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Pituitary Metastasis of Bronchial Carcinoid Tumor Mimicking Pituitary Adenoma: a Case Report

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Case Report

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Tumors that metastasize to the pituitary gland are unusual and metastasis of neuroendocrine neoplasm to the sellar region is extremely rare. We report a 59-year-old man with pituitary metastasis from pulmonary carcinoid tumor who presented with left progressive deterioration of visual field. Sellar dynamic magnetic resonance imaging revealed an enhancing sellar mass invading the left cavernous sinus. We report this unusual case with a review of the relevant literature.

Keywords: Metastasis; Carcinoid tumor; Pituitary gland

INTRODUCTION

Metastasis to the pituitary gland is uncommon and constitute only 1-5% of all cases of brain metastasis (1). Pituitary metastases usually occur in the 6th or 7th decade of life and this age range does not differ according to sex. The most common types of primary tumor for causing pituitary metastases are breast and small cell lung cancers (1, 2). Bronchial carcinoid tumors metastatic to the sella are extremely rare. There were only a few reported examples of pulmonary carcinoid tumors, typical or atypical, metastatic to the pituitary gland (1-9). Pituitary metastasis is usually asymptomatic and diabetes insipidus is commonly reported symptomatic condition (1). Herein, we present the case of a 59-year-old man with a pulmonary carcinoid tumor metastatic to the sella who presented with progressive deterioration of visual acuity and visual field. A literature review of sellar metastases of neuroendocrine neoplasm is also included.

CASE REPORT

A 59-year-old man presented with recent-onset left progressive deterioration of visual acuity and visual field. He had undergone a wedge resection of right middle lobe to remove primary bronchial atypical carcinoid tumor three years earlier and received adjuvant chemotherapy and radiation therapy. Brain computed tomography (CT)

showed about a 2 cm sized, poorly defined, iso attenuated and heterogeneously enhancing pituitary mass (Fig. 1a, b), which extended to left cavernous sinus and showed focal erosion of left sellar floor (Fig. 1c, d). He underwent sellar dynamic magnetic resonance imaging (MRI), which showed a 2.2 × 1.4 × 1.3 cm poorly defined, intermediate T2 signal intensity (Fig. 1e, h), iso T1 signal intensity (Fig. 1f, i), heterogeneously enhancing mass involving the pituitary gland with invasion to left cavernous sinus and focal erosion of left sellar floor (Fig. 1g, j). The mass involved the left side of pituitary gland, including both anterior and posterior hypophysis. There was no evidence of pituitary

