angiography (acknowledged to be the most sensitive test for laser-induced retinal damage[6]) confirmed that no iatrogenic damage had occurred. Although this treatment has had some success with diabetic and macroaneurysmal preretinal haemorrhages, to our knowledge it has not been used before in treating Valsalva preretinal haemorrhages.

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Sir,

Spontaneous acute scleritis and scleral necrosis in choroidal malignant melanoma

Necrosis of choroidal malignant melanoma is not unusual and may rarely be accompanied by necrosis of intraocular tissues.[1] However, the sclera is relatively resistant to necrosis and acute scleritis with necrosis, secondary to choroidal malignant melanoma, has not been reported to the best of our knowledge.

Case report

A 58-year-old Caucasian man presented with loss of vision in the right eye of 3 weeks' duration. The visual acuity in the right eye was perception of light. Examination revealed a subretinal pigmented mass elevating the retina and normal intraocular pressure. A clinical diagnosis of choroidal malignant melanoma was made.

Three weeks later he developed a painful red eye with vitreous haemorrhage, hyphaema and an elevated intraocular pressure of 35 mmHg. The ultrasonogram

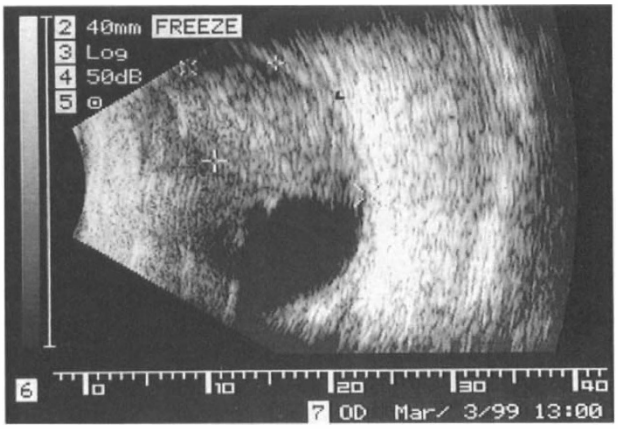

Fig. 1. *Ultrasonogram showing scleral thickening overlying the tumour mass (arrowhead).*

showed an 8 × 16 mm choroidal mass with features suggestive of melanoma (Fig. 1). The sclera overlying the tumour mass was thickened, but there was no evidence of extrascleral extension (Fig. 1). In view of the tumour mass and intractable pain, the eye was enucleated. There was no evidence of systemic metastasis. There was no history or clinical evidence of systemic collagen vascular diseases. Serological screening for connective tissue diseases including rheumatoid arthritis was negative.

Pathological findings. Macroscopic examination revealed a firm globe measuring 22 mm in diameter. A light-brown tumour, 14 × 5 mm in cross-section, was present in the inferior part of the posterior segment. There was no extrascleral extension (Figs. 2, 3). Microscopic examination revealed a choroidal malignant melanoma, which was almost entirely necrotic. Immunohistochemistry revealed expression of neurone-specific enolase within the tumour and focal expression of HMB45 and S100, particularly in the better-preserved cells around the edge of the tumour. The tumour did not demonstrate a lymphocytic response. Both the anterior and posterior segments of the eye were filled with a proteinaceous exudate in which fresh haemorrhage was seen (Fig. 2). The retina was totally detached and showed reactive microcystic changes and gliosis.

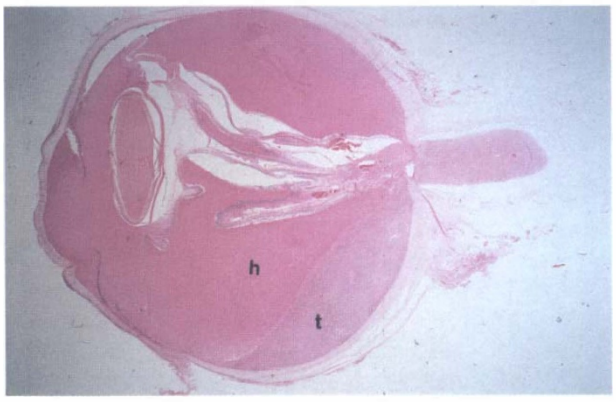

Fig. 2. *Plan view of the globe demonstrating a choroidal melanoma. The detached retina is seen running anteroposteriorly and there is a proteinaceous exudate and fresh haemorrhage. h, Haemorrhage; t, tumour. (Original magnification* ×8)

