

achieved in group G streptococcal endophthalmitis with prompt administration of intravitreal antibiotics and steroid.

The value of immediate vitrectomy in the treatment of endogenous endophthalmitis is uncertain. Theoretical advantages include rapid removal of the infecting organisms and toxins, clearing of vitreous opacities, collection of a large vitreous sample for culture and possibly better distribution of intravitreal antibiotics. Vitrectomy may, however, be technically difficult in such cases and is associated with complications such as cataract and retinal detachment.⁹

Immediate vitrectomy was considered in our patient because of rapidly progressive cellular infiltration of the vitreous. While the severity of endophthalmitis in each eye was similar, immediate vitrectomy was performed in only one eye because of inadequate pupil dilatation in the other eye. Ultimately, both eyes achieved a good visual outcome. The eye that underwent an immediate vitrectomy did, however, suffer operative complications and required subsequent surgery for retinal detachment and cataract.

The Endophthalmitis Vitrectomy Study has helped to clarify the role of immediate vitrectomy in acute endophthalmitis after cataract surgery. The findings of this study cannot, however, be extrapolated to the management of endogenous endophthalmitis. Appropriate treatment of this heterogeneous disorder depends on both the causative organism and the clinical setting. For the treatment of group G streptococcal endogenous endophthalmitis, however, this case report suggests that immediate vitrectomy with intravitreal antibiotics offers no advantage compared with the administration of intravitreal antibiotics alone.

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Sir,

Combined limbal and corneal autograft transplantation

The technique of limbal autograft transplantation has been well described by several authors in the acute and chronic management of alkali-injured eyes.¹⁻⁴ Studies have shown that autograft transplantation of uninjured limbal tissue results in a fast regeneration of normal corneal epithelium with improvement of symptoms. This technique also promotes regression of corneal neovascularisation with a subsequent improvement in the prognosis for a future penetrating keratoplasty.^{4,5} Our case is unique in that all the surgical rehabilitation was performed at one operation, with all the tissue coming from the patient himself as a result of a series of unfortunate events.

Case report

A 57-year-old man presented with a deterioration in his right visual acuity due to a serous retinal detachment with an underlying choroidal malignant melanoma. Unfortunately, the right eye had been the better seeing eye. In 1979 he had sustained a severe corneal alkali injury to this left eye, with a reduction of vision in this eye to 6/60 (Fig. 1). He was referred to an ophthalmic oncologist for an opinion regarding management of his right choroidal melanoma. Due to the large size of the tumour it was not technically possible to salvage the right eye by more conservative treatment. After



Fig. 1. Left eye with extensive corneal scarring resulting from alkali injury.

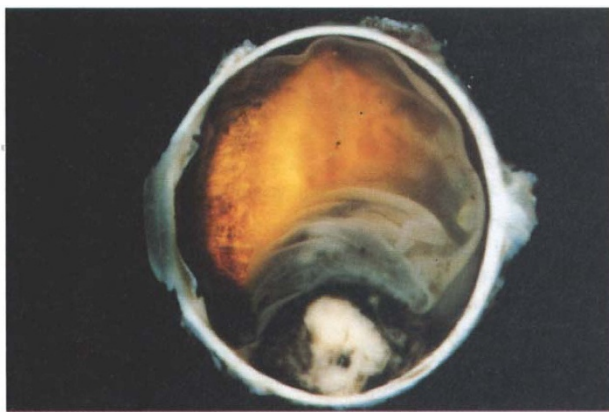


Fig. 2. Histopathological section of the right eye showing the gross appearance of the choroidal malignant melanoma.

consideration of the various treatment options, it was decided that the best chance for achieving a good visual outcome was to enucleate the right eye (Fig. 2) and proceed to a combined limbal and corneal autograft transplantation.

