

Enophthalmos with Simultaneous Orbital and Subcutaneous infiltration as the presenting sign of metastatic carcinoma of Breast

Vineet Singh - Department of Ophthalmology,
Kinnar P. Merchant - Department of Ophthalmology,
Surabhi Singh - Department of Medicine
Clive Bloxham - Department of Pathology,

Abstract

A 52-year-old woman with a past history of breast carcinoma presented with unilateral painless swelling of the left temple, enophthalmos and ptosis. MRI showed an abnormal plaque of soft tissue present subcutaneously in the left temporoparietal region extending to the superolateral orbital margin and involving the orbit in an extraconal position. A biopsy of the lesion revealed metastatic breast carcinoma that was confirmed by immunohistochemistry. Simultaneous subcutaneous, intraorbital and intracranial spread of tumor is a rare finding. It is unusual for metastatic breast carcinoma to present primarily in and around the orbit without concomitant non-orbital metastasis.

Introduction

Orbital metastases from breast carcinomas constitute the majority of orbital secondaries in most clinical studies. The clinical presentations of these metastatic tumours are diverse, but some general trends help to differentiate them from other orbital tumours. We describe a rare case of simultaneous orbital and subcutaneous infiltration as presenting signs of metastatic breast carcinoma.

Case Report

A 52-year-old female presented with complaints of left upper lid drooping and double vision for two months.

Six months previously she had noticed a progressive swelling on her left temple, which slowly extended towards her left brow. No significant ocular history was elicited. There was however a history of simple mastectomy for a poorly differentiated ductal carcinoma of the right breast followed by five years of post operative tamoxifen therapy. Her mother had also suffered from a breast carcinoma.

On ocular examination no abnormality of visual acuity or colour vision was found.

The examination revealed a fixed, firm, non-tender nodule in the left temporoparietal region extending to the superior orbital rim (Fig 1), causing moderate ptosis, inferior displacement of the globe, as well as a 4mm enophthalmos.



Fig 1 Swelling in left supraorbital region extending to the orbital rim.

Extra ocular movements were limited in elevation and levator palpebrae superioris function was reduced. The anterior and posterior segments were normal. The right eye examination did not reveal any important findings.

MRI showed an abnormal plaque of soft tissue present subcutaneously in the left temporoparietal region (Fig 2) extending to the superolateral orbital margin and entering

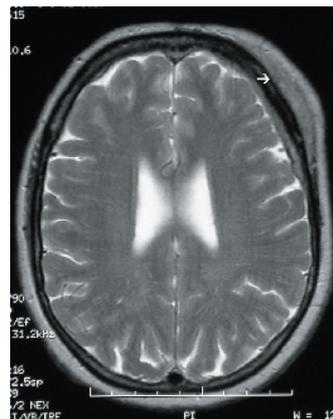


Fig 2 Axial T2W MRI showing subcutaneous mass (arrow) in the left frontoparietal region.

the orbit in an extraconal position. Soft tissue was seen to lie above the superior rectus muscle extending posteriorly towards the orbital apex. A small amount of soft tissue was suspected to be passing through the superior orbital fissure, and there was quite extensive meningeal thickening involving the

left frontoparietal region corresponding to the soft tissue mass outside the calvarium (Fig 3). There was no focal metastatic deposit or any intracranial abnormality.



Fig 3 Coronal T1W MRI post gadolinium showing extensive meningeal thickening in the left frontoparietal region (upper arrow) corresponding to subcutaneous mass (lower arrow)

On biopsy a metastatic carcinoma consistent with a metastasis from primary ductal carcinoma of breast (Fig 4) was found.

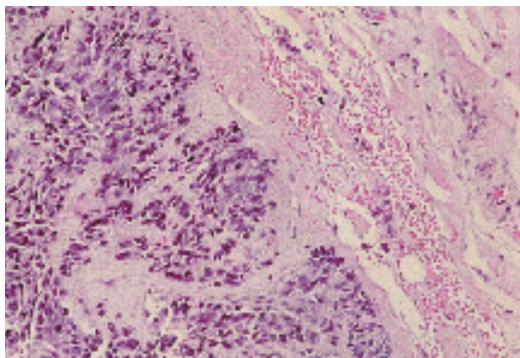


Fig 4 Histopathology showing metastasis from primary ductal carcinoma of breast.

The patient was referred to the oncology department where palliative radiotherapy was advised. No bony metastasis was found in the skull. Blood investigation showed an elevated CA153 marker at 107 units per litre. Following palliative radiotherapy the swelling resolved and she no longer had diplopia.

Discussion

Breast cancer can metastasize into every

organ in the body with bone, liver and lung being the most frequent sites involved. The orbit is the second most common site of metastatic disease to the eye with the uveal tract most frequently involved¹. Ophthalmic manifestations can signal the onset of metastatic disease; and therefore the ophthalmologist can play an important role in diagnosis and initiating treatment.

