

Ophthalmoplegia in a Patient with Breast Cancer

An 83-year-old Chinese lady was diagnosed with right locally advanced breast cancer in August 2008. Histology of core biopsies showed infiltrative ductal carcinoma grade III. Estrogen and progesterone receptors were positive, Cerb-B2 negative. CT scan showed right breast tumour extending to the skin surface with ipsilateral axillary and supraclavicular lymphadenopathy. In view of her frail health contributed by multiple medical comorbidities, surgical therapy and chemotherapy were deemed to be too risky. She was started on tamoxifen for 3 months but switched to letrozole, with minimal response observed. She then underwent radiotherapy to her right breast in February 2009 for local control of her right breast mass.

In May 2009, she presented with a 3-day history of bilateral eyelid swelling and difficulty in opening her eyes. This was associated with severe frontal headache and vomiting. Examination revealed bilateral complete ptosis with periorbital edema. There was complete ophthalmoplegia

on her right eye. She was blind on her left eye due to a 10-year history of glaucoma. Her right pupil was 2 mm and reactive to light, with normal vision. Her left pupil was 4mm and non reactive. The rest of the neurological examination was unremarkable.

CT scan of her brain was unremarkable other than chronic microvascular ischemia. Magnetic resonance imaging (MRI) of her brain was performed.

Fig. 1 demonstrates sagittal pre-(A) and post gadolinium enhanced (B) T1-weighted images, as well as axial (C) and coronal (D) T2-weighted images

What do they show?

- A. Metastasis to the clivus
- B. Cavernous sinus thrombosis
- C. Primary clival chordoma
- D. Pituitary adenoma

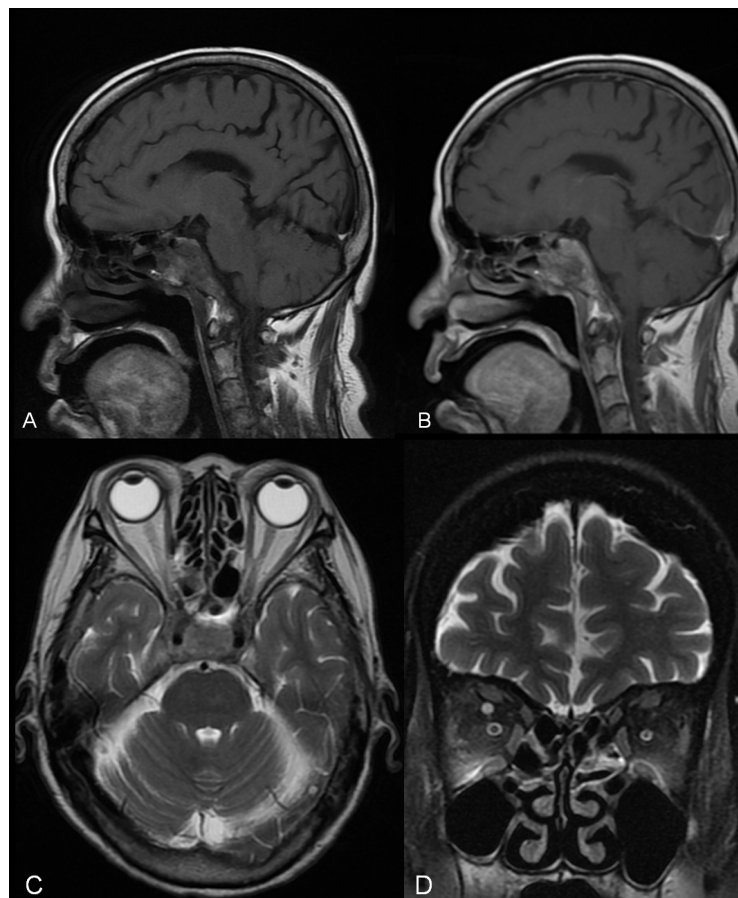
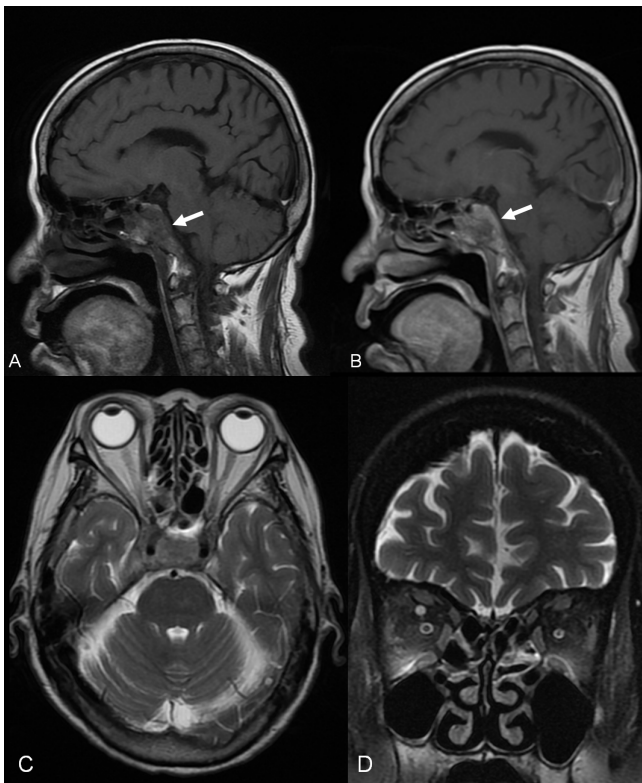