The patient underwent a right enucleation and primary hydroxyapatite implant. In the alkali-injured eye a resection of conjunctiva and pannus was made followed by a lamellar excision of limbal tissue 0.3 mm deep and extending 2 mm into cornea and 2 mm into sclera over 270°. A graft of similar dimensions was then obtained from the enucleated eye. The graft was sutured in place with 10/0 vicryl at the corneal and scleral borders. A right full-thickness corneal donor button of 7 mm was harvested using a Supra-trephine and corneal scissors. This was then sutured into position with a combination of continuous and interrupted 10/0 nylon into a 7 mm bed in the left eye.

Post-operatively the patient has made a remarkable recovery, and by 3 months obtained a corrected visual acuity of 6/9 + 3, which has been maintained at 6 months. The graft remains clear and functioning with healthy epithelium and no evidence of neovascularisation (Fig. 3). He has ceased all topical treatment and has now had his driving licence restored

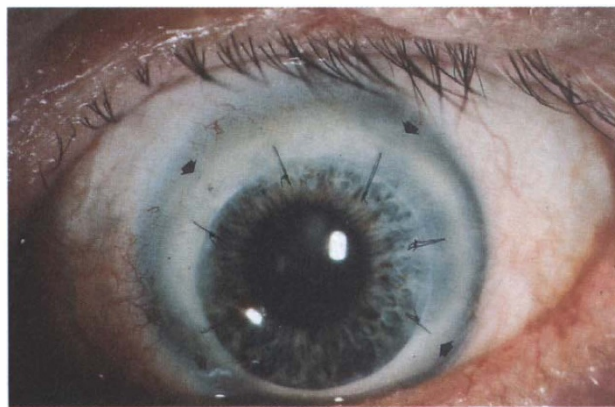


Fig. 3. The post-operative result at 1 year: a clear corneal autograft with healthy epithelium. Arrows indicate the extent of the limbal stem cell autograft.

and has returned to work. Unfortunately histological examination of his enucleated eye showed a large pleomorphic partially epithelioid and spindle cell tumour with extrascleral spread adjacent to a vortex vein. Presently he shows no evidence of local or systemic recurrence. He has been fully counselled regarding the implications of these findings, but despite this he is delighted to have returned to a normal life with an excellent visual outcome following his complex surgery.

Discussion

This case demonstrates the effectiveness of combining an autologous corneal graft with an associated autolimbic transplantation. The literature has shown that certain groups of patients have a dismal outcome following penetrating keratoplasty alone. Those with chronic cicatrizing conditions, chronic conjunctival inflammation, corneal neovascularisation and chemical injury have a particularly poor prognosis following corneal grafting, the graft usually remaining clear for only a few months before opacifying.²

Kenyon and Tseng⁴ have termed the resultant ocular surface complications 'ocular surface failure', and attribute this to a loss of a significant proportion of limbal stem cells. The procedure of repopulating these cells with an autologous limbal transplant dramatically improves ocular surface conditions, providing a good basis and preparation for any future corneal graft. The suggested protocol in such cases is therefore to correct surface symptoms such as irritation and photophobia primarily, following this with visual rehabilitation procedures as the secondary aim.

Despite the misfortune of our patient having to undergo enucleation of the right eye for choroidal melanoma, both the cornea and limbal stem cells from this eye could effectively be utilised in reconstituting the integrity of the left anterior segment, restoring vision from <6/60 to 6/9 + 3 in that eye. The use of wholly autologous tissue has obvious advantages. Both tissue transplants could be performed at one operation with the benefit of a rapid visual rehabilitation without the need for chronic immunosuppressive therapy. We commend this type of procedure in such rare and desperate cases, as worthwhile and effective.

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Sir,

Actinic keratoconjunctivitis and minocycline

Minocycline is widely used as second-line therapy for acne vulgaris. It is given as a once- or twice-daily preparation and the antibiotic appears not to induce resistance. Although this tetracycline is found to be efficacious in the management of acne, it is associated with a recognised profile of side-effects. Infrequently, the eye is adversely affected by minocycline.

We present the case of a patient who developed acute actinic keratoconjunctivitis secondary to minocycline use. To our knowledge this is the first report of such an interaction.

