

CASE REPORT

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**Tuberculum Sellae Meningioma Causing Progressive
Visual Impairment During Pregnancy**
—Case Report—

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Abstract

A 29-year-old woman in the 17th week of pregnancy presented with blurred vision and visual impairment of both eyes. Magnetic resonance imaging revealed a tuberculum sellae meningioma. Visual impairment progressively worsened, and surgical resection was performed in the 19th week of pregnancy without fetal heart monitoring. The intra- and postoperative courses were without complications. Her visual acuity and field almost fully recovered immediately after the operation. She delivered a healthy normal baby on the expected day.

Key words: brain tumor, tuberculum sellae meningioma, pregnancy, visual impairment, hormonal receptor

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Introduction

Intracranial tumors during pregnancy were first described in 1898.³⁾ Only seven women with primary brain tumors during pregnancy were found among 126,413 pregnancies over 13 years,¹⁰⁾ and two of the seven women had meningiomas. Intracranial tumors during pregnancy is a rare event, with few reports of brain tumor associated with pregnancy.⁷⁾ A PubMed search using the keywords “tuberculum,” “sellae,” “meningioma,” and “pregnancy” identified only seven cases. We treated a pregnant woman with tuberculum sellae meningioma causing progressive visual impairment of both eyes within a month.

Case Report

A 29-year-old woman, gravida 1 in the 17th week of pregnancy, presented with a 2-week history of blurred vision and progressive visual impairment of both eyes. There were no other neurological symptoms. Neuro-ophthalmological examination found decreased visual acuity to 0.9 in the left eye and left irregular homonymous hemianopia (Fig. 1A). Magnetic resonance imaging showed a suprasellar mass suspected to be meningioma measuring 21 × 26 × 15 mm with compression of the optic nerves and chiasm (Fig. 2).

She complained of a further decline in visual acuity in the 18th week of pregnancy. Neuro-ophthalmological re-evaluation revealed further worsening in visual impairment as visual acuity had dropped to 0.2 in her left eye and 1.2 in her right eye. We planned to perform surgery without fetal heart monitoring after obstetrical and

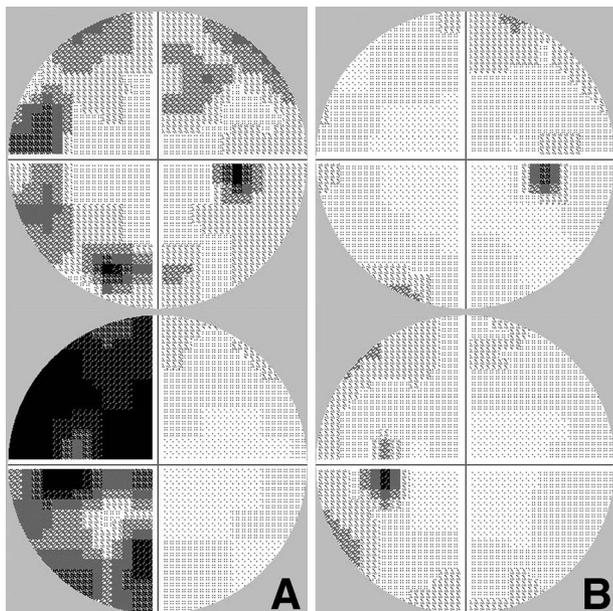


Fig. 1 Visual field examination sheets before (A) and on the 6th day after (B) the operation (upper row: right eye, lower row: left eye) showing left irregular homonymous hemianopsia before the operation, and marked improvement after the operation.

anesthesiological consultations. No plan was made for emergent cesarean delivery even in the event of change in fetal heart monitoring because of the low risk. On the other hand, general anesthesia carries the same risks in both pregnant and non-pregnant women. We recommended surgical resection to her and her family because of the risk of irreversible blindness and reached consensus about performing the operation.

The tumor was exposed via a left pterional approach and a subfrontal approach, and Simpson grade II excision of the tuberculum sellae meningioma was performed (Fig. 3). The left side was chosen for the surgical approach because of worse visual function in her left eye. Intraoperatively, the optic canal was unroofed early before dissection. Tumor consistency was very soft, and the tumor was hypervascular with feeding arteries from right internal carotid artery. The structure considered to be the pituitary stalk was preserved to minimize the risk of possible hormonal impairment during pregnancy. Intravenous administration of methylprednisolone acetate (1000 mg) was performed during the operation, and continued (500 mg per day) for 2 days after the operation to protect the optic nerves from damage. Her visual symptoms rapidly improved, and on the 6th day after operation, neuro-

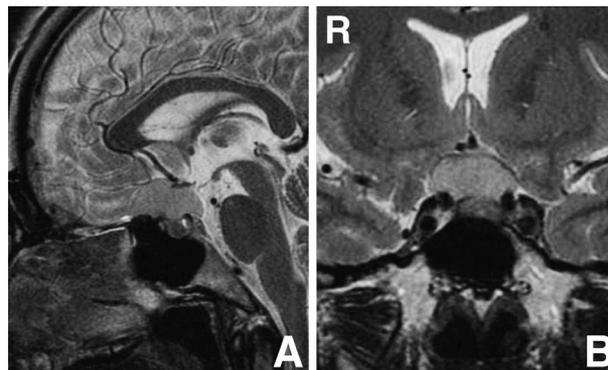


Fig. 2 Sagittal (A) and coronal (B) T₂-weighted magnetic resonance images before the operation showing the location of the tumor.