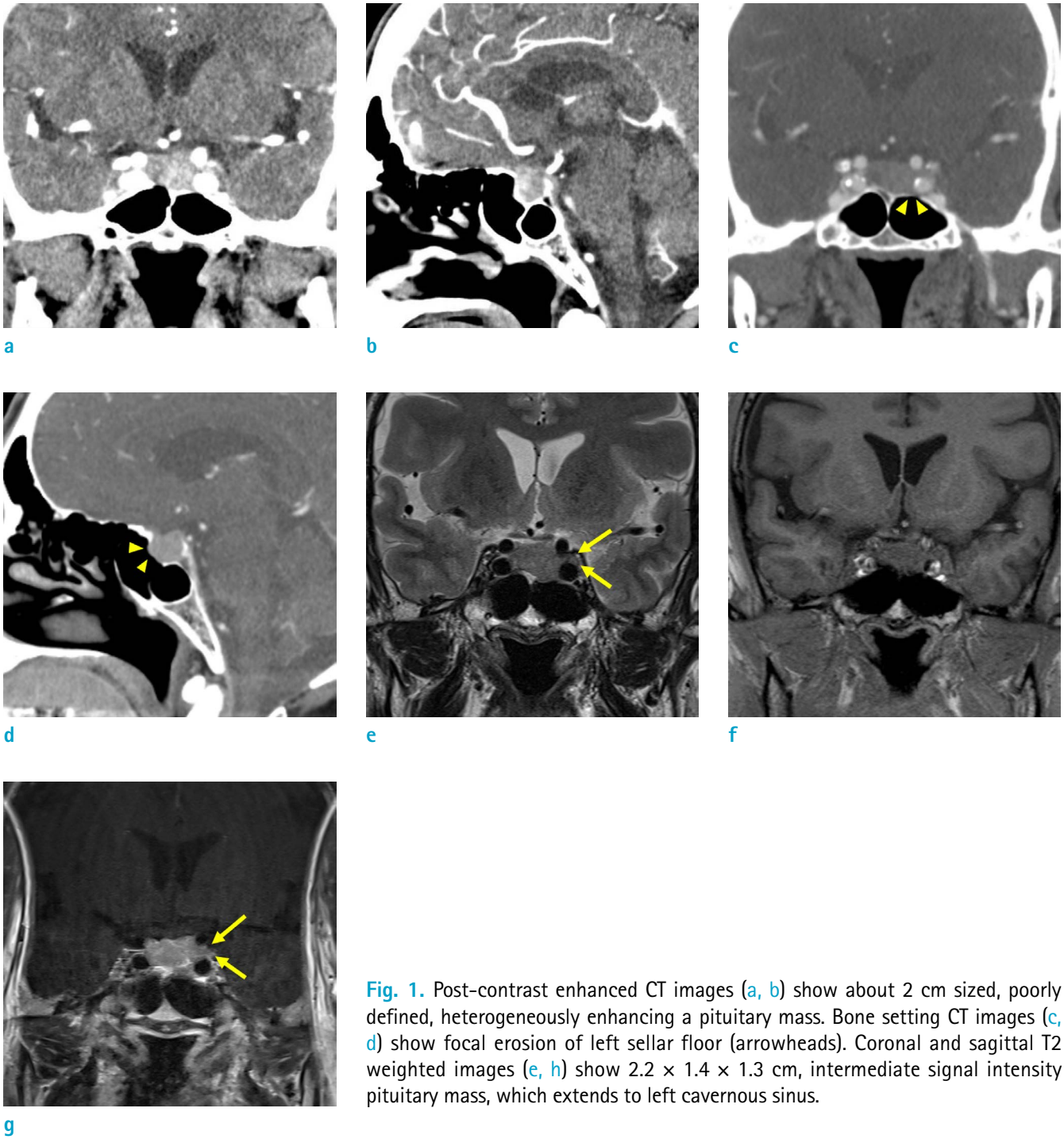
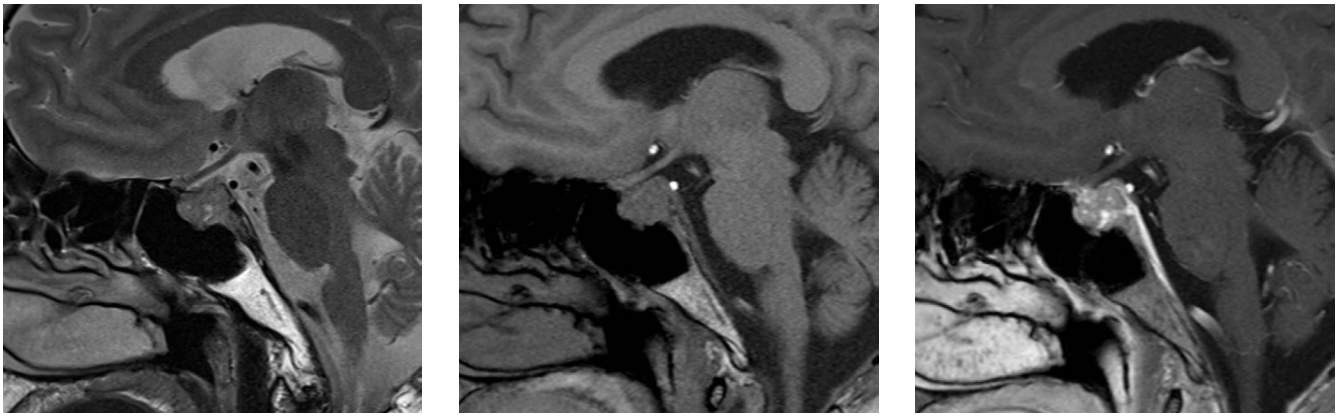


