

Case Report

Sellar Chordoma Presenting as Pseudo-macroprolactinoma with Unilateral Third Cranial Nerve Palsy

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ABSTRACT

We described a 61-year-old female with a sellar chordoma, which presented as pseudo-macroprolactinoma with unilateral third cranial nerve palsy. Physical examination revealed that her right upper lid could not be raised by itself, right eyeball movement limited to the abduction direction, right pupil dilated to 4.5 mm with negative reaction to light, and hemianopsia in bitemporal sides. CT scanning showed a hyperdense lesion at sellar region without bone destruction. Magnetic resonance imaging (MRI) revealed the tumor was 2.3 cm×1.8 cm×2.6 cm, with iso-intensity on T1WI, hyper-intensity on T2WI and heterogeneous enhancement on contrast imaging. Endocrine examination showed her serum prolactin level increased to 1,031.49 mIU/ml. The tumor was sub-totally resected via pterional craniotomy under microscope and was histologically proven to be a chordoma. Postoperatively, she recovered uneventfully but ptosis and hemianopsia remained at the 6th month.

Key words Sellar chordoma; Pseudo-macroprolactinoma; Unilateral third cranial nerve palsy

INTRODUCTION

Chordomas are rare, slow-growing malignant tumors arising from the remnants of the primitive notochord. Within cranium, they are usually located at clivus and account for about 0.15% of all intracranial neoplasm^[1]. Despite a few cases of sellar chordomas with increased serum prolactin level have been described in literatures^[1-3], they are rare and prone to be misdiagnosed as pituitary macro-prolactinoma. Herein, we report a case of sellar chordoma that led to unilateral oculomotor nerve palsy, as well as elevated serum prolactin level. In combination with literature review, we discussed the clinical characteristics of sellar chordomas mimicking macro-prolactinoma.

CASE REPORT

A 61-year-old female was transferred to our hospital due to right upper lid ptosis for one month. On physical examination, we found her right upper lid could not be raised by itself (Figure 1A), right eyeball movement limited to abduction direction and right

pupil dilated to 4.5 mm with negative reaction to light. Moreover, hemianopsia was found in bitemporal sides.

CT scanning revealed a hyperdense sellar lesion without bone destruction (Figure 1B). On magnetic resonance imaging (MRI), it was 2.3 cm×1.8 cm×2.6 cm, with iso-intensity on T1WI, hyper-intensity on T2WI and heterogeneous enhancement when a contrast medium was administered (Figures 1C–E). The lesion squeezed the right cavernous sinus, compressed the optic chiasma upward and pushed the pituitary stalk contra-laterally (Figure 1F). Laboratory tests revealed her serum prolactin was 1,031.5 mIU/ml (normal value, 58.1–416.4 mIU/ml for females).

Thus, we thought preoperatively that it was an atypical pituitary adenoma and chose pterional approach craniotomy because the patient had the manifestation of unilateral oculomotor nerve palsy indicating that the lateral wall of the cavernous sinus was compressed by the tumor. At surgery, we found the tumor was grayish, soft and mingled interiorly with fiber-like tissue. Under operational microscope, the tumor was sub-totally removed considering that it stuck tightly with the cavernous sinus. Histological examination showed physaliferous tumor cells arranged in nests and cords in a background of myxoid matrix (Figures 2A and 2B). Moreover, immune-

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histological investigation proved further that these tumor cells were positive to S-100 and cytokeratin (Figures 2C and 2D), but negative to prolactin. These histopathological findings were in line with the diagnosis of a chordoma. Postoperatively, she recovered uneventfully and the serum prolactin level decreased to 453.7 mIU/L on day 7. She refused radiological therapy and was discharged on day 10. At the 6th month, her ptosis and hemianopsia remained.

