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An Unusual Cause of Diplopia in a Cancer Patient

Antoinette van der Heijden, Albert Twijnstra, Willy P.M.A. Lamers, Pierre S.G.J. Hupperets and Gerard Freling

A 47-year-old woman with metastatic infiltrating lobular carcinoma of the breast developed diplopia. Computed tomography of the orbits showed enlargement and irregularity of the right inferior rectus and inferior obliques muscles. Biopsies of these muscles contained breast carcinoma cells. This case report discusses the causes of diplopia in cancer patients, with special attention to the diagnostic problems of metastasis in extraocular muscles. The possible combined occurrence of metastasis in the leptomeninges and extraocular muscles is also to be borne in mind if the latter diagnosis is not to be missed.
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INTRODUCTION

A SUBSTANTIAL proportion of cancer patients develop neurological complications during the course of their disease [1]. Diplopia in a cancer patient requires neurological evaluation. The most common cause of diplopia in cancer is leptomeningeal metastasis or metastasis to the base of the skull. Metastasis to the brainstem can also cause diplopia, in which case it is usually accompanied by involvement of other cranial nerves or long tracts [2]. Orbital metastasis of solid tumours is rare, and metastasis into the extraocular muscles has seldom been described.

In this report we describe an unusual case of metastasis of breast cancer in two extraocular muscles of the right eye without infiltration of the orbit.

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CASE REPORT

A 47-year-old woman was admitted to the hospital with diplopia in April 1988. She had been well until 5 years earlier, when she had a mastectomy for an infiltrating lobular carcinoma of the left breast. She subsequently underwent adjuvant chemotherpy because of the presence of metastasis in the axillary nodes. She remained well until April 1988, when she developed enlarged left axillary and left cervical nodes. Biopsy confirmed breast cancer. Further examination revealed bone metastasis. She started treatment on tamoxifen and bisphosphonate capsules.

In April 1988 she complained of painless diplopia on left lateral gaze. There were no other neurological symptoms. There was no history of previous neurological problems. On neurological examination the patient was alert and full oriented. Visual acuity and visual fields were normal; optic fundi were normal; pupils were equal in size and reactive. Both orbital regions appeared normal. There was an impaired adduction and downwards gaze of the right eye without ptosis. The external movement of the left eye was normal in all directions. Ocular media were clear. Results of the remainder of her neurological and

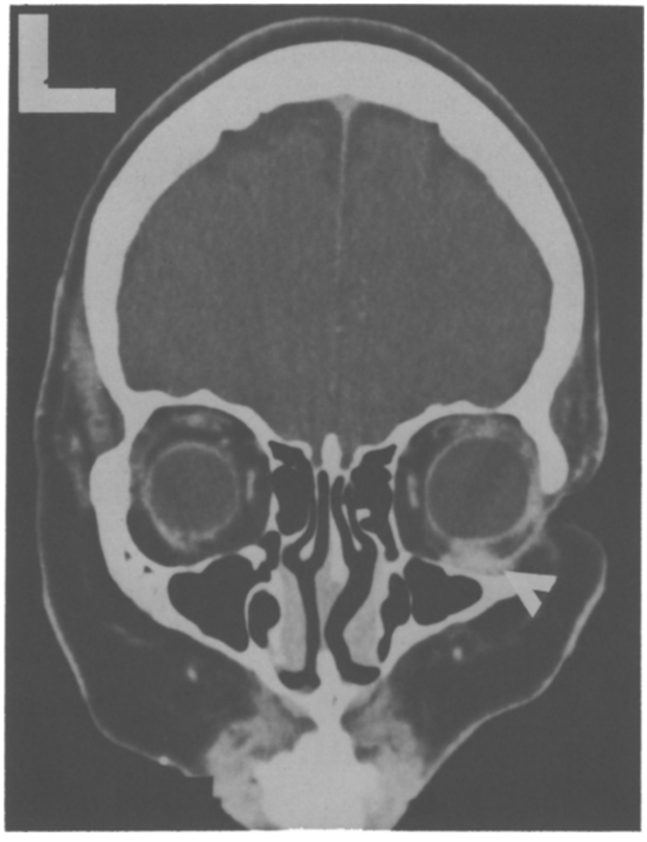

Fig. 1. Orbital CT showing enlargement of the rectus inferior muscle and the obliquus inferior muscle (arrow) of the right eye.

neuro-ophthalmological examination were normal. Computed tomography (CT) of the brain and a lumbar puncture revealed no abnormal findings.

Follow-up 3 months later showed an improvement of the movement of the right eye. 6 months later, diplopia had progressed, with progressive medial limitation approximately 50% of normal and elevation approximately 25% of normal. At that time there was also a palpable mass in the right orbit just below the eye. CT of the orbita showed an enlargement of the right inferior rectus and inferior obliquus muscles (Fig. 1).

Lumbar puncture showed the cerebrospinal fluid to be clear and colourless and containing no tumour cells. Protein and glucosis contents were normal. An open biopsy of the right musculus rectus inferior and musculus obliquus inferior was performed, whereby as much tumour as possible was excised. Histological examination of the ocular muscle biopsy showed slight fibrosis and infiltration with small carcinoma cells in so-called "indian file" formation, corresponding the primary infiltrating lobular carcinoma of the breast. Furthermore, immunohistochemically the tumour cells in the biopsy showed expression for oestrogen receptors.

The patient was treated with radiotherapy to the right orbit. Follow-up after 1 year revealed almost normal vision and a diminished diplopia.

DISCUSSION

Diplopia in cancer patients may be due to leptomeningeal metastasis or metastasis to the base of the skull. Diplopia caused by brainstem metastasis is usually accompanied by involvement of other cranial nerves or long tracts [2]. However, metastasis into the brainstem may be too small to be detected by CT, and magnetic resonance imaging (MRI) of the brain may be necessary [3]. Leptomeningeal metastasis can be difficult to detect and repeated lumbar punctures are often necessary to detect malignant cells.

A less common cause of diplopia, which appears to be increasing in frequency [4] is metastasis of solid malignancies into the orbits. Breast [5], lung and prostate cancer are the most common source of metastasis into the orbits [4–8]. An even less frequent cause of diplopia is metastasis into the extraocular muscles without infiltration of the orbits. In recent years a few case-reports have been published discussing, metastasis in extraocular muscles [5, 8–12].

The symptoms and signs are diplopia, unilateral proptosis (which may be very mild), limitation of ocular movement in the direction of action of the affected muscle, which can be tested by forced duction and sometimes pain in the affected eye. None of the reported cases showed a palpable orbitable mass.

Metastasis in the extraocular muscles can be detected by ultrasonography, by CT with special attention to the orbit and by MRI of the orbit. Li *et al.*[13] compared these three methods and concluded that MRI using a 0.15 T resistive magnet offered no distinct advantage over the combination of CT and ultrasound in the diagnosis of orbital tumours. It is likely that diagnosis of metastasis in extraocular muscles is not infrequently missed, especially when a cause for the diplopia has been identified. The finding of leptomeningeal and/or brain metastasis does not exclude metastasis in extraocular muscles [8]. The neurological examinations of patients with diplopia without other evidence of nerve dysfunction should include examination of the cerebrospinal fluid including culture and cytology, and CT with special attention for the orbit.

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