Fig. 1. Post-contrast enhanced CT images (a, b) show about 2 cm sized, poorly defined, heterogeneously enhancing a pituitary mass. Bone setting CT images (c, d) show focal erosion of left sellar floor (arrowheads). Coronal and sagittal T2 weighted images (e, h) show 2.2 × 1.4 × 1.3 cm, intermediate signal intensity pituitary mass, which extends to left cavernous sinus.



h i j

Fig. 1. Coronal, sagittal non enhanced T1 weighted images (f, i) and coronal, sagittal enhanced T1 weighted images (g, j) show contour-bulging, poorly defined, heterogeneously enhancing mass at pituitary gland with invasion to left cavernous sinus, exceeding the lateral tangent on the lateral aspect of the intracavernous and supracavernous internal carotid arteries (e, g, arrows). This pituitary mass involve the left side of pituitary including anterior and posterior hypophysis. The high T1 signal intensity of posterior hypophysis remained partially (not shown).

stalk invasion. The differential diagnosis included pituitary adenoma and a metastasis. On visual field examination, deteriorated vision and visual field was reported. Hormonal tests including thyroid stimulating hormone (TSH), testosterone, prolactin, cortisol, adrenocorticotropic hormone (ACTH), insulin- like growth factor-1 (IGF-1) and vasopressin were all within normal range.

The otorhinolaryngology and neurosurgery team removed the tumor via a transsphenoid approach, and this procedure obtained symptomatic relief. On the surgical field, surgeon found that the tumor protruded to sphenoid sinus throughout the sellar floor and clear-cut cavernous sinus dural involvement by the tumor. The tumor was subtotal removed for decompression.

Pathologically, the mass proved to be a metastatic atypical carcinoid. On the microscopic evaluation, the metastatic tumor cells were arranged trabeculae, irregular nests (Fig. 2a). And individual cells were immunoreactive for chromogranin (Fig. 2b), synaptophysin (Fig. 2c) and CD 56 (Fig. 2d).

The patient underwent Gamma knife radiosurgery treatment for remnant mass in the pituitary gland 19 days after the initial operation. He died 11 months later because of multiple organ metastasis.

DISCUSSION

Pituitary gland is unusual site for metastasis. In pituitary tumor resection series, only less than 1% are found to be metastatic tumors (10). The routes of metastasis to the pituitary gland include hematogenous spread or via direct invasion through the skull base. The former is the main pathway. When tumors do metastasize, the posterior part of the pituitary is more susceptible than the anterior. An involvement of the posterior lobe either alone or in combination with the anterior lobe in 84.6%, whereas only the anterior lobe was affected in 15.4%. The predilection for metastasis to the posterior lobe is mainly attributed to the lack of direct arterial blood supply of the anterior lobe. The most common symptom seems to be diabetes insipidus, reflecting a predominance of metastasis to the posterior lobe (10). Radiologic findings of pituitary metastases are not specific and it is difficult in distinguishing pituitary metastasis from adenoma. In a meta-analysis of 70 cases with pituitary metastasis, Komninos et al. (10) reported that MRI may demonstrate an isointense or hypointense mass on T1-weighted images with a high-intensity signal on T2-weighted images, homogeneous enhancement with gadolinium and an absent high-signal intensity for the posterior lobe on T1-weighted images, a rapid increase on a sellar tumor with aggressive infiltration of adjacent tissues, or a dumbbell-shaped intrasellar and suprasellar tumor. The CT usually shows a hyperdense or isodense mass, homogeneously or inhomogeneously enhancing (if cystic degeneration, hemorrhage, or necrosis exists) in contrast images. Schubiger and Haller (11) reported that invasion of the infundibular recess by a suprasellar mass is in favor of

