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Development of pituitary apoplexy in a patient with meningioma and pituitary macroadenoma: A case report

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Although pituitary adenomas and meningiomas are among commonly encountered benign tumors, the co-existence of these tumors is rare. One of the most important complications of pituitary adenomas is the development of apoplexy, often resulting in death if left untreated. In this article, we presented a patient admitted to the emergency department with complaints of sudden onset headache, nausea, vomiting, and optic nerve paralysis. On examination, the case was found to have parietal lobe meningioma and pituitary adenoma. So, the case underwent emergent transsphenoidal surgery considering pituitary apoplexy and was treated with l-thyroxine and hydrocortisone in the post-operative period. Although the co-existence of a pituitary adenoma and a meningioma is known in the literature, such a co-existence with apoplexy is the first case to be described in the literature.

Keywords: Apoplexy, hypophysis, meningioma, pituitary adenoma
Short Title in English: Meningioma and apoplexy

INTRODUCTION

Pituitary apoplexy is one of the major complications of pituitary adenomas and is known as one of the endocrinological emergencies manifesting itself with headache, visual impairment, hypopituitarism, and cranial nerve paralysis. If untreated medically and/or surgically, pituitary apoplexy can result in deaths. The frequency of apoplexy ranges between 2 and 12% in patients with pituitary adenomas[1]. Apoplexy generally develops suddenly at the base of a non-functional or functional pituitary adenoma, triggered by hypertension, anticoagulant therapy, increased intracranial pressure, major surgery, and sometimes also occurs idiopathically due to necrosis triggered by dynamic tests and sometimes owing to hemorrhages, and thus resulting in a rapid increase in the size of the pituitary gland[1,2]. Apoplexy may also lead to deaths if it goes untreated surgically and/or conservatively medically.

Meningiomas are tumors with a commonly often benign nature and originating from arachnoidal cap cells by constituting 13-26% of intracranial tumors[3]. Meningiomas are

generally seen in later periods of life and among women[3]. Complete surgical excision is the standard treatment, and radiotherapy can also be administered in the treatment of atypical, recurrent, or malignant meningiomas[3].

Although the number of meningiomas is limited, the cases of meningiomas co-existent with functional or non-functional pituitary adenomas have been reported in the literature[4-6]. Some cases of meningiomas, especially those originating from the region of diaphragmatic sella, may present with an appearance similar to pituitary adenomas and cause diagnostic confusion[4-6].

In our report, we presented a case detected with a pituitary macroadenoma and a right parietal lobe meningioma in emergency examinations performed due to the clinic of pituitary apoplexy, where hypopituitarism developed after surgical debulking by the transsphenoidal route.

CASE

A 72-year-old female patient was found to develop severe headache with sudden onset, nausea, vomiting, vision loss in the left eye, and left-eyelid ptosis on cranial computerized tomography (CT) performed nearly three months ago (on 8th October 2020). On CT examination, an extra-axially located calcific meningioma on the right side of the cranium was determined (Figures 1A and B). Additionally, a peripherally located extra-axial meningioma in size of 12x11 mm was detected in the lateral part of the parietal lobe on cranial magnetic resonance imaging (MRI). A 22 mm of adenoma, the borders of which could not be distinguished, was also identified within the pituitary gland (Figures 2a, b, c, and d). Thereupon, considering pituitary adenoma and apoplexy in the case, an emergent pituitary decompression surgery was performed by transsphenoidal route under the coverage of steroids, and during the surgery, the pressurized hematoma or adenoma was observed to be evacuated after the dura incision. The histopathological examination of the hypophysectomy material of the case, where postoperative hypopituitarism was detected and steroid therapy was continued, revealed that the lesion was

completely necrotic. Through the medical history, it was found out that the case had been diagnosed with low-grade non-Hodgkin lymphoma 34 years ago, received chemotherapy due to the recurrence twice 34 and 12 years ago, undergone hysterectomy 30 years ago, had hypothyroidism for 25 years and so received the treatment of levothyroxine 50 µg/day po recently, and also had chronic hepatitis B infection for 18 years and thus been treated with entecavir of 0.5 mg tb 1x1 po lately. The medical history also revealed that the case had hypertension for 10 years, and most recently received a combination therapy of perindopril/indapamide 4 mg/1.25 mg 1x1 po with amlodipine of 5 mg 1x1 po, as well as receiving metformin 2x850 mg po due to type 2 diabetes mellitus (T2DM) for the last seven years. The patient having received hydrocortisone treatment of 3x10 mg po within the latest period was admitted to our department. On physical examination, the case (height: 162 cm, weight: 72 kg, and body mass index: 27.4 kg/m^2), was found to be conscious, cooperative, and full of motor functions. Blood pressure and visual field examination of the case were observed to be within the normal limits. Given the re-examination of the specimens prepared in the pathology unit, it was detected that while the preparations were inappropriate for healthy histopathological evaluation due to necrosis, the background was composed of the cells with monotonous appearance not constituting a distinct pattern, and these cells were stained with synaptophysin in immunohistochemical examination (Figure 3 a, b). Therefore, the case was followed-up in the outpatient clinic with the current treatment.