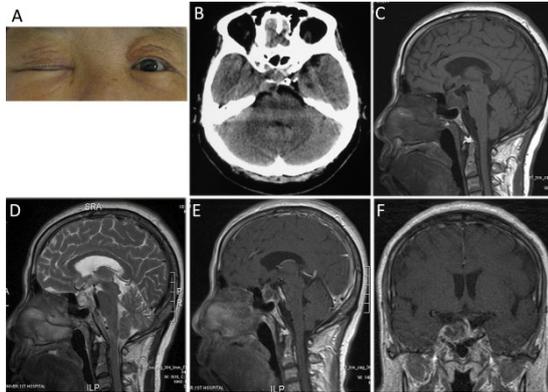


Figure 1. CT scanning revealed a hyperdense sellar lesion without bone destruction (A). On MRI, it was iso-intense on T1WI (B), hyper-intense on T2WI (C) and heterogeneous enhancement after administration of contrast medium (D). The lesion squeezed the right cavernous sinus, compressed the optic chiasma upward and pushed the pituitary stalk to the contra-lateral side (E). Physical examination revealed that her right upper lid could not be raised by itself (F).

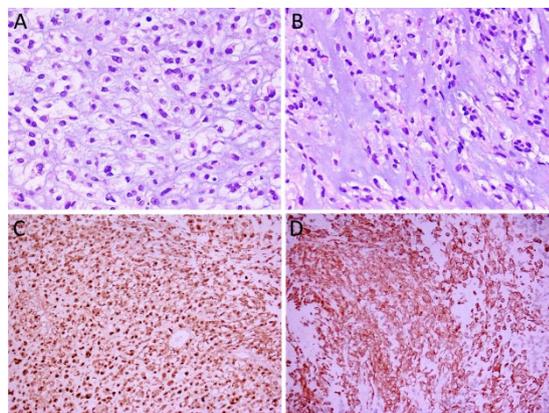


Figure 2. Hematoxylin eosin staining showed that physaliferous tumor cells arranged in nests and cords surrounded by a myxoid matrix (A and B, $\times 40$). Immunohistological examination showed the tumor cells were positively stained with S-100 (C, $\times 20$) and cytokeratin (D, $\times 20$).

DISCUSSION

Pseudo-macroprolactinoma often refers to a sellar

tumor with higher level of serum prolactin, but it is not a genuine pituitary prolactinoma histologically. In addition to 3 sellar chordomas found to be with elevated serum prolactin level from 1966 to 2000^[1], another 2 cases had been reported in recent 10 years^[2,3]. Besides sellar chordomas, other sellar tumors such as schwannoma, paraganglioma or mixed germ cell tumor could also lead to hyperprolactinemia^[4-6] and they were regarded as pseudo-macroprolactinoma as well. Despite the mechanism underlying the higher level of serum prolactin produced by these pseudo-macroprolactinomas is not fully understood, pituitary stalk compression syndrome was proposed to explain this phenomenon. This theory considered that the reduction of dopamine release due to the compression of pituitary stalk by sellar tumors would result in the elevation of prolactin output as commensuration. In our case, the chordoma cells were immunologically negative to prolactin, which indicated that the tumor cells would not secrete directly prolactin into blood. Thus, the higher level of serum prolactin in the present patient was also thought to be resulted from pituitary stalk compression, which could be discerned on MRI.

Clinically, the patients with sellar chordomas usually complained of headache, visual defect, diplopia and ptosis^[1], rarely felt symptoms caused by endocrine abnormality, despite laboratory investigation showed their serum prolactin levels were still high^[1-3]. As Table 1 showed, although the serum prolactin level in the present patient was two and half times as normal maximal value, it used to be three or four times higher than normal limit in the previously reported sellar chordoma cases. By contrast, it is always over 3,000 mIU/L in the patient with a typical prolactinoma. Unilateral third cranial nerve palsy used to be encountered in the patients with pituitary apoplexy. To the best of our knowledge, none of sellar chordomas was reported to result in oculomotor nerve palsy. Previously, only one sellar chordoma was reported to lead to ptosis. The patient was an 80-year-old female with one month history of ptosis, whose MRI demonstrated that her ipsilateral cavernous sinus was invaded by the tumor^[1]. In the present case, her ptosis not only developed gradually in one month, but also was concomitant with limited eyeball movement, pupil dilation and negative reaction to light. Furthermore, her MRI and intra-operative findings revealed that the oculomotor nerve palsy was because the cavernous sinus was compressed and invaded by the tumor.

