Anterior visual system involvement in non-Hodgkin's lymphoma

A G Zaman, E M Graham, M D Sanders

Abstract
Non-Hodgkin's lymphoma may have ocular involvement but optic nerve and chiasmal disease is unusual. Determining the cause of the neuropathy in this group of patients presents major difficulties despite modern neuroimaging and immunocytochemistry. Two patients with NHL are presented; one had an anterior chiasmal syndrome and the other bilateral optic nerve involvement. The first patient was thought to have lymphomatous infiltration and the second a concomitant infection (progressive multifocal leukoencephalopathy). Toxic effects of therapy were considered but finally rejected. The importance of modern neuroimaging and the role of optic nerve biopsy are discussed.

(Br J Ophthalmol 1993; 77: 184–187)

Visual loss in non-Hodgkin's lymphoma (NHL) may be due to disease of the uveal tract, or of the visual pathways from retina to cerebral cortex. The incidence of CNS involvement is increasing because of longer survival associated with more effective treatment and thus the ophthalmologist has an increasing chance of being involved with these patients. Optic neuropathy in NHL is extremely rare. There are few well documented series and many anecdotal cases with a paucity of histological examinations. Optic nerve involvement has been associated with lymphomatous infiltration, infections, neurotoxic drugs, radionecrosis, and paraneoplasia.

The management of such patients requires prompt investigation to exclude treatable causes such as infiltration, drug toxicity, and certain infections. However establishing the diagnosis may prove difficult, as tissue biopsy of optic nerve is often unavailable.

We present two cases of NHL and visual loss which demonstrate the value of accurate visual field assessment and modern neuroimaging.

Case reports

CASE 1
A 42-year-old woman presented in 1988 with a fever of unknown origin. A lymph node biopsy from the left axilla revealed centroblastic non-Hodgkin's lymphoma and a staging computed tomographic (CT) scan showed splenomegaly and enlarged lymph nodes in the axillae and para-aortic region. At the time she had weakness in both arms and legs with impaired power and areflexia in both lower limbs. A CT scan of the brain, lumbar puncture, and bone marrow examination were normal.

Despite improvement with vincristine, doxorubicin hydrochloride, prednisolone, and etoposide, multiple cranial nerve palsies and right sided myoclonic jerks developed after 6 months. A CT scan showed a non-enhancing, ill defined low density lesion in the left temporal lobe but no brain stem mass and a lumbar puncture was normal. A diagnosis of cerebral lymphoma was made and whole brain irradiation was begun (400 cGy over 4 weeks). Intrathecal methotrexate and cytosine arabinoside were also instituted and there was a marked improvement in her clinical condition. However 6 months after radiotherapy she noted loss of vision in her right eye followed by temporal loss in her left eye. These signs suggested an anterior chiasmal lesion.

However, a CT scan of the orbits and brain showed only the temporal lobe lesion and a further lumbar puncture was normal. It was felt that as the initial course of radiotherapy may...
have left the optic nerves untreated, the visual loss could be due to lymphomatous infiltration and both optic nerves were irradiated (a total of 2400 cGy over 2 weeks). However there was no improvement in vision and the patient was referred to St Thomas’s Hospital.

On examination there was no evidence of systemic relapse. The visual acuity in the left eye was 6/12 and she could identify 14 of the 17 Ishihara plates. The visual acuity in the right eye was perception of light and there was a right relative afferent defect. The field (Fig 1) showed temporal loss in her left eye and the optic discs were pale (Fig 2). Haematological and biochemical tests were normal and the CSF showed a white cell count of 4×10⁹/l with normal cytology. There were no red cells and the protein level was 0·6 g/l. In contrast to earlier CT scans, a magnetic resonance imaging (MRI) scan of the brain and orbits now revealed thickening of the optic chiasm (Fig 3) and a diagnosis of lymphomatous infiltration was made.

CASE 2
A 36-year-old woman presented in 1985 with painless lymphadenopathy affecting the axillae and both sides of the neck. A lymph node biopsy revealed nodular poorly differentiated NHL and a staging CT scan demonstrated enlarged para-aortic nodes and splenomegaly. Neurological examination was normal as was the bone marrow. She was treated intermittently for periods of 3–4 months with vincristine, chlorambucil, and prednisolone with no change in the disease.

Three years later she noticed progressive bilateral deterioration of vision without other symptoms. On examination the visual acuity was 6/12 in each eye and she could not identify any of the Ishihara plates. Visual fields showed constriction with central scotomas (Fig 4A and 4B) and the optic discs were pale (Fig 5). Neurological examination was normal as was a CT scan of the orbits and brain. A lumbar puncture was also normal and treatment with vincristine, chlorambucil, and prednisolone was continued.

