Case Report

The coexistence of recurrent pituitary adenoma and meningioma: case report

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Abstract: The coexistence of pituitary adenoma and meningioma is very rare. Here, we present a case of recurrent non-functioning pituitary adenoma and temporal lobe meningioma in a patient without previous irradiation. A 73-year-old woman underwent a right-sided craniotomy of pituitary adenoma for visual deficits 30 years ago. She presented again with a 2-year history of lack of alertness, confusion and visual deficits. Brain magnetic resonance imaging (MRI) demonstrated a recurrent pituitary adenoma and a left temporal lobe tumour. The patient underwent a left frontotemporal craniotomy. After the surgery, the patient showed improvement in neurological symptoms. The histology of the sellar region tumour revealed that it was a pituitary adenoma, and the histology of the temporal lobe tumour demonstrated that it was a meningioma of transitional type. The coexistence of pituitary adenoma and meningioma is a very rare surgical entity, especially in a patient with recurrent pituitary adenoma. Although this co-occurrence is rare, more cases and additional studies are necessary to explain these unusual findings.

Keywords: Case report; coexistence; meningioma; pituitary adenoma

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Introduction

Pituitary adenoma is a common benign tumour in the brain. Recently, its incidence has increased annually, accounting for 15–25% of all intracranial tumours (1). Meningioma is another common intracranial tumour that accounts for 15–25% of all central nervous system neoplasms (2,3). However, the coexistence of pituitary adenoma and meningioma is extremely rare and is even rarer in patients with no previous history of irradiation. Here, we present a case of recurrent non-functioning pituitary adenoma and left temporal lobe meningioma in a patient without a previous history of irradiation. As far as we know, this appears to be the first description of the coexistence of recurrent non-functioning pituitary adenoma and meningioma in a patient with no previous history of irradiation. We present the following case in accordance with the CARE Guideline (4).

Case presentation

A 73-year-old woman underwent a right-sided craniotomy of a saddle region tumour to treat visual impairment in 1987. Her daughter recalled that the histological diagnosis was a non-functioning pituitary adenoma. However, the medical record and imaging data were missing. The patient was discharged uneventfully without irradiation. She presented again in May 2018 with a two-year history of lack of alertness, speech confusion and visual impairment. She had no other relevant medical history, and she did not smoke or consume alcohol. Therefore, a brain magnetic resonance imaging (MRI) scan was performed. The brain MRI revealed a recurrent pituitary adenoma and a left temporal lobe tumour (*Figure 1*).

Her preoperative hormone blood levels were as follows: total T3, 0.87 nmol/L (reference range, 1.30–3.10 nmol/L);

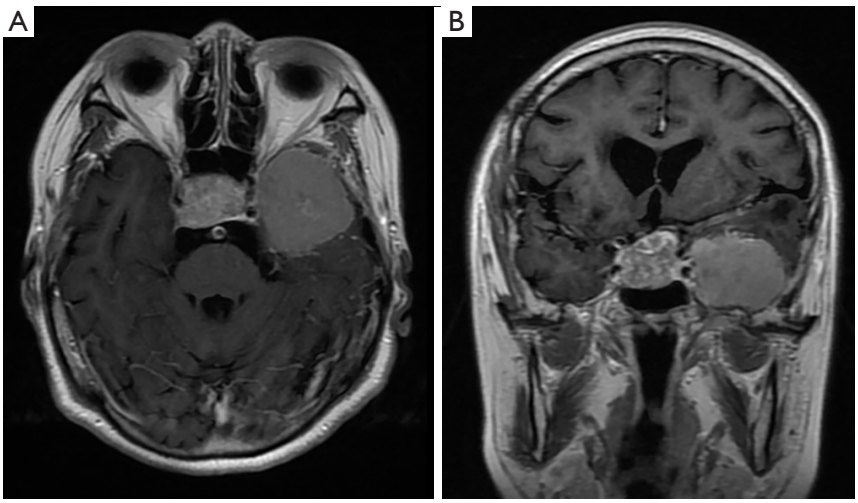

Figure 1 T1-weighted contrast-enhanced axial preoperative images (A) showing coexistent recurrent pituitary adenoma and a left temporal lobe tumour, (B) T1-weighted contrast-enhanced coronal preoperative images (B) showing coexistent recurrent pituitary adenoma and a left temporal lobe tumour.

