นิพนธ์ต้นฉบับ

Meningiomas of the sellar region: a clinicopathological study

Suthon Eksathien*
Yot Navalitloha* Vira Kasantikul**

Eksathien S, Navalitloha Y, Kasantikul V. Meningiomas of the sellar region: a clinicopathological study. Chula Med J 1998 Jan;42(1): 11-8

Objective : *To correlate the pathological aspects and the clinical manifestation.*

Design : *Retrospective study*

Setting : *Department of Surgery, Chulalongkorn Hospital*

Materials/Methods : *The clinical records of thirteen patients with meningioma of the sellar region between 1993 and 1996 and their histology were reviewed.*

Result : *There were 3 men and 10 women. The youngest patient was 3 years and the oldest one was 74 years old (mean 43 years). The duration of symptoms ranged from 1 month to 2 years (mean 9.8 months). Visual disturbance was the most common initial symptoms while hormonal abnormality was found in only one instance. There is no direct relationship between size of the tumor and the duration of symptoms. With usage of CT and MRI, we can detected the disease earlier. Most histological features of this kind of tumor are benign subtypes.*

Conclusions : *The prognosis of the patient depends on many factors including the preoperative condition, location and size of the tumor and the extent of surgery.*

Key words : *Meningioma, Sellar turcica, Visual acuity, Visual field.*

Reprint request: Eksathien S, Departments of Surgery, Faculty of Medicine, Chulalongkorn University, Bangkok 10330, Thailand.

Received for publication. November 15,1997.

*Departments of Pathology, Faculty of Medicine, Chulalongkorn University
**Department of Pathology, Faculty of Medicine, Chulalongkorn University

สุธน เอกเสถียร, ยศ นวฤทธิ์โลหะ, วีระ กสานติกุล. เมนิงจิโอมาบริเวณแอ่งเซลล่า : การศึกษาทางคลินิกพยาธิวิทยา. จุฬาลงกรณ์เวชสาร 2541 ม.ค;42(1): 11-8

วัตถุประสงค์ : *เพื่อศึกษาความสัมพันธ์ระหว่างผลทางพยาธิวิทยากับอาการทางคลินิก*

รูปแบบการวิจัย : *เป็นการศึกษาย้อนหลัง*

สถานที่ทำการวิจัย : *ภาควิชาศัลยกรรม โรงพยาบาลจุฬาลงกรณ์*

การคัดเลือกผู้ป่วย /วิธีการศึกษา : *บันทึกประวัติผู้ป่วยจำนวน 13 ราย ที่ป่วยเป็นโรคเนื้องอกเมนิงจิโอมาบริเวณแอ่งเซลล่า ระหว่างปี พ.ศ. 2536 ถึง พ.ศ. 2540 และผลชิ้นเนื้อทางฮีสโตโลยี ได้ถูกทบทวน*

ผลการศึกษา : *มีผู้ป่วยชายจำนวน 3 ราย และผู้ป่วยหญิง 10 ราย ผู้ป่วยที่มีอายุน้อยที่สุดมีอายุ 3 ปี และผู้ป่วยที่มีอายุมากที่สุด มีอายุ 74 ปี (อายุเฉลี่ย 45 ปี) ระยะเวลาของอาการพบตั้งแต่ 1 เดือน ถึง 2 ปี (เฉลี่ย 9.8 เดือน) การมองเห็นที่ผิดปกติเป็นอาการเริ่มแรกที่พบบ่อยที่สุด ในขณะที่อาการผิดปกติทางฮอร์โมนพบเพียง 1 ราย จากการศึกษา ไม่พบมีความสัมพันธ์โดยตรงระหว่างขนาดของเนื้องอก และระยะเวลาของอาการ การตรวจด้วยเอ็กเรยซ์คอมพิวเตอร์ และการตรวจด้วยคลื่นแม่เหล็กไฟฟ้า ทำให้สามารถวินิจฉัยโรคได้ในระยะเริ่มแรก ผลชิ้นเนื้อทางฮีสโตโลยีของเนื้องอกชนิดนี้ส่วนใหญ่มีลักษณะไม่ร้าย*

วิจารณ์และสรุป : *การพยากรณ์โรคในผู้ป่วยกลุ่มนี้ขึ้นอยู่กับสภาพผู้ป่วยก่อนผ่าตัด, ตำแหน่งและขนาดของเนื้องอกรวมทั้งขอบเขตของการทำผ่าตัด*

Generally, meningioma accounts for 10% to 15% of intracranial neoplasms and 5% to 10% of these meningiomas arise from the sellar turcica.[1-3] Tuberculum sellae meningiomas are of interest because they have proven difficult to diagnose and treat due to their close anatomical association with the optic nerves, chiasm, hypothalamus, pituitary glands, and internal carotid arteries. In this report, 13 cases of meningiomas involving the sellar turcica were reviewed to correlate the pathological aspects and the clinical manifestations for a better understanding of this uncommon tumor.