Case report

A 21-year-old Caucasian man with a 1 day history of bilateral eye discomfort associated with watering, photophobia and blurred vision was seen by his general practitioner and treated with co-amoxiclav, ibuprofen and topical fusidic acid. The patient had been in bright sunshine for a short period the previous day. He had not performed any recent arc-welding, snow-skiing or boating. He had started oral minocycline 2 weeks earlier for acne vulgaris.

The patient re-presented a day later as his symptoms of eye pain, watering and blurred vision became progressively worse. He had intense photophobia and marked blepharospasm. The visual acuities were 6/18 right and 6/4 left unaided, the right improving to 6/6 with pinhole. Diffuse punctate epitheliopathy was seen affecting the entire cornea in both eyes, along with marked papillary conjunctivitis, reminiscent of the findings in a person who has been arc-welding for a prolonged period of time without protective eyewear. A florid photosensitivity skin eruption was seen on the face, anterior trunk and flexor surfaces of the upper arms. A degree of facial angioedema was noted. He was asked to stop minocycline and the epitheliopathy was treated with chloramphenicol ointment.

Vision returned to normal within 2 days, and the eyes became asymptomatic within 4 days with complete resolution of the punctate epitheliopathy. The skin reaction resolved in 1 week.

Comment

The onset of the diffuse punctate epithelial keratitis along with the cutaneous photosensitivity reaction at light-exposed areas of the face and trunk 2 weeks after starting systemic minocycline and its subsequent improvement on cessation of the drug is highly suggestive of a cause-and-effect relationship. It is known that the resolution of photosensitivity may occur with either protection from the relevant radiation or drug withdrawal.¹ Rechallenge with the drug was felt to be unethical considering the distressing nature of the symptoms.

The mechanism of photosensitivity remains unclear;² however, it has been noted that some tetracyclines induce greater degrees of photosensitivity than others. Minocycline has been regarded as the least phototoxic agent,^{1,3} whereas doxycycline is a more potent photosensitiser.⁴ Some authors have even indicated that minocycline has virtually no phototoxic effect.^{5,6}

Photosensitivity implies a reaction to usually harmless ultraviolet or visible radiation doses. Drugs may induce photosensitivity either by direct mechanisms where the drug is present in the affected organ unaltered or altered, or through indirect effects as is seen in drug-associated lupus erythematosus or hepatic porphyria. Direct reactions comprise the two broad categories of phototoxic and photoallergic outcomes.

Phototoxic reaction is seen with the anti-arrhythmic drug amiodarone, whose chemical structure is closely related to the psoralens. Other drugs with similar reactions include the non-steroidal anti-inflammatory compounds benoxaprofen and azapropazone, the tricyclic antidepressant protriptyline, the retinoid etretinate, the thiazide diuretics hydrochlorothiazide and cyclopenthiiazide, fluorouracil, vinblastine, and the psoralen 8-methoxypsoralen.

Photoallergic reactions are mediated via the immune response. Chlorpromazine, quinine and quinidine are systemic drugs that have demonstrated this reaction. Halogenated phenols such as tetrachlorosalicylanilide and buclosamide can exert topical photoallergic responses, as can *para*-aminobenzoic acid esters, which are found in sunscreen lotions.

The action spectrum of most drug photosensitisers, including tetracyclines, is within the solar UVA range (320–400 nm). These frequencies of radiation, unlike UVB, are not filtered by window glass.

Minocycline is routinely prescribed for acne vulgaris and its side-effect profile is well known. It can cause a range of effects including gastrointestinal disturbances, autoimmune hepatitis and systemic lupus erythematosus (SLE)-like syndrome,⁷ vestibular disturbances and pigmentation of many organs, including the skin⁸ and sclerae.⁹

Since 1 July 1963 the Medicines Control Agency in the United Kingdom has received notification of nearly 2000 instances of adverse reactions with minocycline.¹⁰ Minocycline has been associated with a number of ocular conditions. These include single cases of dry eyes, conjunctivitis, eyelid swelling and cataract. Eight patients