On CT scanning, sellar chordomas often produce bone destruction, but pituitary adenomas usually make sellar bottom present balloon-like figure, which could be used for differentiating chordomas from pituitary macro-adenoma. However, in our case, no marked signs of bony destruction were found on the

preoperative CT imaging or during operation. Similarly, a 63-year-old female with a sellar chordoma was reported to have no bone erosion on CT imaging either^[1]. Although it was found that intra-dural chordoma did not invade bone tissue, neither neuro-imaging signs nor intra-operative findings indicated this tumor was contained within dura mater totally.

MRI is a complement for CT scanning. Chordomas usually show slightly or moderately low signals on T1WI and heterogeneous or homogenous high signals on T2WI. After administration of contrast medium, chordomas usually enhance at variable degrees. The MRI of our case is consistent with above-mentioned features. Additionally, as our case showed (Figure 1D), fibrous connective tissue strands might be seen and make the tumor have a lobulated appearance, which was found by macroscopic examination of the removed specimen as well.

Sellar chordomas with hyperprolactinemia should be differentiated primarily with pituitary prolactinomas. Despite these two types of tumors are similar on MRI, the prolactin level of a sellar chordoma used to be half of that of a typical pituitary prolactinomas (3,000 mIU/L), which could be used as a key point in differential diagnosis. Other sellar tumors leading to elevated prolactin also include meningioma, craniopharyngioma, schwannoma, paraganglioma, neuroblastoma or mixed germ cell tumor^[4-9]. Just as in our case, the higher levels of prolactin induced by these tumors were thought to be caused by pituitary stalk

compression, so that their prolactin level is not as high as that in the typical pituitary prolactinomas.

Surgical removal is currently the best treatment option for chordomas. As previously reported^[2,3], trans-sphenoidal approach or craniotomy could be chosen for sellar chordomas. Trans-sphenoidal approach was minimally invasive and could achieve satisfactory resection, but it is difficult to remove the tumors that stick tightly with cavernous sinus. Therefore, we chose craniotomy for our patient. At the postoperative stage, radiotherapy is an option as an adjuvant treatment, despite the effectiveness of which is still needed to be confirmed. Definitely, chordomas are not sensitive to chemotherapy.

At present, the prognosis of sellar chordomas presenting as pseudo-macroprolactinoma is unclear due to lack of information on long-term follow up. But for the sellar chordoma without elevated serum prolactin level, on the basis of the data summarized by Thodou, et al^[1], the average survival time is about 45.4 months, with the longest one more than 10 years and the shortest one over 11 months.

In conclusion, sellar chordomas could produce hyperprolactinemia and isolated unilateral oculomotor nerve palsy. Thus, they should be regarded as a differentiation item for sellar tumors. Despite trans-sphenoidal approach is widely used for sellar tumor, craniotomy is still one option for sellar chordomas involving cavernous sinus compression.

Table 1. Summary of sellar chordoma presented as pseudo-macroprolactinoma.

No.	Age/Sex	Symptoms	Endocrine signs	Treatment	Reference
1	34/M	Diplopia	Hyperprolactinemia	None available	Elias Z, 1985
2	56/M	Bilateral visual impairment	Hyperprolactinemia	None available	Kikuchi, 1994
3	63/F	Right eye scotoma	Hyperprolactinemia: prolactin, 97.5 ng/ml (normal, 5–25 ng/ml)	Trans-sphenoidal surgery	Thodou E, 2000
4	25/F	Galactorrhea, oligomenorrhoea, diplopia, progressive vision loss, grand mal-seizures	Hyperprolactinemia: prolactin, 1,785 mIU/L (normal, up to 400 mIU/L)	Transsphenoidal surgery	Haridas A, 2003
5	60/F	Headache, diplopia, progressive vision loss	Hyperprolactinemia 1,982.0 mIU/ml (normal, 72–511 mIU/ml)	Pterional craniotomy	Kumar P, 2009.
6	61/F	Headache, ptosis, oculomotor nerve palsy	Hyperprolactinemia 1,031.5 mIU/L (normal, 58.1–416.4 mIU/ml)	Pterional craniotomy	This case

M: male; F: female

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Disclosure of Potential Conflicts of Interest

No potential conflicts of interest were disclosed.

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