Materials and Methods

This is a retrospective study of 13 patients with meningiomas of the sellar turcica who were treated at the Department of Surgery of Chulalongkorn Hospital between 1993 and 1996. The clinical records were studied after review of the microscopic materials. All specimens were fixed in 10% formalin and embedded in paraffin. Sections were stained with hematoxylin and eosin (H&E).

Results

The clinical features and pathological findings are given in Table 1. There were 3 men and 10 women. The age of the patients ranged from 3 to 74 years with an average age of 43 years. The duration of symptoms varied from 1 month to 2 years with a mean duration of 9.8 months. All patients complained of visual disturbance as their initial symptom, and in 65% of the patients the visual symptom was accompanied by non-localizing headache. Ptosis was noted in 11 cases, diplopia in 5 instances, and ptosis with total opthalmophegia in 1 case. Decreased visual acuity was found in 10 patients, two had normal visual acuity and fields, and two had impaired acuity with normal visual fields. Bitemporal hemianopia was observed in 7 cases and one patient was blind in one eye. An increased level of serum prolactin was found in one case.

Four patients had tumors confined within the sellar turcica, 7 had tumors extended from the tuberculum sellae onto the planum sphenoidale, and two had parasellar meningiomas. The size of the intrasellar tumors was small ranging from 0.5 cm. to 1.5 cm. in greatest diameter. The suprasellar mass varied from 1 cm to 3 cm., and the two parasellar lesions were 1 cm. and 3 cm. Small tumors with 1 cm. diameters were found mostly in patients with 1 year of symptoms, while tumors with 3 cm. in diameter generally were associated with a shorter time of illness. Neither the age, sex, nor size of the tumor of the patient was significantly correlated with the duration of symptoms. However, the shortest duration of symptoms was 1 month in a 3-year old girl with a 3 cm. suprasellar lesion. The most frequent subtypes of meningiomas were transitional (7 cases), fibroblastic (3 cases), meningocytic (2 case), and meningocytic with angiomatous component (1 case).

Regarding the radiographic findings, all patients had plain skull x-rays. Hyperostosis at the site of tumor was identified in 9 cases. The sellar turcica was enlarged in 5 cases and tuberculum erosion was seen in only 1 instance. Computed tomography (CT) was performed in all cases (Table 2). Most lesions were isodense on unenhanced scans. Only two tumors were non-homogeneous. All tumors showed enhancement after intravenous contrast medium was injected(Fig.1) Magnetic resonance imaging (MRI) was done in 5 cases.

Table 1. Clinicopathological features of 13 patients with sellar meningiomas

Case No.	Age (yrs)	Sex	Location Symptoms	Duration of	Size (cm.)	Clinical	Tumor Type
1	3	F	Suprasellar	1 mo.	1x3	Ptosis, ↓ VA, BH	Fibrovlastic
2	30	F	Intrasellar	1 yr.	1x1.5	Ptosis, ↓ VA, BH	Transitional
3	32	M	Parasellar	1 yr.	1x2.5	Ptosis, ↓ VA, blindness, total ophthalmoplegia	Fibroblastic
4	32	F	Intrasellar	6 mo.	1x1	Diplopia, ↓ VA, normal VF	Meningocytic
5	36	F	Suprasellar	1 yr.	NA	Ptosis, normal VA, BH	Transitional
6	38	F	Suprasellar	6 mo.	1x1	Ptosis, diplopia, ↓ VA, BH	Transitional
7	38	F	Suprasellar	1 yr.	1x1	Diplopia, ↓ VA, normal VF	Fibroblastic
8	47	M	Suprasellar	1 yr.	NA	Ptosis, normal VA and VF	Transitional
9	5	F	Suprasellar	6 mo.	1.5x3	Ptosis, ↓ VA, normal VF	Meningocytic
10	57	M	Parasellar	9 mo.	1x3	Ptosis, diplopia, normal VA and VF	Transitional
11	58	F	Intrasellar	4 mo.	1x3	Ptosis, ↓ VA, BH	Meningocytic and angiomatous
12	60	F	Intrasellar	1 yr.	0.5x0.5	Ptosis, ↑ prolactin, ↓ VA, BH	Transitional and angiomatous
13	74	F	Suprasellar	1 yr.	1x1	Ptosis, diplopia, ↓ VA, BH	Transitional

