Pituitary gland metastases from breast carcinoma: a case report

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Section: Neuroradiology
Area of Interest: Neuroradiology brain
Procedure: Diagnostic procedure
Imaging Technique: MR
Special Focus: Neoplasia Case Type: Clinical Cases
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Patient: 50 years, female

Clinical History:

A 59-year-old female patient diagnosed with invasive duct carcinoma 3.5 years before underwent right radical mastectomy and received both chemotherapy and loco-regional radiotherapy. Three years later the patient developed widespread bony metastases. While under treatment for bone metastases, the patient complained of newly occurring headache and progressive visual disturbance.

Imaging Findings:

MRI examination of the sella revealed a large dumbbell-shaped sellar and suprasellar mass lesion, extending upwards along the infundibulum and significantly compressing the optic chiasm. It elicits an intermediate signal on T1WI and relatively high signal on T2WI, together with intense enhancement upon contrast administration (Fig. 1, 2). A hypointense signal is also seen involving the clivus bone, denoting a marrow-replacement lesion (Fig. 1a). An associated thin sheet of dural enhancement is noted creeping along the posterior aspect of the clivus (Fig. 2b). Further on, trans-sphenoidal biopsy and mass decompression were performed along with histopathology, which confirmed metastatic pituitary gland deposit from breast carcinoma.

Discussion:

Metastatic spread to the pituitary gland is uncommon, it occurs in 3.5% of all cancer patients [1]. The majority of pituitary metastasis occurs in association with disseminated systemic metastases and is typically associated with end-stage disease [2, 4]. Almost all primary tumours have been reported to metastasize to the pituitary gland, with breast and lung cancer accounting for about two thirds of cases [2]. The most frequent primary site of the tumour in women is the breast, followed by lung, stomach, and uterus; in men, it is the lung, followed by prostate gland, urinary bladder, stomach, and pancreas [3].

The routes of metastasis to the pituitary gland include haematogenous spread, meningeal spread or direct invasion through the skull base. The former is the main pathway [2, 5]. The most commonly involved site is the posterior hypophysis (69-79%), followed by the anterior hypophysis, both anterior and posterior hypophyses, and stalk. However, metastasis from breast cancer involves preferentially the anterior hypophysis [6].

Most pituitary metastases are asymptomatic, with only 7% reported to be symptomatic. Diabetes insipidus, anterior
pituitary dysfunction, visual field defects, headache/pain and ophthalmoplegia are the most commonly reported symptoms [4].

Metastasis to the pituitary gland is demonstrated on MRI as an iso to hypo-intense mass on T1WI with a relatively high-intensity signal on T2WI and intense gadolinium enhancement [6]. MRI findings are non-specific, although there are some characteristics that can be used to help differentiate it from an adenoma, such as sizeable growth over a short time, dumbbell shape of a sellar and supra-sellar mass, relatively normal-size of the sella with destruction rather than remodelling of its floor and/or posterior clinoid process, thickening of the pituitary stalk and infundibulum, thickening of the dura, irregular edges, and loss of the normal high-intensity signal of the posterior pituitary on T1WI [7, 8].

Treatment for pituitary metastases is often multimodal, including surgery, radiotherapy, and chemotherapy. Tumour invasiveness can hinder the feasibility of resection. Although tumour resection surgical series have not shown any significant survival benefits, it could still improve patients’ quality of life [4].

Overall, prognosis following pituitary metastases is poor. This can be attributed to widespread metastatic disease at the time of diagnosis rather than pituitary involvement [9]. The mean survival rate of pituitary metastasis cases ranges from 6 to 22 months, with poorer prognosis in cases of pituitary stalk invasion, ranging from 2 to 4 months [4, 10].

Differential Diagnosis List: Pituitary metastases from breast cancer, Pituitary macroadenoma, Craniopharyngioma (papillary type), Lymphoma, Lymphocytic hypophysitis, Meningioma

Final Diagnosis: Pituitary metastases from breast cancer

References:

Description: Fig 1a:
A dumbbell-shaped sellar and suprasellar mass is seen displaying intermediate T1WI signal. The mass extends upwards along the infundibulum and markedly compresses the optic chiasm (arrow). Origin: Nasser Institute for Research and Treatment. Department of Diagnostic and Interventional Radiology
Description: Fig 1b: A small metastatic marrow lesion is also noted at the clivus bone (arrow). Origin: Nasser Institute for Research and Treatment. Department of Diagnostic and Interventional Radiology
**Description:** Axial T2WI:
The mass displays slightly hyperintense T2 signal. **Origin:** Nasser Institute for Research and Treatment. Department of Diagnostic and Interventional Radiology
Description: Fig 2a:
The pituitary mass demonstrates homogeneous intense gadolinium enhancement. The mass has squeezed through the diaphragma sella with only minimal stretching (arrows) as this has occurred over a short time. Origin: Naser Institute for Research and Treatment. Department of Diagnostic and Interventional Radiology.
**Description:** Fig 2b: A thin sheet of dural enhancement is seen creeping downwards along the posterior aspect of the clivus (double arrow). **Origin:** Naser Institute for Research and Treatment. Department of Diagnostic and Interventional Radiology.