DISCUSSION

In the present report, we presented a case developing pituitary apoplexy at the base of a pituitary adenoma and a simultaneous meningioma detected in the right parietal region. To our knowledge, no reports including the co-existence of pituitary apoplexy and a meningioma were encountered in the literature. Albeit their rarity, pituitary adenomas and meningiomas can be seen together. In some cases, both conditions can be found together as a collision tumor[7]. Since

adenomas and meningiomas are often required to be removed by transsphenoidal surgery and craniotomy respectively, the preoperative differential diagnoses of pituitary adenomas and meningiomas, especially arising from diaphragmatic or tuberculum sella, are so important[6]. It has been reported that contrast-enhanced dynamic pituitary MRI can be beneficial in the differential diagnosis of these two conditions[5]. The meningioma in our case was detected in the parietal region, and thus there was no diagnostic confusion. The reason for the co-existence of a meningioma and a pituitary adenoma has yet to be fully elucidated. In the study comparing 57 cases with pituitary adenoma-related meningiomas with those sporadic pituitary adenomas and sporadic meningiomas, Zhou et al. reported that the lower expression of the multiple endocrine neoplasia type 1 (MEN1) gene plays an important role in pituitary adenoma-related meningiomas by upregulating the mammalian target of rapamycin (mTOR) signaling pathway, and that the treatment with rapamycin, an mTOR inhibitor, can be used by increasing apoptosis in treating pituitary adenomas in the future[8].

In our case, such clinically pre-existing symptoms as headache, problems of vision, and galactorrhea were absent. Additionally, our case was deprived of other clinical findings suggesting Cushing's syndrome or acromegaly, and probably the adenoma in our case was also non-functional. On pathological examination, it was found out that the base was composed of cells with a monotonous appearance not forming a distinct pattern. The immunohistochemical examination also revealed that these cells were stained with synaptophysin. Even so, no immune staining could be performed for pituitary hormones due to necrotic tissues. The presence of necrotic tissues in the surgical material was also compatible with apoplexy. In her history, our case was found out to have been diagnosed with non-Hodgkin's lymphoma (NHL), as in a remission state. Base on the literature, NHL has been reported to exhibit sometimes an adenoma-like image by leading to the pituitary infiltration[9]; however, there was no finding suggesting the lymphoma infiltration in the pathological examination of our case.

The prevalence of apoplexy ranges between 2-12% in patients with pituitary adenomas[1]. Apoplexy is an emergency-requiring condition developing usually with hypertension, anticoagulant therapy, etc. at the base of a non-functional or functional pituitary adenoma, or developing sometimes idiopathically, occurring suddenly after the necrosis or hemorrhages, and resulting in a rapid increase in the size of the pituitary gland; it may also result in deaths if untreated surgically and/or conservatively medically[1,2]. Her history revealed that our case had a medical history of hypertension and T2DM, and so receiving three antihypertensive drugs and one oral antidiabetic medication per day due to these diseases. The case also received L-thyroxine therapy for the pre-existing hypothyroidism. When diagnosed with apoplexy, the case underwent transsphenoidal surgery under the coverage of steroids. and as the continuation therapy, hydrocortisone combined with L-thyroxine was continued.

Our case had a history of NHL existing for many years and currently in remission. Based on the literature, various cases rarely developing apoplexy in the lymphoma background have been reported[10]. However, in our case, there was no lymphoma infiltration in the postoperative tissue, and immunostaining with synaptophysin was consistent with the pituitary adenoma.

CONCLUSION

In conclusion, in the report, we presented a case developing the pituitary apoplexy at the base of a pituitary adenoma and a parietal meningioma. Although the co-existence of a pituitary adenoma and a meningioma is known in the literature, such a co-existence with apoplexy is the first case to be described in the literature.