Fig. 1. Sagittal pre-(A) and post gadolinium enhanced (B) T1-weighted images, axial (C) and coronal (D) T2-weighted images



Figs. 2A and B demonstrate replaced expansion of the clivus (arrows) and heterogeneous enhancement. Fig. 2C shows replacement of normal marrow signal (arrow) in clivus. In Fig. 2D, perineural fluid cuffs are seen around both optic nerves in the coronal view (straight arrows). In addition, the right superior ophthalmic vein is dilated (curved arrow).

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A bone scan revealed metastases to the spine and pelvis. In view of the clinical picture, the clival lesion is mostly likely to be metastatic in nature.

Fig. 3 further demonstrates this. Axial pre-(A) and post gadolinium enhanced (B) T1-weighted images show replaced marrow signal in the clivus (arrow) and heterogeneous enhancement of the clivus and the clinoid processes (arrow heads) with involvement of the cavernous sinuses more on the right side (curved arrow). A section (C) through the upper orbits shows the dilated right superior ophthalmic vein (arrow).

Our patient was treated with a course of steroids and subsequently underwent palliative radiotherapy to the clivus. Her periorbital edema and headache resolved but ophthalmoplegia and ptosis persisted at discharge to the hospice for comfort care.

Metastasis to the clivus is rare, mainly reported in case reports and small case series. The most common primary tumours are prostate and thyroid carcinoma. Other primary tumours include hepatocellular, renal and gastric carcinoma, in addition to melanoma and liposarcoma.¹

The most frequent route of tumour spread is hematogenous. In the case of metastases to the clivus from prostate cancer, transfer through the epidural venous plexus may be possible. Headache and diplopia due to a sixth nerve palsy are the most common presenting symptoms.¹ Other reported features include multiple cranial nerve palsies and visual loss.

In our patient, complete ophthalmoplegia was caused by extension of clival metastases into the cavernous sinus. Her bilateral periorbital edema was likely secondary to involvement of the superior ophthalmic vein and subsequent venous congestion. Differential diagnoses for total ophthalmoplegia would include neurological conditions such as myasthenia gravis or autoimmune conditions such as thyroid eye disease. However, in the context of malignancy, metastatic infiltration would be far more likely.

In the absence of histopathological evidence, possible differential diagnoses for tumour at the clival bone would also include chordoma or chondrosarcoma. Differentiating metastases from chordomas and chondrosarcomas may be difficult on MRI. Metastases tend to be hypo-intense in T2



Fig. 3. Axial pre-(A) and post gadolinium enhanced (B) T1-weighted images show replaced marrow signal in the clivus (arrow) and heterogeneous enhancement of the clivus and the clinoid processes (arrow heads) with involvement of the cavernous sinuses more on the right side (curved arrow). A section (C) through the upper orbits shows the dilated right superior ophthalmic vein (arrow).

Answer: A

weighted images, as a result of higher cellular density and lower cytoplasm/nuclear ratio.¹ Occasionally, metastases can also be hyper-intense on T2 weighted sequence, in which case they are difficult to differentiate from chordomas and chondrosarcomas.

Delayed clival metastases and those which present as the first sign of the primary neoplasm can be especially difficult to recognise. Late clival metastasis has been reported in prostate cancer and leiomyoma.^{2,3} Altman et al. described clival metastasis occurring 12 years after primary presentation of follicular thyroid carcinoma.⁴

Trans-sphenoidal approach is the least invasive method for obtaining histopathological diagnosis. However, this was not carried out in our patient due to multiple medical comorbidities and advanced stage of her disease.

In patients with metastases, sixth cranial nerve palsy is usually progressive and rarely improves after surgery, as opposed to chordomas where surgical decompression is commonly followed by improvement of eye motility. In our patient, the complete ophthalmoplegia persisted after radiotherapy, while the headache and periorbital edema resolved.

The prognosis in metastasis to the clival bone is grave. However, recognising this condition is crucial because treatment by palliative radiotherapy may help to stabilise the cranial nerve palsy and alleviate other symptoms such as headache, providing better quality of life for the remaining time the patient has.

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