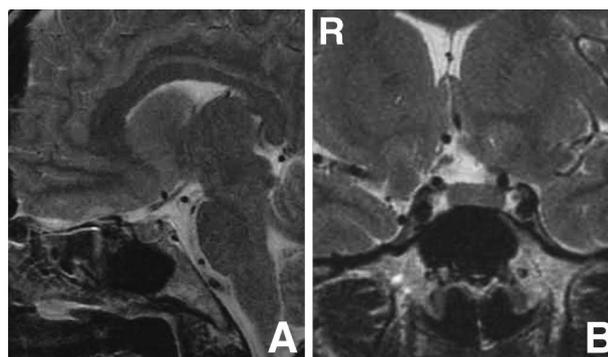


Fig. 3 Sagittal (A) and coronal (B) T₂-weighted magnetic resonance images after the operation showing gross total removal of the tumor.

Table 1 Reported cases of tuberculum sellae meningioma during pregnancy

Author (Year)	Age (yrs)/ Obstetric history*	Complaint of visual impairment (wks)	Other symptoms	Complica- tions	Delivery	Excision of meningioma	Visual impairment	PgR	ER	MIB-1 index
Balki and Manninen (2004) ¹⁾	33/0G0P	28th	nothing	nothing	40 wks spontaneous vaginal birth	28th	improved	ND	ND	ND
Idowu et al. (2004) ⁹⁾	35/ND	8th estimated	fecal and urinary incontinence, irrational talk, and behavior inability to walk	transientorial herniation	aborted 5 days after resection	25th	unchanged	ND	ND	ND
Ebner et al. (2008) ⁶⁾	31/1G1P	25th	ND	ND	34th	3 days after childbirth	complete recovery	50%	ND	2-5%
Johnson et al. (2009) ¹¹⁾	35/2G1P	24th	ND	ND	spontaneous vaginal birth	3 mos postpartum	improved	ND	ND	ND
	30/2G1P	16th	headache, nausea, and vomiting for 3 mos	ND	forceps assisted vaginal birth	30th	ND	ND	ND	ND
Baxter et al. (2009) ²⁾	32/3G2P	17th	morning headache	ND	ND	ND	complete normaliza- tion	+	-	ND
Chacko et al. (2010) ⁴⁾	27/ND	24th	headache, nausea, and vomiting for 4 mos	preterm delivery	30th	40 wks postpartum	full recovery	+	-	ND
Present case	29/0G0P	13th	nothing	nothing	spontaneous vaginal birth	18th	complete recovery	+	-	2.5-3%

*Gravida (G) and para (P). ER: estrogen receptor, ND: no data, PgR: progesterone receptor.

ophthalmological examination showed marked recovery of visual functions. Visual acuity recovered to 1.5 in her right eye and 1.2 in her left eye, and the visual field defect improved to almost the normal range in both eyes (Fig. 1B), and no hypopituitarism was observed.

The histological diagnosis was meningothelial meningioma World Health Organization grade I. About 2.5–3% of the tumor cells were positive for Ki-67 antigen, and almost all tumor cells expressed the progesterone receptor (PgR) but were negative for the estrogen receptor (ER). She was discharged on the 15th day after the operation without complications, and she delivered a healthy normal baby on the expected day.

Discussion

A total of eight cases including our case of tuberculum sellae meningioma were reviewed and analyzed (Table 1).^{1,2,4,6,9,11} The mean age at diagnosis was 31.5 years, and the mean gestational age at self-awareness of visual impairments was 19.3 weeks. The symptoms besides visual impairments were headache, nausea, and vomiting, and these symptoms were complaints before visual impairments occurred.

ER and PgR expression in tumor cells in cases of pregnant women is a matter of debate. Meningiomas may be hormonally responsive to progesterone and estrogen, and positive for PgR and/or ER,^{8,14} and might show rapid growth if these hormone levels became higher during the first and second trimester of pregnancy. Four cases including ours of the eight cases investigated these receptors and PgR was expressed in the tumor cells of all four cases. On the other hand, ER was not expressed in any tumor cells. ER is expressed in almost 30%, and PgR in 55–70% of all meningiomas regardless of pregnancy.^{13,16} Therefore, the elevation of serum progesterone levels in the second trimester of pregnancy is likely to lead to the expansion of the volume of meningiomas with PgR. Any intervention should be done without delay if the visual impairment becomes progressive in a pregnant woman with suprasellar meningioma.

The timing of surgical excision is open to argument. In our case, we consulted with obstetricians and anesthetists, who expressed no opposition to surgical intervention, so we performed the surgical removal without fetal heart monitoring and with no plan to perform urgent cesarean delivery. As the visual impairment further worsened, we thought it was necessary to decompress the optic nerves before irreversible change occurred. In five cases including ours, surgical excision was performed before delivery, and three cases after delivery. In one case, the surgery was scheduled before delivery, but postponed because of imminent delivery.⁴ As a consequence, six cases showed improvement of visual symptoms regardless of the timing of operation, and one complicated case with tentorial herniation showed no improvement after the operation during pregnancy. The therapeutic strategy should be considered individually for a pregnant woman with a brain tumor. Recent safer anesthesia techniques allow general anesthesia for pregnant women.^{1,5,15}

Surgical techniques are also important to preserve and improve visual functions by manipulating the optic nerve gently, avoiding heat and mechanical injuries, and preserving the vascular supply to the optic nerve. We recently reported the possibility of improved visual function by early optic canal unroofing in surgical resections of tuberculum sellae meningiomas and planum sphenoidale meningiomas by using the visual impairment score of the German Ophthalmological Society.¹² Optic canal unroofing was also performed before dissection of tumor in the present case, which might influence the recovery of her visual functions. Unfortunately, the other reported 7 cases did not describe the surgical techniques and procedures.

The management of pregnant women with tuberculum sellae meningioma causing progressive visual impairment must be individualized considering the neurological and gestational conditions. The treatment plan should be considered with all medical personnel, and a cooperative network of obstetricians, anesthetists, and neurosurgeons is necessary to obtain a good clinical outcome.

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