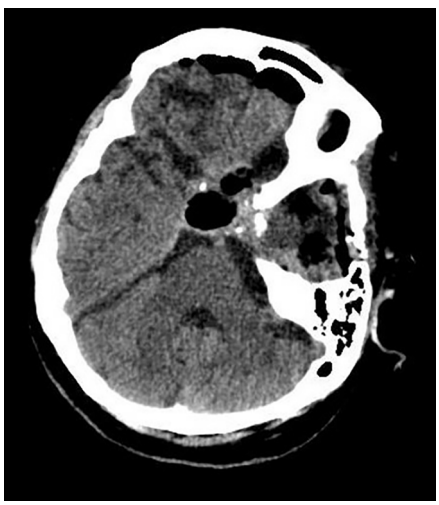

Figure 2 Postoperative. Postoperative computed tomography scans confirmed the complete resection of the recurrent pituitary adenoma and temporal lobe tumour.

total T4, 48.52 nmol/L (reference range, 66.00–181.00 nmol/L); free T3, 2.80 pmol/L (reference range, 2.80–7.10 pmol/L); free T4, 7.59 pmol/L (reference range, 11.46–23.17 pmol/L); thyroid stimulating hormone (TSH), 4.11 μIU/mL (reference range, 0.30–5.50 μIU/mL); luteinizing hormone (LH), 3.63 mIU/L (reference range, 10.87–58.64 IU/L in postmenopausal women); follicle-stimulating hormone (FSH), 10.18 mIU/mL (reference range, 16.74–113.59 mIU/mL in postmenopausal women); prolactin (PRL), 16.74 mg/mL (reference range, 2.74–19.64 mg/mL in postmenopausal women); and growth hormone (GH), 0.22 ng/mL (reference range, 0.06–5 ng/mL). Neurological examination showed that the uncorrected visual acuity was 0.2 in the left eye and 0.3 in the right eye; visual field examination revealed patchy defects.

After discussion with the patient and the patient's family members, the decision was made to resect the recurrent pituitary adenoma and the left temporal lobe tumour simultaneously. The patient underwent a left frontotemporal craniotomy, and total removal of the temporal lobe tumour and pituitary adenoma was achieved using a microsurgical technique. The postoperative computed tomography scan performed 6 hours after the surgery showed no evidence of residual tumours (*Figure 2*).

The histology of the saddle region tumour revealed that it was a pituitary adenoma, and the immunohistochemical results were as follows: Ki-67 (1%+), Syn (+), CgA (+), CK8/18 (–), adrenocorticotropic hormone (ACTH) (–), GH (–), PRL (–), FSH (partly +), LH (–), and TSH (–) (*Figure 3A*). The histology of the temporal lobe tumour revealed that it was a meningioma of transitional type (*Figure 3B*).

After the surgery, the patient showed improvement in her lack of alertness and speech confusion. The visual impairment was slightly improved. Postoperatively, the patient was found to have hormonal dysregulation and needed thyroid hormone replacement therapy. She was

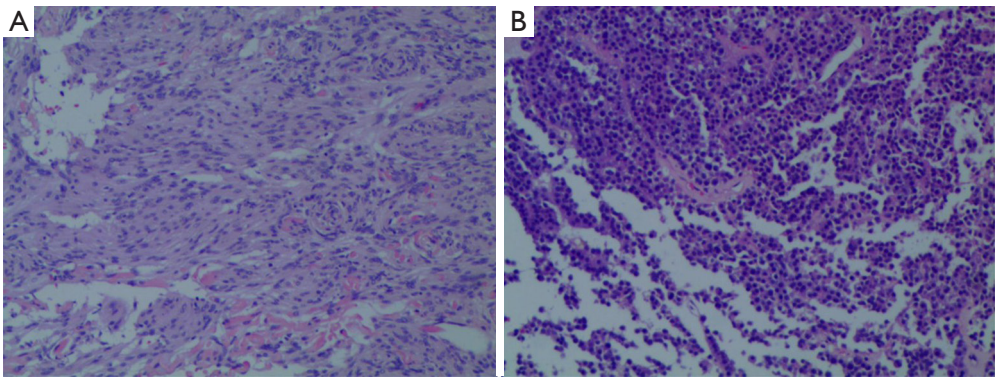

Figure 3 Pathological findings. (A) The histology of the saddle region tumour indicated that it was a pituitary adenoma. Haematoxylin and eosin staining. Original magnification: 100×; (B) the histology of temporal lobe tumour indicated that it was a meningioma of transitional type. Haematoxylin and eosin staining. Original magnification: 100×.