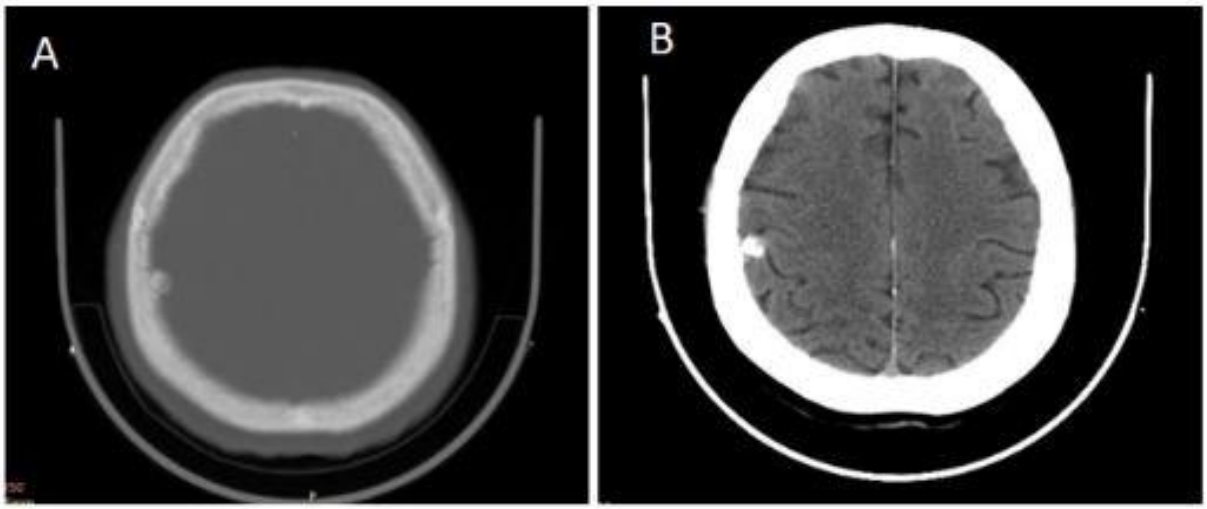

Figure 1: The extra-axially located calcific nodular mass lesion (calcific meningioma) is present on the right side of the bone window (A) and parenchymal window images (B) taken through unenhanced computerized tomography.