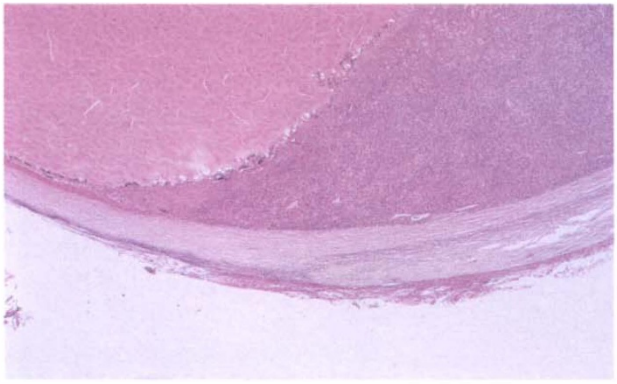

Fig. 3. *The melanoma is extensively necrotic. There is no evidence of transscleral extension by the tumour, but the sclera is thickened with an inflammatory infiltrate, which particularly involves the outer part of the sclera. (Original magnification ×25)*

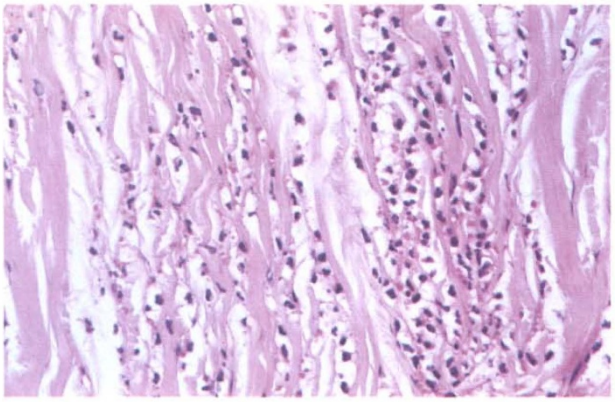

Fig. 4. *At high power the inflammatory cell infiltrate contains many polymorphonuclear neutrophils. Karyorrhexic nuclear fragments representing necrotic cells are present and the sclera appears somewhat degenerate and fragmented. (Original magnification ×100)*

No scleral invasion was seen. The sclera was thickened over the tumour and appeared degenerate and fragmenting (Figs. 3, 4). A polymorphonuclear infiltrate was present circumferentially infiltrating into the outer sclera (Fig. 3). This was most severe over the tumour, where neutrophils penetrated the outer two-thirds of the sclera but did not infiltrate into the underlying melanoma. Many necrotic cells were present with karyorrhexic nuclear fragments (Fig. 4). Tumour cells were poorly preserved, and some were epitheloid and demonstrated strong expression of melanoma antigen HMB-45 (Fig. 5). PAS (periodic acid-Schiff) did not show any particular staining patterns. There was no evidence of thrombosis of central retinal artery and vein or haemorrhage into the tissues. The acute scleritis and necrosis were not accompanied by any evidence of bacterial or fungal infection on special stains (Gram and PAS-diastase).

Comment

Acute scleritis with scleral necrosis in the absence of extrascleral spread is an unusual complication of malignant melanoma, which has not been reported to the best of our knowledge. Ocular inflammation and necrosis of intraocular structures may be associated with spontaneous necrosis of malignant melanoma.[3–5] The sclera, however, is relatively resistant to necrosis due to its metabolic inactivity. Scleral necrosis has rarely occurred months to years after radiation therapy for malignant melanoma.[2,3]

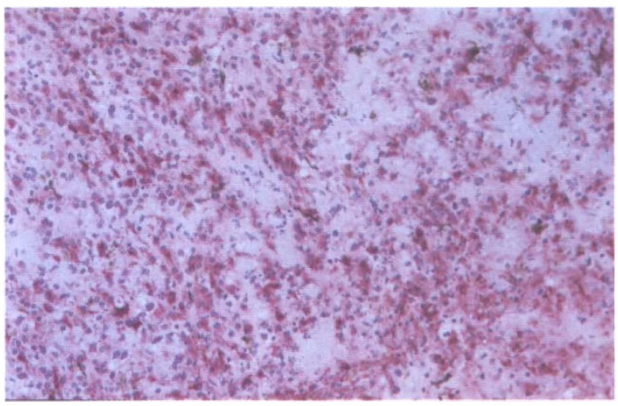

Fig. 5. *High-power view of an immunohistochemical preparation for melanoma antigen HMB-45, demonstrating strong cytoplasmic expression (red signal) in a proportion of tumour cells. (Original magnification ×300)*