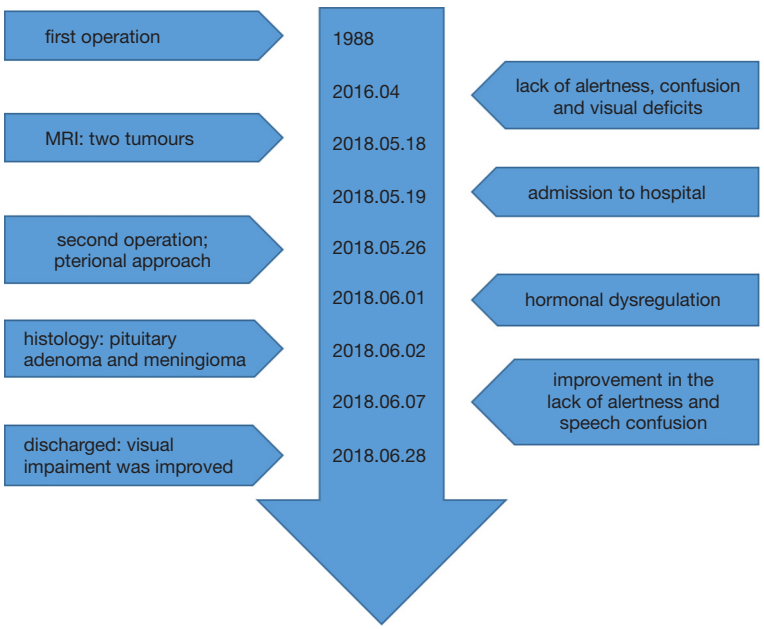

Figure 4 The timeline figure of the patient.

discharged with no significant neurological deficits. The timeline picture of the patient was shown in *Figure 4*.

Discussion

The coexistence of a pituitary adenoma and an intracranial meningioma is a very rare event (5,6), especially in patients with a history of pituitary adenoma and without a history of previous irradiation (7). Among the reported cases of coexistent pituitary adenoma and meningioma, planum sphenoidale, tuberculum sellae and the sphenoid wing meningiomas clearly predominate (5,7).

The aetiology of coexistent pituitary adenoma and intracranial meningioma is unknown. Coexistent meningiomas have been reported in patients with non-functioning pituitary adenoma, prolactinoma and Cushing disease after radiotherapy (8-10), but the coexistence of meningioma and these types of pituitary tumour has also been described in patients who were not previously irradiated (11), suggesting that the coexistence of meningioma and pituitary adenoma may not imply a relationship between the two diseases. Certain hormones, such as oestrogens and prolactin,

are recognised to have roles in stimulating the growth of meningiomas (12). In general, prolactinomas are the most common pituitary adenomas, but GH-producing tumours are the most commonly secreting adenomas that are found co-occurring with meningiomas (7).This evidence indicates that GH or somatostatin may stimulate the dura and arachnoid cells and may play roles in the occurrence or growth of meningioma (13); however, this statement has yet to be proven. In addition, it is possible that genetic alterations shared by these two tumours on the same chromosomes may explain their simultaneous occurrence (14-16).

The coexistent pituitary adenoma and intracranial meningioma in one patient presented a surgical and management challenge. In most previous reported cases, the coexistent pituitary adenoma and intracranial meningioma were managed independently, usually involving addressing the pituitary adenoma with a transsphenoidal approach and treating the meningioma separately with conservative measures or another surgical approach. When the pituitary adenoma and meningioma are contiguous, they can be removed in a one-stage operation using a single pterional approach or an endoscopic expanded endonasal approach. Compared to the surgical treatment of a single pituitary adenoma or meningioma, any of these surgical approaches have significant increases in the level of risk involved. Thus, adequate knowledge of the coexistent pituitary adenoma and meningioma is a very important precondition to planning the appropriate surgical approach and avoiding severe surgical complications.

Here, we present a case of recurrent non-functioning pituitary adenoma and temporal lobe meningioma in a patient without previous irradiation. To our knowledge, this is the first description of the coexistence of recurrent non-functioning pituitary adenoma and meningioma in a patient with no previous history of irradiation. In this case, we resected the recurrent pituitary adenoma and the meningioma simultaneously. The simultaneous removal of two tumours carries a higher risk than resection of the pituitary tumour and meningioma in two stages. Finally, the patient was discharged with no significant neurological deficits. There are two limitations to this study. First, the medical records and imaging data for the first operation were missing. Second, as similar cases are rare, the aetiology of coexistent pituitary adenoma and meningioma is unknown.

Conclusions

In conclusion, coexistent pituitary adenoma and temporal lobe meningioma is a very rare surgical entity, and diagnosis poses a therapeutic challenge. In this case, we used a single pterional approach for both tumours. The results prove that the treatment is feasible. The aetiology of coexistent pituitary adenoma and intracranial meningioma is unknown, and more cases and additional studies are necessary to explain such unusual findings.

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Footnote

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at http://dx.doi.org/10.21037/tcr.2020.03.78). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

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