Note : **F**=female ; **M** = male ; **Mo** = month ; **Yr** = Years ; **VA** = Visual acuity ; **VF** = Visual field ; **BH** = bitemporal hemianopia ; **NA** = not available

Table 2. Radiographic findings

Case No.	Computerized tomography		Magnetic resonance imaging	
	Unenhanced	**Enhanced**	**T1-weighted**	**T2-weighted**
1	Homogenous isodensity	Homogenous enhanced	ND	ND
2	Homogenous isodensity	Homogenous enhanced	Hyposignal	Hypersignal
3	Nonhomogenous isodensity	Nonhomogenous enhanced	Nonhomogenous hyposignal	Nonhomogenous hypersignal
4	Homogenous hypodensity	Homogenous enhanced	ND	ND
5	Homogenous isodensity	Homogenous enhanced	Hyposignal	Hypersignal
6	Homogenous isodensity	Homogenous enhanced	ND	ND
7	Homogenous isodensity	Homogenous enhanced	ND	ND
8	Homogenous isodensity	Homogenous enhanced	Hyposignal	Hypersignal
9	Nonhomogenous hypodensity	Nonhomogenous enhanced	Nonhomogenous hyposignal	Hypersignal
10	Homogenous isodensity	Homogenous enhanced	ND	ND
11	Homogenous hypodensity	Homogenous enhanced	ND	ND
12	Homogenous isodensity	Homogenous enhanced	ND	ND
13	Homogenous isodensity	Homogenous enhanced	ND	ND

ND = Not done

The tumors were hyposignal on T1-weighted and hypersignal on T2-weighted images(Fig2). Three lesions were homogenous and two were heterogeneous in appearance.

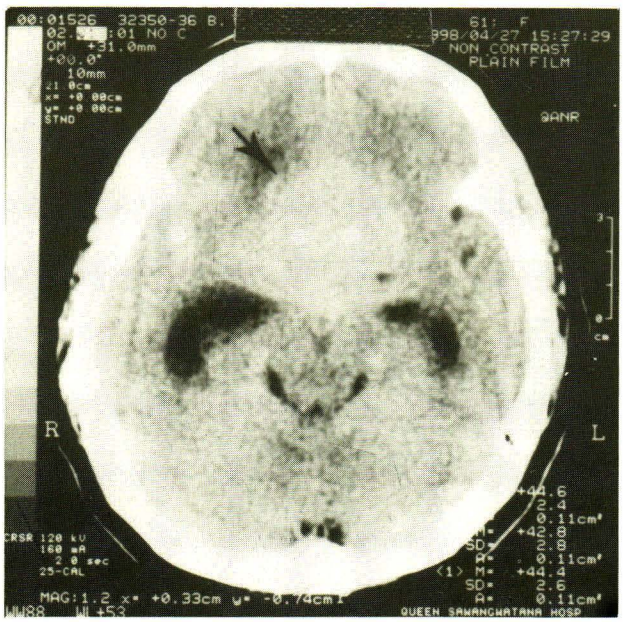
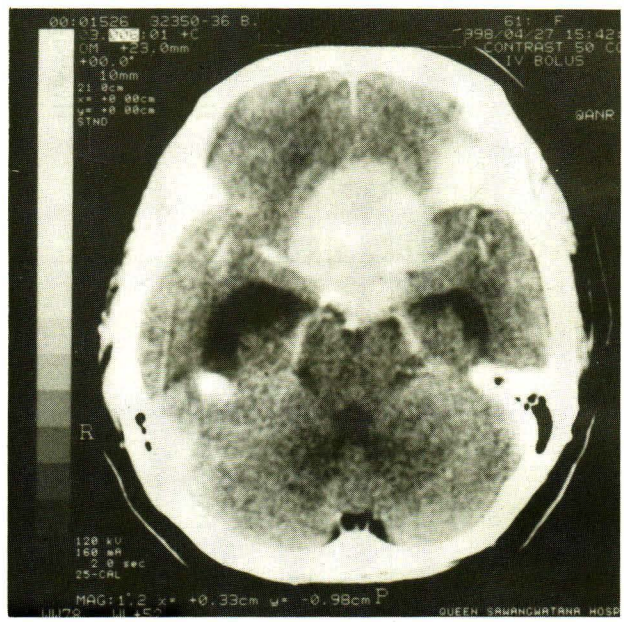


Figure 1. (A) unenhanced axial CT showed large isodense mass (arrow) involving sellar region.