Spontaneous necrosis of malignant melanoma is a powerful irritant and even small areas of necrosis may provoke inflammation.[3] Episcleritis, iridocyclitis, chorioretinitis, endophthalmitis, panophthalmitis and orbital cellulitis have been reported in association with necrotic malignant melanoma.[1,4] Extensive necrosis of retina, iris, ciliary body, lens epithelium and peripheral cornea have also been observed.[1]

Ocular inflammation and associated haemorrhage may be the first clinical sign in patients with malignant melanoma.[4] Episcleritis was the initial sign of presentation in more than one-third of patients where the presentation was ocular inflammation. Uveal melanomas may initially present like panophthalmitis, endophthalmitis, uveitis and orbital cellulitis, due to tumour necrosis.[4,5]

Necrosis of the tumour and other intraocular structures may be related to multiple factors such as loss of nutritional blood supply, hypoxia, bacterial toxin, activated complement and T-lymphocytes.[6,7] Microbial infection can be a factor but did not play a role in our case.

Several patterns of microvascular loops and networks in uveal melanoma through which it receives nutrition and oxygen have been described.[8,9] Microvascular density is the dominant prognostic factor in uveal melanoma and certain patterns may be related to tumour necrosis.[8–10] Folberg *et al.*[8,9] have described six patterns recognised on histological sections of uveal melanomas using PAS staining techniques. The recognisable patterns are: silent tumour with no vessels; straight with randomly distributed vessels; parallel with cross-linking between the vessels; arcs or incomplete loops; arcs with branching; loops representing vessels that surround a lobule of tumour and networks.[8,9] In the case we report PAS staining did not demonstrate any patterns and the tumour was PAS-silent. Foss *et al.*[10] reinvestigated the

nature and significance of PAS patterns and contend the patterns described are based not on microcirculation but fibrovascular tissue. Foss *et al.*[10] ascribed the patterns to three underlying factors: (1) disordered growth, (2) emergence of rapidly growing subclones and (3) section orientation. The first two factors have prognostic significance.[10]

There is evidence to suggest that the inflammatory response and spontaneous necrosis of melanoma may have an immunological basis.[6,7] Melanoma cells contain tumour-specific antigens and tumour-associated antigens, which act as a stimulus for the immune system.[6,7] The tumour-specific antigens are recognised by antigen-specific receptors on T lymphocytes and are associated with cell-mediated immunity. The cellular infiltration mediated by the immune response is most marked in the immediate vicinity of blood vessels, in contrast to that observed in ischaemic necrosis.[6]

A relatively large mass of necrotic tumour can incite a non-specific response and the chemical mediators and cytotoxic products released by the inflammatory infiltrates also cause direct cellular damage, vasculitis and thrombosis inciting scleritis.[3]

It may be postulated that the scleritis is immunologically induced from the locally produced tumour antigens (type IV delayed hypersensitivity reaction). The cellular infiltrate in granulomatous types of scleritis consists of lymphocytes, plasma cells, macrophages and giant cells but not usually polymorphs.[11] However, our case did not show a lymphocytic response. The cellular infiltration was predominantly polymorphonuclear leucocytes. This may be related to a type III reaction due to immune complexes precipitating within the sclera. Another possible explanation is that tumour antigen liberated by the necrotic melanoma permeates the sclera overlying the tumour forming antigen-antibody complexes locally, as evidenced by the scleritis and necrosis being most marked overlying the tumour. In type III reaction the polymorphonuclear leucocytes predominate and excite an inflammatory response.[11] This may explain the unusual feature of acute scleritis with predominant polymorphonuclear infiltration and scleral necrosis observed in our patient with necrotic malignant melanoma in the absence of scleral invasion by the tumour.

Intraocular haemorrhage may be an associated finding in uveal melanomas, originating either from tumour necrosis or spontaneously.[4] Spontaneous intraocular haemorrhage may precipitate an acute rise in intraocular pressure resulting in stagnation of blood flow, hypoxia and tumour necrosis. In the case we report the possible source of haemorrhage is likely to be tumour necrosis, as the intraocular pressure was less than 38 mmHg at the time acute presentation.

Eyes with scleral necrosis and raised intraocular pressure are more vulnerable to globe perforation with orbital spillage during enucleation and extra caution should be exercised to prevent this complication from occurring.

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Sir,

Choroidal ischaemia and serous retinal detachment in toxaemia of pregnancy

Deterioration of vision is not uncommon during both normal and complicated pregnancies. Serous retinal detachment is a known ocular complication of toxaemia of pregnancy.[1,2] However, serous retinal detachment with fluorescein angiographic evidence of choroidal ischaemia without retinal vascular change is very rare. We report a case of choroidal ischaemia and serous retinal detachment in the absence of retinal vascular changes.