Due to the high-grade nature of the lymphoma and the progressive symptoms, the investigation for possible central nervous system involvement was expedited. A lumbar puncture demonstrated malignant lymphocytes in the cerebrospinal fluid. The patient was treated with 2000 cGy whole-brain irradiation and 3500 cGy to the left orbit. In the ensuing months he sequentially developed a complete third nerve palsy of the right eye and choroidal effusions of the right eye, all in the setting of lymphomatous meningitis. The patient was then treated with five cycles of intrathecal and one dose of intravenous methotrexate. Recovery of the ocular motility was achieved after 4 months. Thirty-three months following treatment the patient is free of ocular symptoms.

Discussion

Visual loss complicating orbital lymphoma may be permanent due to optic neuropathy,[2,3] which is a consequence of direct external compression or infiltration of the optic nerve. Another cause of permanent visual loss is chronic elevated intraocular pressure.[4]

Central retinal artery occlusion has been described as an early manifestation of ocular–central nervous system (CNS) lymphoma.[5] In these cases there was no orbital involvement. To our knowledge an orbital compartment syndrome, as observed in this patient from a rapidly expanding orbital lymphoma resulting in central retinal artery occlusion, has not been reported. In this case we postulate that the rapid tumour growth caused increased orbital pressure and compromised perfusion of the optic nerve. Such a rapid clinical progression is unusual for orbital lymphoma. In a large series, the mean duration of symptoms attributable to orbital lymphoma prior to presentation was 4 months.[6] In this case, symptoms were reported for only 10 days prior to the central retinal artery occlusion. The biopsy sampled only the anterior-most portion of the orbital tumour, and was not associated with any intraoperative or post-operative haemorrhage. It did not appear to adversely affect the inherent clinical course of this aggressive tumour. Therefore, patients with a rapidly progressive orbital lymphoma should be monitored very closely after biopsy, even in the absence of an orbital haemorrhage. In rare cases demonstrating rapid progression, systemic steroids may be warranted to decrease the risk of developing an orbital compartment syndrome, prior to definitive treatment. The systemic investigation should be accelerated because prolonged steroid use may mask cerebrospinal fluid signs of CNS lymphoma. Combined systemic steroids, cranial irradiation and intrathecal methotrexate resulted in prolonged control of disease and survival in this patient.

References

1. Rubin PAD, Jakobiec FA. Orbital and ocular adnexal lymphoid tumours. In: Albert DM, Jakobiec FA, editors. Principles and practice of ophthalmology. Philadelphia: WB Saunders, 1993:2005–18.
2. Yen M-Y, Liu J-H. Malignant lymphoma involving the optic nerve head and the retina. Ann Ophthalmol 1985;17:697–700.
3. Guyer DR, Green WR, Schachat AP, Bastacky S, Miller NR. Bilateral ischemic optic neuropathy and retinal vascular occlusions associated with lymphoma and sepsis: clinicopathologic correlation. Ophthalmology 1990;97:882–8.
4. Harris GJ. Bilateral blindess due to orbital lymphoma. Ann Ophthalmol 1981;13:427–30.
5. Gass JD, Trattler HL. Retinal artery obstruction and atheromas associated with non-Hodgkin's large cell lymphoma. Arch Ophthalmol 1991;109:1134–9.
6. Knowles DM, Jakobiec FA, McNally L, Burke JS. Lymphoid hyperplasia and malignant lymphoma occurring in the ocular adnexa (orbit, conjunctiva and eyelids). Hum Pathol 1990;21:959–73.

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Sir,

Carbon deposits in the conjunctival fornices

We describe a patient who had long-term exposure to airborne graphite, and presented with ocular discomfort associated with deposits of graphite in the subepithelial connective tissue of the conjunctival fornices.

Case report

A 30-year-old woman presented with discomfort and a foreign body sensation in the right eye. Her past medical history was unremarkable; however, her occupation for the previous 12 years involved sawing and cutting graphite blocks using a stationary power tool with built-in eyeguard, therefore without protective goggles. The sawing produced a large quantity of graphite dust. General physical examination was normal, with specifically no clinical or radiological evidence of interstitial lung disease. Visual acuities were 6/6 right and left. Deep in all four conjunctival fornices were black granular deposits with some lace-like subconjunctival scarring. The cornea, anterior chamber, lens, intraocular pressures and fundi were all normal. The tear film was not disturbed in either eye. A conjunctival biopsy was taken under local anaesthetic.

Histology showed conjunctiva with deposits of black particulate material both within the macrophages of the subepithelial connective tissue, and extracellular, consistent with graphite. EXAX analysis (energy dispersive analysis of X-rays of the wax-embedded tissue

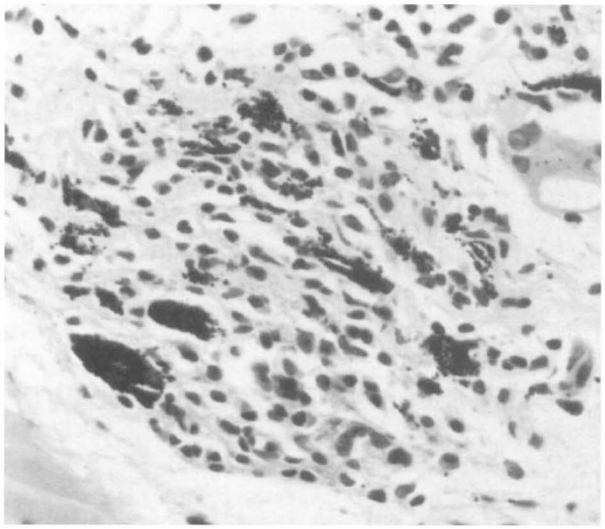

Fig. 1. *Carbon deposits taken up by macrophages.*

block) was used to confirm that the deposits were graphite. There was a mild accompanying chronic inflammatory response (Fig. 1).

The patient made a good recovery from the biopsy. Her symptoms were controlled with tear substitutes, probably due to an additional lubricant effect.

Comment

Conjunctival deposits can either be exogenous or endogenous. Exogenous sources of conjunctival deposits include silver, described in Peruvian silver workers exposed to airborne silver for an extended period,[1] mascara, and long-term adrenaline eye drops. Endogenous sources include gold, visible within the conjunctival macrophages of rheumatoid patients taking gold salts orally,[2] other drugs such as chlorpromazine, and calcium salts in the conjunctiva or patients with hyperparathyroidism or renal failure, with a massive level of circulating calcium salts.[3]

The patient's occupation involved sawing and cutting graphite with a consequent high exposure to airborne particles. In the absence of protective eye-wear, these particles were probably sequestered in the conjunctival fornices and then taken up by the macrophages.

The deposits may cause acute inflammation with a red eye, or more commonly be asymptomatic. The foreign body sensation that caused this patient to present may not have been due to the graphite deposits as there were equal deposits in each eye whereas the symptoms were only in the right eye and improved with artificial tears.

References

1. Spencer WH, Gorran LK, Contreras F, Hayes TL, Lai C. Endogenous and exogenous ocular and systemic silver deposition. Trans Ophthalmol Soc UK 1980;100:171–8.
2. Mancel E, Janin A, Duquesnoy B, Noachovitch-Rigaut B, Hatron PY, Constantinides G. Gold salt deposits in the conjunctiva in rheumatoid arthritis after gold therapy: a systematic study of 15 biopsies. Rev Rhum 1992;59:715–20.
3. Klaassen-Broekema N, Van Bijsterveld OP. The red eye of renal failure: a crystal induced inflammation? Br J Ophthalmol 1992;76:578–81.

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