(B) enhanced axial CT of the same patient demonstrated the tumor was enhanced homogenously that is characteristic of meningioma.

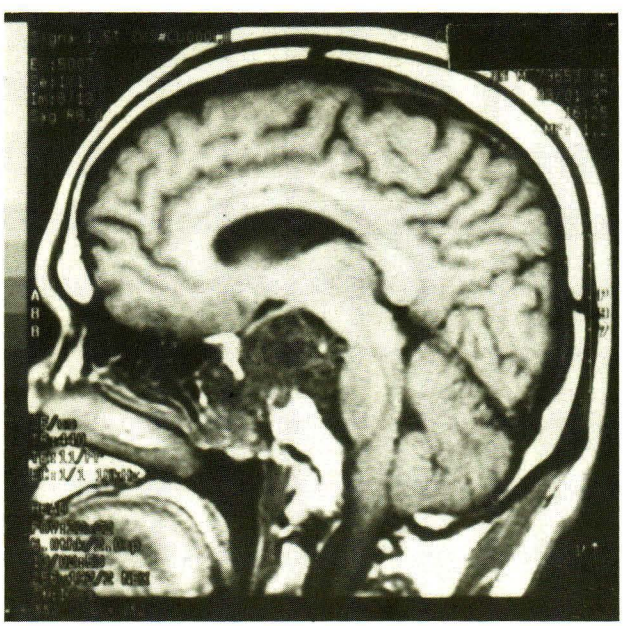
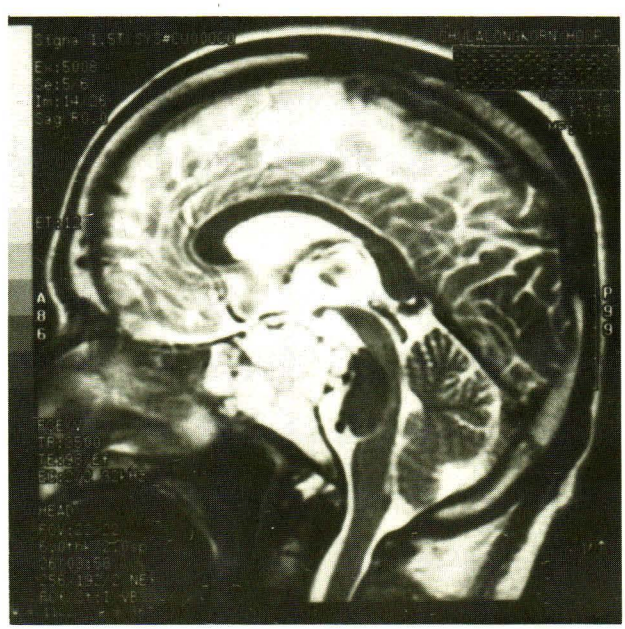


Figure 2. (A) Sagittal unenhanced T1WI revealed mass involving the sellar turcica, sphenoid sinus with suprasellar extension and posterior extension to the brainstem. Note the tumor was hyposignal to the gray matter.



(B) Sagittal unenhanced T2WI of the same patient showed the tumor was hypersignal compared to T1WI.

The tumors were completly resected in 11 cases. Most cases had perioperative transcient confusion. There were no deaths in this series, regardless of size of tumor. All patients were doing well when seen at postoperative times from 5 months to 3 years. Some had residual symptoms and the tumor had recurred in two cases with partial removal of parasellar meningiomas.

Discussion

In 1929, Cushing and Eisenhardt described "a chiasmal syndrome" consisting of progressive asymmetrical bitemporal hemianopsia associated with optic nerve atrophy in patients with meningiomas in the region of the tuberculum sellae. Such clinical features have been confirmed in this study and others.[2-5] Non-localizing headache was also common in our series and no patient had pain in the symptomatic eyes. The nature of the preoperative visual loss had been influenced by the location of the tumor. Meningiomas involving the optic foramen or medial sphenoid wing often caused unilateral visual impairment due to compression of the optic nerve in the optic canal, while tumors restricted to the intrasellae area typically caused bilateral visual loss through chiasmal compression.[6] In general, a meningioma of the sellar turcica can produce slight or no hormonal disturbance. We found only one patient with hyperprolactinemia, probably from disturbance of the hypothalamic-hypophyseal axis.