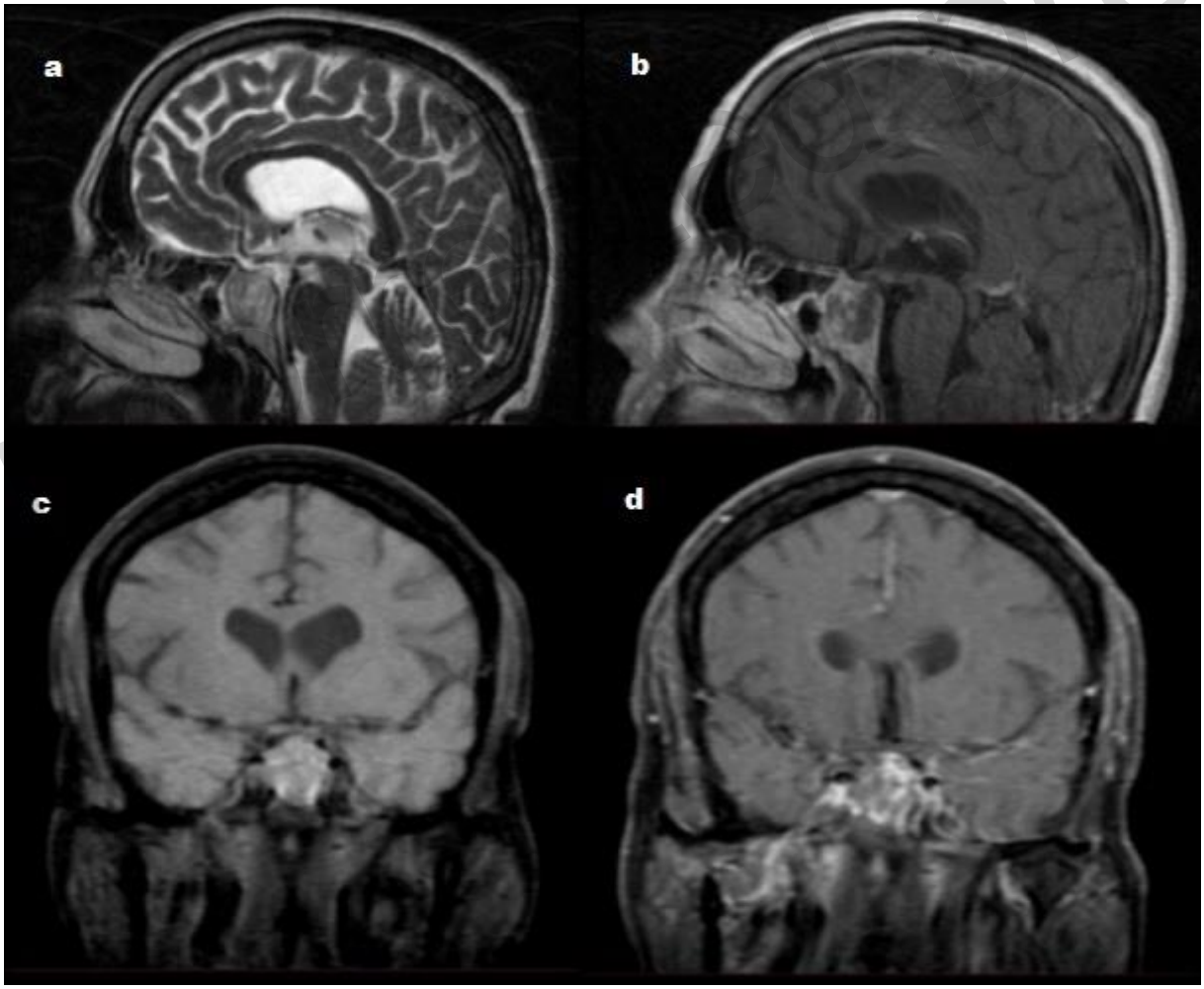

Figure 2: (a) T2-weighted sagittal section. Magnetic resonance imaging (MRI) shows the heterogeneous enlargement of pituitary gland, (b) T1-weighted contrast enhanced sagittal, and

(c) T1-weighted non-contrast coronal section. MRI shows the enlargement of pituitary gland with heterogeneous hyperintense hemorrhagic areas, (d) T1-weighted contrast enhanced coronal section. MRI shows the heterogeneous contrast enhancement of enlarged pituitary gland.

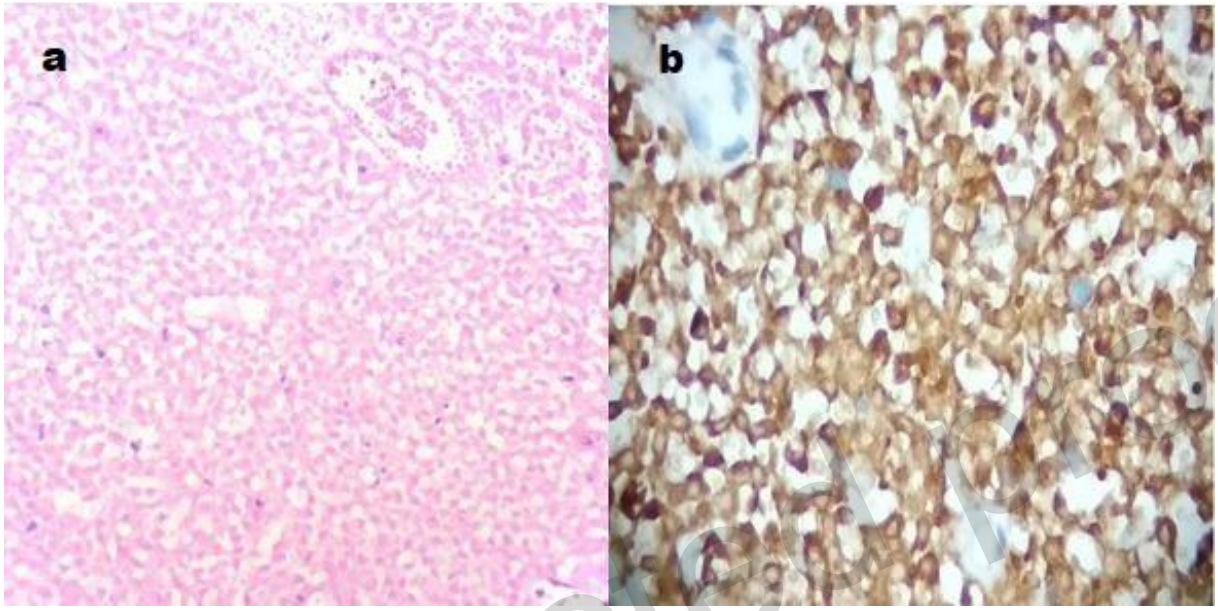

Figure 3: (a) The area containing necrobiotic cells surrounded by necrotic tissue and thrombus-including venule (x20 magnification, stained with Hematoxylin&Eosin), (b) Diffuse synaptophysin positivity in cells. The vessel wall is negatively stained (x40 magnification)

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