The three known mechanisms for development of metastasis are mechanical preference, presence of fertile field for tumor localisation and growth and specific tumor adherence factors²⁻³. According to the mechanical preference theory as the orbit lacks lymphatics, orbital metastasis must arise from haematogenous spread. Physiologically breast carcinoma cells destined to reach the orbit must pass through the lungs. Interestingly, our patient also did not show any signs of pulmonary or systemic metastasis. The fertile field theory seems to explain the location of metastases in this situation. It suggests that specific tumour cell–host tissue interaction exists that predisposes to tumour localisation and growth. There is indirect evidence indicating fat and muscle tissue within the orbit as a fertile field for breast carcinoma. This explains the metastatic spread to the orbit but does not reveal the reason for initial spread in the subcutaneous tissue of left temporoparietal region.

Between 10 and 37% of women diagnosed with breast cancer were found to have detectable ocular or orbital metastasis on post-mortem examination⁴. Considering these data, orbital or eye metastasis often remains subclinical, mostly due to late onset in the course of the disease and other dominant problems. Our case is unusual with respect to orbital infiltration being an early sign of metastatic breast disease. Between 74 and 89% of patients with orbital metastasis present with a known history of primary breast adenocarcinoma and the majority of these have concomitant non-orbital metastases at the time of presentation^{2,5-6}. Examination of our patient did not reveal any such non-orbital metastases.

Though there are reports of isolated metastatic breast carcinoma found either extracranially, intracranially or in the orbit,

there is no previous report suggesting simultaneous existence of metastasis in all three areas. It has been suggested that on rare occasions breast carcinoma cells have an affinity for intracranial meningiomas⁷ – the so-called ‘tumour to tumour’ metastases. The criteria to identify a true ‘tumour to tumour’ phenomenon are existence of malignant primary tumor, metastasis contained within a benign tumor and metastatic cells found in the benign tumor similar to the primary tumor. There is only one report⁸ in which a correct diagnosis of metastatic tumor to a meningioma had been made prior to surgical removal and histological evaluation of the cerebral mass. It is impossible to differentiate radiologically a metastatic breast carcinoma in the meningioma mass. The MRI in our case indicates extensive meningeal thickening involving the left frontoparietal region. The meningeal thickening could have been either due to a straightforward intracranial breast metastasis or from a pre-existing meningioma with metastatic cells. These cells could have spread onto the orbital fat and muscle tissue and emerged into extracranial subcutaneous tissue. A major argument against such a hypothesis is the fact that the patient noticed the extracranial lump before the ptosis. If the spread had been from inside out then the ptosis would have occurred before the appearance of the subcutaneous lump. In this clinical presentation the soft tissue mass on the scalp slowly progressed towards the left orbit and gave rise to ptosis and inferior displacement of the globe. Therefore it can be deduced that, the most likely route of infiltration is thought to be extracranial-orbit-intracranial and it is rare to find the simultaneous existence of metastases at all these anatomic sites.

Conclusion

This case emphasizes that in a patient with a history of breast carcinoma, any soft tissue mass in and around the orbit should be investigated with a high degree of suspicion of orbital metastasis. The treatment of orbital involvement is difficult compared with subcutaneous involvement around the orbit. It is therefore important to recognize such atypical presentation of metastasis

early, so that treatment can be instituted to preserve vision and maintain high quality of life.

References:

1. **Jacobs M**, Benger R. Metastatic breast carcinoma of the orbit. *Aust NZ J Ophthalmol* 1989; **17**: 357-361.
2. **Goldberg RA**, Rootman J, Cline RA. Tumours metastatic to the Orbit: a changing picture, *Surv. Ophthalmology* 1990; **35**: 1-24.
3. **Nicolson GL**. Organ specificity of tumor metastasis: role of preferential adhesion, invasion and growth of malignant cells at specific secondary sites. *Cancer Metastasis Rev* 1998; **7**: 143-88.
4. **Merrill CF**, Kaufman DI, Dimitrov NV. Breast cancer metastatic to eye is a common entity. *Cancer* 1991; **68**: 623-627.
5. **Tijl J**, Koornneef L, Eijpe A, et al. Metastasis tumor to the orbit – management and prognosis. *Graefes Arch Clin Exp Ophthalmol* 1992; **230**: 527-30
6. **Sheilds CL**, Sheilds JA, Peggs M. Tumours metastatic to the Orbit, *Ophthalmic Plastic Reconstructive Surg.* 1988; **4**: 73 – 80
7. **Watanabe T**, Fujisawa H, Hasegawa M, Arakawa Y, Yamashita J, Ueda F. Metastasis of breast cancer to intracranial meningioma: case report. *Am J Clin Oncol* 2002; **25**: 414-7.
8. **Baratelli GM**, Ciccagliani B, Dainese E, Arnaboldi L. Metastatic of breast carcinoma to intracranial meningioma. *Journal of Neurosurgical Sciences.* 2004; **48**(2): 71-73

Address for Correspondence
Mr Vineet Singh,
Senior House Officer,
Department of Ophthalmology,
Darlington Memorial Hospital,
Email vinee0073@hotmail.com