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Case Report & Case Series

Colon metastasis to residual pituitary macroadenoma causing accelerated growth: Case report and review of the literature

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ABSTRACT

Background: Metastasis to post-surgical pituitary adenoma (PA) is extremely rare.
Case description: A 53-year-old man previously underwent endoscopic transsphenoidal surgery (TSS) for resection of PA and had stable annual post-operative magnetic resonance imaging for several years. Later, he had abdominal surgery for newly discovered malignant colon neoplasm. In addition, evidence of multiple lung metastases was subsequently discovered prompting chemotherapy. The patient, before his second TSS, presented with symptomatic visual field defect from rapidly enlarging residual PA causing mass effect to optic apparatus. Subsequently, second operation was performed with unremarkable intraoperative findings and postoperative course. However, histopathology revealed metastatic adenocarcinoma inside the PA.
Conclusions: This is the first reported case of metastasis from colon cancer to post-TSS PA.

1. Introduction

Sellar lesions are common in neurosurgical practice. The most frequent sellar pathology is pituitary adenoma (PA) [1] with incidence of 0.4–8.2 cases per 100,000 per year [2]. In contrast, non-PA was seldomly diagnosed. Valassi et al. [1] reported 7.9% of their 1469 patients who underwent transsphenoidal surgery (TSS) were non-PA. Even rarely encountered is secondary malignant neoplasm at sella. Pituitary metastases were found in only 1% in few large TSS series [3,4]. Among secondary neoplasms spreading to pituitary area, breast and lung cancer have been the most frequent primary sources [3,5–8]. Although case reports of adenocarcinoma metastasis to sella have been published, it is extremely uncommon to find such tumor spread to pre-existing PA [3,4]. We report a patient, with a known non-functioning PA (NFPA) who previously underwent endoscopic TSS 5 years ago, with recent diagnosis of advanced stage colorectal cancer and rapid growth of residual pituitary tumor. Despite the fact that repeated TSS for tumor resection was grossly unremarkable, histopathology revealed adenocarcinoma metastasis within PA. History, physical examination, radiographic studies and histopathology are presented as well as a short review of previous case reports.

2. Case report

A Thai male patient, at the age of 48, underwent his first endoscopic TSS for resection of NFPA after he had been suffering from gradual visual acuity (VA) and visual field (VF) decline. He was also found to have pituitary hormone deficiency including hypothyroidism, hypogonadism, and adrenal insufficiency. Preoperative magnetic resonance imaging (MRI) with pituitary protocol showed a heterogeneous enhancing mass at sella turcica with extension up to suprasellar space causing compression of optic apparatus. Its size was measured 1.8, 2.2 and 2.0 cm in its widest anteroposterior, transverse, and vertical respectively (Fig. 1).

Intra-operatively, the tumor had typical friable and suckable consistency, as one would anticipate of adenoma. Official histopathology confirmed PA (Fig. 2).

Post-operatively, his VA and VF improved to normal examination. Additional treatment was not required since annual clinical and radiographic imaging showed no progression of the residual tumor for 4 consecutive years (Fig. 3).

Abbreviations: A, At autopsy; ACTH, Adrenocorticotropic hormone; BH, Bitemporal hemianopia; bil, Bilateral; CMT, Chemotherapy; CN, Cranial nerve; CN III, Oculomotor nerve; CN VI, Abducens nerve; d, Days; DI, Diabetes insipidus; ETSS, Endoscopic transsphenoidal surgery; F, Female; FPA, Functioning pituitary adenoma; FSH, Follicle-stimulating hormone; GH, Growth hormone; HA, Headache; HE, Hematoxylin and eosin; IVC, Inferior vena cava; (L), Left; LE, Left eye; LH, Luteinizing hormone; LN, Lymph nodes; m, Months; M, Male; MRI, Magnetic resonance imaging; N, Nausea; NA, Not applicable; NF, Non-functioning; NFPA, Non-functioning pituitary adenoma; NR, Not reported; PA, Pituitary adenoma; PE, Pulmonary embolism; PRL, Prolactinoma; (R), Right; RE, Right eye; RT, Radiation therapy; SIADH, Syndrome of inappropriate secretion of antidiuretic hormone; TCS, Transcranial surgery; TSS, Transsphenoidal surgery; VA, Visual acuity; VF, Visual field; VL, Visual loss; V, Vomiting; w, Weeks; y, Years.

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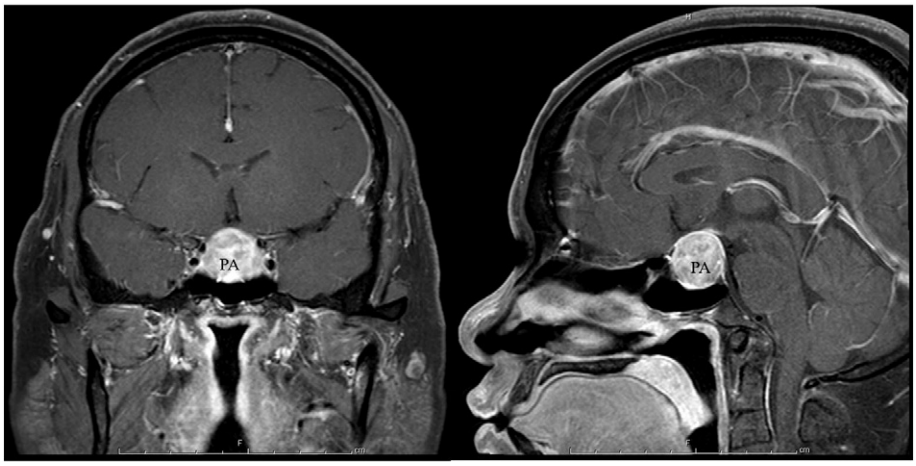

Fig. 1. Magnetic resonance imaging (MRI) scan of the patient, five years ago, before his first transsphenoidal surgery (TSS). Preoperative, gadolinium-enhanced T1-weighted scans, coronal and sagittal views, show a pituitary adenoma (PA) at sellar-suprasellar region with optic chiasm compression.