Nine months later she developed dysarthria and right sided myoclonic jerks. An MRI scan now showed an abnormality lateral to the body of the left ventricle and a further lumbar puncture was normal. Despite whole brain irradiation (3000 cGy over 3 weeks) she continued to deteriorate rapidly with confusion, ataxia, motor weakness, and multiple cranial nerve palsy. Her vision deteriorated to perception of light in both eyes. Haematological and biochemical tests were normal as was a lumbar puncture. Viral titres to JC, BK, and herpes simplex virus were negative and an electroencephalogram showed diffuse abnormalities. A CT scan showed extensive bilateral low density lesions of the white matter and dilated ventricles (Fig 6) leading to a diagnosis of progressive multifocal leucoencephalopathy (PML). The patient died 6 days later and consent for a postmortem examination was denied.

Comment
Two patients with NHL and visual loss are
MRI imaging is much more sensitive in detecting CNS disease. Infiltrative neuropathy may respond to radiotherapy and it is essential to keep a high index of suspicion despite apparently normal investigations. Delay may lead to irreversible visual loss.

Radionecrosis of the optic nerves is uncommon and rarely occurs with low doses of radiation (a total of 5000 Gy with daily fractions less than 200 Gy is considered safe). Severe visual loss is the rule, often sudden in onset with the other eye becoming involved a few weeks later. The neuropathy occurs from 4 months to years after treatment with a peak at 18 months. CT scans are either normal or show white matter changes adjacent to the anterior visual pathways. The recent use of MRI with gadolinium DTPA enhancement is more specific and sensitive leading to increasing recognition of this condition.

PML is a rare disease of the CNS caused by infection with a polyoma virus, usually JC virus, in the presence of immunosuppression. Visual symptoms are common, the majority being due to homonymous hemianopia. In a series of 74 histologically confirmed cases 37-8% had visual defects at presentation; 23% had a homonymous hemianopia, 2-7% cortical blindness, 2-7% diplopia, and 8-7% visual blurring. Optic neuropathy is very rare and only one patient in the above series had optic atrophy. Henson mentions optic neuritis in PML but gives no further details, and there is one case report of optic neuropathy progressing to homonymous hemianopia in a patient with a clinicoradiological diagnosis of PML. To date there has been no report of histology from optic nerves in such patients.

Optic neuropathy has been attributed to vincristine which both our patients received but there was no evidence that this drug produced the neuropathy per se, although in combination with the other mechanisms it may have had a contributory effect.

Early diagnosis is essential in management of these cases if vision is to be preserved. However, as our two patients demonstrate this can be extremely difficult despite extensive investigations. The advent of sophisticated neuroimaging has enhanced the diagnostic yield of patients with visual loss in NHL. Both lymphomatous infiltration and PML have characteristic radiological appearances and radionecrosis can now be accurately diagnosed by MRI with gadolinium DTPA enhancement. Thus in the absence of clinical clues a radiological diagnosis may provide therapeutic guidelines.

Occasionally a clinicoradiological diagnosis may not be sufficient and in these cases it may be worth considering biopsy of optic nerve and sheath when vision is extinguished. This procedure is simple with a medial approach and has proved invaluable in our own experience with late onset optic nerve gliomas.

The authors thank Mrs Deborah Embleton for secretarial help and Mr Richard Dewhurst for the illustrations.

Necrotic orbital melanoma arising de novo

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Abstract
A 76-year-old man with compressive optic neuropathy secondary to a retrobulbar mass was managed by orbitotomy and removal of the mass. The lesion proved histopathologically to be an unusual orbital melanoma with massive central necrosis. There was no histopathological evidence of congenital melanocytosis. Dermatological and systemic evaluation before and after orbital surgery revealed no evidence of primary melanoma elsewhere. The patient developed hepatic metastasis 2 years after excision of the orbital tumour. It appears that the melanoma was a primary orbital tumour and not a metastatic melanoma from an occult primary lesion.

Case report
A 76-year-old white male, who had no previous ocular problems except for mild amblyopia of the left eye, developed blurred vision in the right eye associated with epibulbar redness. An orbital computed tomography (CT) detected a retrobulbar mass. The initial clinical diagnosis was orbital inflammatory pseudotumour. After a 14 day course of oral corticosteroids failed to relieve his symptoms, the patient was referred to the ocular oncology service on 10 December 1990 for further evaluation and management.

The patient had a history of medically controlled hypertension, three previous myocardial infarctions, a prostatectomy for benign prostatic hypertrophy, and an inguinal herniorrhaphy. Two histopathologically confirmed seborrhoeic keratoses had been recently excised from his right scapular area. There was no history of ocular or cutaneous melanoma.

Our evaluation revealed best corrected visual acuities of 6/12 in the right eye and 6/21 in the ambylopic left eye. Intraocular pressures were normal. There was mild oedema of the right upper and lower eyelids and no proptosis. Ocular motility and colour plates were normal. Fundus examination of the right eye showed an elevated, hyperaemic optic disc and several juxtapapillary flame shaped haemorrhages. The left eye was normal except for decreased visual acuity due to ambylophia.

B-scan ultrasonography showed a rounded retrobulbar mass with acoustic hollowness and good sound transmission. CT revealed a 1-5 cm round, well circumscribed, intraocular mass abutting the globe and the optic nerve super temporally (Fig 1).
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doi: 10.1136/bjo.77.3.184

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