VI. The tumor could compress the optical nerve, and causing visual fields deficit. Cavernous carotid artery compression could lead to ischemic deficit.[6]

The diagnosis of meningioma could be made easily using CT and MRI scan. Neurosurgeons are more comfortable evaluating vascular connections of sphenoid meningioma using digital subtraction angiograms. Angiography could also be used to evaluate carotid artery occlusion.(Watts et al. 2014) This patient has underwent MRI/spectrometry with contras and MR angiography to assist diagnosis.

In most case, this tumor could be fully resected as wide as possible until the compression of the optical nerve and/or chiasm improved. The closer the tumor to the middle line, the higher the risk of incomplete resection and complication. Sphenoid tumor located near the middle line usually spread to the contralateral side, a series of surgeries on one side followed by the other side.(Ouyang et al. 2015) Stereotactic radiotherapy for this tumor could also be considered as an alternative.(Fatima et al. 2019)

Conclusion

Ophthalmic manifestations on patient with progressive headache could arrive from intracranial tumors. Ophthalmic examinations and evaluation could assist in early diagnosis of tumor in order to adequately treat the disease. The prognosis is better if the cranial lesion could be recognized early and hence managed well, therefore decreasing morbidity and mortality.

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