Unfortunately, the patient was found to have new onset of anemia that ensuing investigation revealed circumferential mass at rectosigmoid colon. After undergoing colon procedure and histopathology confirmation (Fig. 4), a diagnosis of grade IV colonic adenocarcinoma was established.

A few months later, he was found to have multiple lung metastases and, hence, was subsequently treated with chemotherapy. In 2015, five years after his first PA surgery and 10 months after the diagnosis of colon cancer, he developed rapidly progressive VF decline, within three months. Progressively worsening bitemporal hemianopia, from previously normal VF, was noted, however, without abnormal VA. Based on his VF abnormality, sooner-than-scheduled MRI was obtained. Significant growth of the tumor, compared to its previously stable size for the past 5 years, was observed (Fig. 5). The MRI appearances were typical for recurrent PA without unusual features.

The patient had no clinical or laboratory evidence of diabetes insipidus. Due to progressively worsening bitemporal hemianopia from rapidly enlarging tumor, the patient agreed to proceed with second endoscopic TSS. Intraoperatively, there was no unexpected finding other than minor adhesion from previous operation. Familiar suckable and friable appearance of PA was observed. Despite the usual and unsurprising intraoperative findings, to our wonder, pathology exhibited metastatic colonic adenocarcinoma inside the recurrent NFPA. The patient had an uncomplicated postoperative course with improved VF. He was sent home without event. After discharge from hospital, he, later, received palliative cranial radiotherapy. Unfortunately, three months after the last TSS, the patient died from respiratory complication of pulmonary metastasis.

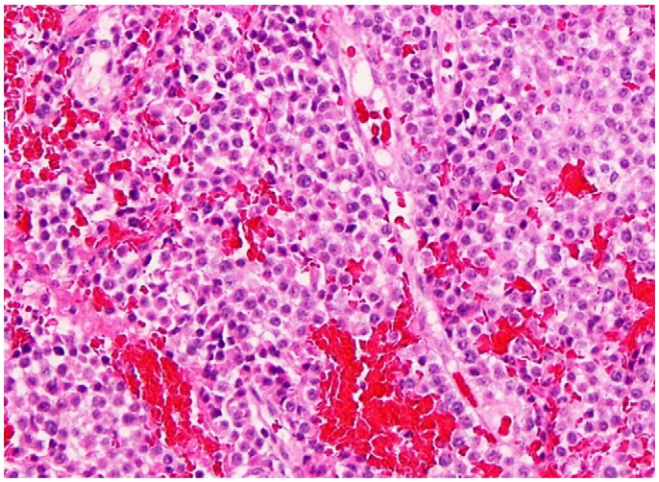

Fig. 2. Histopathology (hematoxylin and eosin; HE) of PA from the first TSS.

3. Histopathology

On the review of specimens from his first TSS, five years ago, this cellular tumor consisted of sheets of monomorphic neoplastic cells separated by delicate capillary network. The tumor cells were round to oval-shaped with uniform round nuclei, stippled chromatin, and moderate amount of eosinophilic cytoplasm, consistent with PA (Fig. 2).

From his colon cancer operation, microscopic examination of the patient's rectal specimen showed an infiltrative adenocarcinoma with abundant extracellular mucin. The tumor invaded into the perirectal soft tissue with microscopic penetration of the visceral peritoneum through anterior wall of the rectum (pT4a) [31] (Fig. 4).

The histopathology of the pituitary mass from his last surgical procedure revealed that the tumor appearance was similar to the first PA from five years ago. Again, reticulin stain showed disrupted reticulin network. These findings confirmed the diagnosis of PA. Interestingly, some fragments of the PA also contained aggregation of adenocarcinoma which had similar histological features to that of the rectal adenocarcinoma. The adenocarcinoma component of this pituitary specimen showed immunoreactivity for cytokeratin 20 and CDX2, but lacked positivity for cytokeratin 7. The morphological features and immunohistochemical profiles indicated the diagnosis of metastatic rectal adenocarcinoma to PA (Fig. 6).

4. Discussion

Although sellar tumor is common, secondary neoplasm to pituitary gland is rare. On the contrary, in population of patients with cancer, pituitary metastasis is not unusual. Max et al. [9] published autopsy series of patients with known cancer that, rather interestingly, pituitary metastasis (3.6%) was found more frequently than PA (1.8%). Komninos et al. reviewed 380 cases of pituitary metastasis from autopsy and reported that most common primary cancers were breast (39.7%) and lung (23.7%) while 2% was from colon. Diabetes insipidus (DI) (45.2%), cranial nerve (CN) II deficit (27.9%), hypopituitarism (23.6%), and CN III, IV, VI palsy (21.6%) were common manifestations in patients with pituitary metastasis [3]. While secondary pituitary neoplasm is infrequent, metastasis to pre-existing PA is extraordinarily rare. Only a handful of case reports have been published in literatures. From PubMed online database search, we found 26 published cases of pituitary metastasis to PA [6,10–30] (Table 1). Five of twenty-six of these reports (20%) were from autopsy findings without patients' actual PA surgery when they were alive. The rest, roughly 80%, of these case