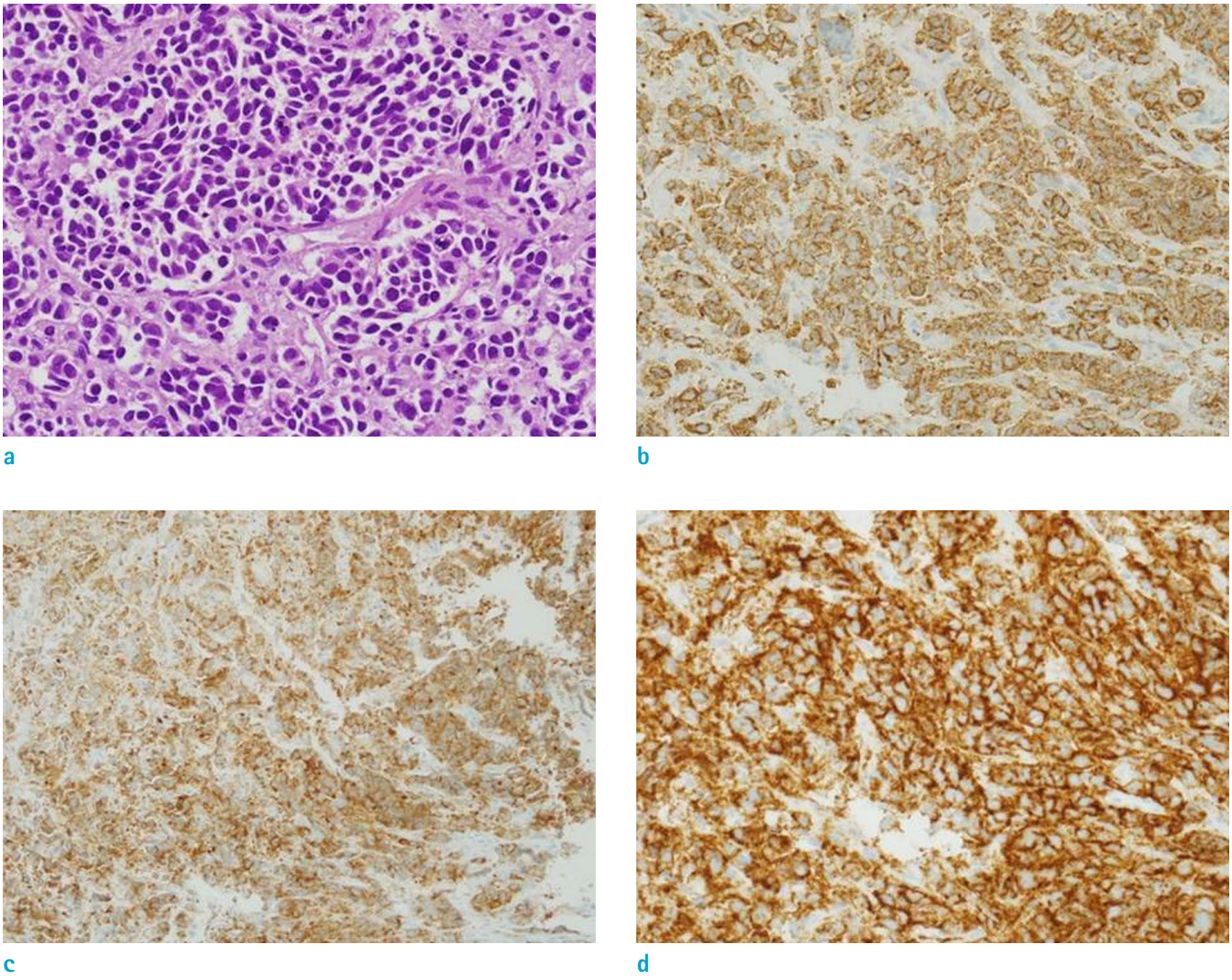


Fig. 2. In the pituitary specimen, the metastatic tumor cells are arranged trabeculae, irregular nests (a, Hematoxylin & Eosin, × 400) and individual cells are immunoreactive for chromogranin (b, chromogranin, × 400), synaptophysin (c, synaptophysin, × 200) and CD 56 (d, CD 56, × 400).

pituitary metastasis, because suprasellar adenomas usually push it posteriorly. Mostly raise suspicion of pituitary metastases is the evolution with rapid and invasive growth, with diabetes insipidus especially in patients over 50 years of age (1).