Although there was no real direct relationship between the size of the tumor and the duration of the symptoms, we found 3 patients with tumors of 3 cm. diameter who had symptoms for less than one year. Based on this limited data we might suggest that the larger the tumor, the shorter the duration. Further investigation is necessary to confirm this observation. In addition, meningiomas in children and young adults are uncommon and they have a reputation for rapid growth and for frequently being malignant. The rapid onset of symptoms in our 3-year old girl with 3 cm. lesion is evidence to support this view.[8]

In the past, the incidious progression of symptoms often delays the diagnosis until the loss of vision is advanced and tumor growth is substantial. With current use of CT and recently MRI, however, the symptoms in our patients were detected in an average of less than one year. Hence, CT and MRI have proven to be the most useful diagnostic techniques which permit an early detection of tumors. They are also useful in follow-up assessments and in recognizing tumor recurrence. Typical CT findings of intracranial meningiomas include hyperostosis, bone destruction, calcium deposits, and striking contrast enhancement as seen in our No.2 patient. By using MRI, most meningiomas often show either hyposignals or isosignals on T1-weighted image and hypersignals on T2-weighted image that are useful for documenting invasion of the cavernous sinus, sphenoid, sinus ethmoid sinuses, petrous apex, internal carotid artery and jugular foramen while CT seems better suited for study of bony changes.[10]

Regarding the histological variants of meningioma, certain subtypes of this tumor such as papillary, angioblastic, and malignant meningiomas are known to have a greater tendency to recur.[8] Most lesions in this study, however, were benign subtypes. The results obtained in our series thus suggests that patients with benign meningiomas are not subject to tumor recurrence if surgical removal is adequately performed.

Complete surgical excision is recommended by most authors.[2,6] The outcome for our patients was satisfactory. However, it should be noted that larger tumors tended to be associated more frequently with postoperative visual deterioration.[6,11] Long-standing preoperative visual impairment also has a negative effect as it a been reported to worsen the visual outcome and more frequently lead to deterioration of vision acuity postoperatively, although excellent recovery is possible.[6-11]

Hence the prognosis for patients depends on many factors including the preoperative condition of the victims, the location, the size of the tumor and the extent of surgery. In contrast to previous surgical series, the mortality rate in our series was nil although the subject number was small.[2,6] Other recent studies also indicate low mortality rates.[2,6,11] This, of course, reflects advances in neuroanesthesia and microsurgery.

References

1. Cushing H, Eisenhardt L. Meningiomas : Their Classification, Regional Behavior, Life, History, and Surgical End Results. Reprinted ed. New York: Hafner, 1969.
2. Al-Mefty O, Holubi A, Rifai A, Fox JL. Microsurgical removal of suprasellar meningiomas. Neurosurgery 1985 Mar ; 16 (3) : 364-72
3. Solero CL, Giombini S, Morello G. Suprasellar and Olfactory meningiomas. Report on a series of 153 personal cases. Acta Neurochir (Wien) 1983 ; 67 (3-4) : 181-94
4. Grant FC. Meningioma of the tuberculum sellac. Arch Neurol Psychialry 1952 Mar; 67 (3) : 411-2
5. Gregorius FK, Hepler RS, Stern WE. Loss and recovery of vision with suprasellar meningiomas. J Neurosurg 1975 Jan ; 42 (1) : 69-75
6. Andrews BT, Wilson CB. Suprasellar meningiomas : the effect of tumor location on postoperative visual outcome J Neurosurg 1988 Oct ; 69 (4) : 523-8
7. Shah RP, Leavens ME, Samaan NA. Galactorrhea, amenorrhea, and hyperprolactinemia as manifestations of parasellar meningioma. Arch Intern Med 1980 Dec; 140 (12) : 1608-12
8. Montriwiwatchai P, Kasantikul V, Taecholarn C. Clinicopathological feateures predicting recurrence of intracranial meningiomas. J Med Assoc Thai 1997 Jul; 80 (7) : 473-8
9. Hershey BL. Suprasellar masses : diagnosis and differential diagnosis. Semin Ultrasound, CT and MR 1993 Jun ; 14 (3) : 215-31
10. Moulin G, Coatrieux A, Gillot JC, Chagnaud C, hagnaud C, Bartoli JM, Pech A, Kasbarian M. Plaque-like meningioma involving the temporal bone, sinonasal cavities and both parapharyngeal spaces : CT and MRI. Neuroradiology 1994 Nov ; 36 (8) : 629-31
11. Rosenstein J, Symon L. Surgical management of suprasellar meningioma. Part 2 : Prognosis for visual function following craniotomy. J Neurosurg 1984 Oct ; 61 (4) : 642-8