Neuroendocrine tumor metastases to the pituitary are rare (1). Goglia et al. (12) and Moshkin et al. (2) summarized 11 cases and 15 cases of pituitary metastasis from neuroendocrine tumors, respectively. The most frequent primary tumor was small cell carcinoma of the lung and the most common clinical presentation was diabetes insipidus. Atypical bronchial carcinoid tumor metastatic to the sellar region is extremely rare. To date, only nine cases of pituitary metastasis from bronchial carcinoid have been reported (Table 1). Mean age of nine patients was 53.4 years old. All cases showed sellar and suprasellar or parasellar extension on radiologic findings. More than half showed inhomogeneous enhancement and optic chiasm compression (n = 4) or internal carotid artery involvement (n = 4) were noted. Two cases showed calcification. Follow up revealed that in patients survival reached 2 to 18 months (1-8). Our case also showed similar pattern as describe above. CT and MRI showed poorly defined, inhomogeneously enhancing mass involving the pituitary gland, parasellar extension with invasion to cavernous sinus and destruction of sellar floor. Our patient was 59 years old and survival period was 11 months.

The treatment of pituitary metastases should be targeted

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Table 1. Literature Review: Reported Cases of Pituitary Metastasis from Pulmonary Carcinoid Tumor

Case	Year	Authors	Age	Gender	Clinical symptoms	Laboratory feature	Radiologic appearance					Treatment for metastasis	Follow up results
1	2015	Pedro	64	F	Visual change, polyuria, polydipsia, decreased level of consciousness	Pan-hypopituitarism	Sellar and suprasellar	Heterogeneous enhancement	5.0 cm	Compression of optic chiasm, both ICAs		TSA	2months
2	2012	Olga	63	F	Headaches	No pituitary dysfunction	Sellar and suprasellar	Homogeneous enhancement	3.0 cm	Both ICAs, clivus erosion	Calcification	TSA	NA
3	2007	Catherine	50	F	Bitemporal hemianopia	Functional hypopituitarism	Sellar with parasellar (anterior sphenoidal sinus and posterior pre-pontine cistern)	Heterogeneous enhancement	3.5 cm	Compression of optic chiasm, displacement of basilar artery	Well-defined	TSA, CTx	18 months alive and well
4	2006	Christian	44	F	Bitemporal hemianopia	Acromegaly	Sellar and suprasellar, surrounding pituitary stalk	Inhomogeneous enhancement	2.6 cm	Compression of optic chiasm, remodeling of the floor of the sella, both CS	Poorly defined margin	TSA, RTx	3 months alive and well
5	2004	Ilan	47	M	Bitemporal hemianopia	Hypopituitarism	Sellar and suprasellar	Homogeneous enhancement		Compression of optic chiasm		TSA, RTx	12 months alive and well
6	2001	Huang	59	M	Left oculomotor palsy and head	No pituitary dysfunction	Sellar with parasellar and suprasellar	Heterogenous enhancement		Extension, left ICA		TSA, GKRS	3 months
7	1997	Takumi	46	F	Headache, blurred vision, bitemporal hemianopsia	No pituitary dysfunction	Sellar and suprasellar	Homogeneous enhancement	2.5 cm		Well-defined	TSA	6 months
8	1988	Marco	49	F	Visual failure	Partial failure of pituitary function	Sellar and suprasellar		1.2 cm		Partial calcification (CT)	Frontal craniotomy	4 months
9	2020	Present case	59	M	Deterioration of visual field	No pituitary dysfunction	Sellar with suprasellar and retrosellar	Heterogeneous enhancement	2.2 cm	Extension, left cavernous sinus, left ICA, sellar floor erosion	poorly defined margin	TSA, GKRS	11 months

CS = centrum semiovale; CTx = chemotherapy; GKRS = gamma knife radiosurgery; ICA = internal carotid artery; RTx = radiation therapy; TSA = transsphenoid approach

to the treatment of the underlying disease and control of symptoms. Although radiotherapy and chemotherapy are the methods of choice, surgical intervention should be considered for relief of symptoms, especially headache and visual field deficits. The prognosis is poor with survival around 6-22 months depending on the aggressiveness of the primary tumor and staging of disease (6, 10).

As we reviewed literature, radiologic findings of pituitary metastasis are not specific. However, the radiologist should raise suspicion of pituitary metastasis for rapidly increasing sellar tumors with aggressive infiltration of adjacent tissue, in the clinical setting of patient over 50 years and underlying malignancy (1, 10). Therefore, pituitary metastasis should be a differential diagnosis of rapid growing invasive lesions in the sellar region in patients over 50 years of age with underlying malignancy.

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