pupillary defect. Anterior segment examination was normal. Fundoscopy revealed multiple white emboli in branches of the right inferotemporal retinal artery with superficial retinal haemorrhage and macular oedema (Fig. 1). There were also smaller emboli in the left inferonasal, inferotemporal, and superonasal retinal arteries (Fig. 2). Vitreous cells 1+ were noted in both eyes. This appearance was consistent with bilateral septic retinal emboli. Fluorescein angiography showed hypofluorescence at and distal to the right inferotemporal emboli with normal choroidal fluorescence and a normal angiogram appearance in the left eye. The white blood cell count was 10.3 with a normal differential and his erythrocyte sedimentation rate was 2 mm in the first hour. Serial blood cultures produced no growth and a gingival swab produced normal flora.

Electrocardiography, transcranial echocardiography, and a carotid duplex scan were normal. Fasting total cholesterol and triglycerides were mildly elevated at 6.1 and 2.89 mmol/l (upper limits of normal 5.8 and 1.8 mmol/l) respectively. Coagulation studies and plasma viscosity were normal. Values for anti-nuclear antibody, antidiiodilipin antibodies, activated protein C resistance, antithrombin III, protein C, and protein S were all normal. No other infective source was found and he was started empirically on cefuroxime 750 mg intravenously three times daily, metronidazole 500 mg intravenously three times daily, hydrocortisone 100 mg intravenously four times daily, and aspirin 300 mg orally daily. There was little change in the fundal appearance over the next few days but visual acuity remained good at 6/5 in both eyes.

On discharge, on the fourth day, he was converted to oral antibiotics and steroids for a further 2 weeks. At a 1 week follow up visit, there was reduced vitreous activity which resolved at 2 weeks and the emboli appeared a little smaller. Two months later, he underwent extraction of his previously abscessed tooth under peripapillary local anaesthetic having started oral amoxycillin/clavulanic acid and metronidazole 750 mg four times daily for 1 week.

Three weeks afterwards, he presented with fresh bilateral white intra-arterial septic retinal emboli and bilateral vitreous cells 2+. Blood cultures were negative and there was no clinical evidence of infective endocarditis. Repeat haematological investigations were normal. CD4 count was normal and cytomegalovirus titres were negative. His symptoms settled and the emboli reduced in size after 5 days of cefuroxime 750 mg intravenously three times daily and metronidazole 500 mg intravenously three times daily, which was continued orally for a further 2 weeks. Oral aspirin therapy was commenced. He presented 1 month later, while on aspirin, with renewed vitreous activity and right inferotemporal and superotemporal retinal emboli. He was given intravenous cefuroxime and metronidazole for 7 days converting to oral therapy for a further 2 weeks. Oral anticoagulants were started and he had no further episodes. Seven months later, visual acuity remains at 6/5 in both eyes but small vitreous cells persist with distal luminal narrowing and pallor.

COMMENT

Focal metastatic endophthalmitis with discrete retinal septic emboli is a very rare complication of dental surgery.1 2 The clinical appearance of this patient is similar to patients with subclinical partial rejection following intravenous anti-biotic implicate septic emboli. The dental origin of sepsis in this patient was presumed as each episode occurred within 1 week, and 3, and 7 months of dental surgery on an infected tooth and no other focus was found. The initial episode may have been due to an initial transient bacteriaemia or possibly paradoxical embolism but the subsequent delayed episodes may have been of cardiac origin. A normal transthoracic echocardiogram cannot completely rule out the possibility of an intracardiac communication allowing right to left shunting and paradoxical embolism.3

The third episode of acute septic emboli occurred 7 weeks after dental extraction and may be due to subclinical infective endocarditis despite negative investigations. Each episode was treated with 1 week or less of intravenous antibiotics which may have been insufficient. Transient bacteriaemia following dental surgery has been reported to occur in 55% of cases,4 the most common organism being viridans streptococci.5 Amoxycillin is regarded as the most appropriate antibiotic prophylaxis for patients at risk for infective endocarditis after dental surgery.6 However, prophylactic administration of amoxycillin does not reduce the incidence of postextraction bacteriema7 and may not affect bacterial cardiac adherence.8

Despite amoxycillin prophylaxis in this otherwise healthy patient, septic retinal emboli developed 3 weeks after the dental procedure. Focal metastatic endophthalmitis, if treated with appropriate antibiotics, has an excellent prognosis with a minor permanent ocular changes.9 Our patient maintained an excellent visual acuity of 6/5 in both eyes but scotomata persisted corresponding to ischaemic retinal infarcts distal to the emboli despite appropriate antibiotic therapy. Despite the lack of supporting evidence, the possibility of subclinical infective endocarditis cannot be excluded to account for recurrent septic retinal emboli following dental surgery in this patient.

D J KILMARTIN
P BARRY
Research Foundation, Royal Victoria Eye and Ear Hospital, Dublin, Ireland

Correspondence to: Dr J D Kilmarlin, Department of Ophthalmology, Aberdeen Royal Infirmary, Foresthill, Aberdeen AB9 2ZD.

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An unusual corneal injury

EDITOR—Most thermal injuries to the cornea are superficial and tend to heal rapidly1 2 but deeper sight threatening burns may occur when exposed to the heat source and the cornea occurs.3 New methods of demolition using an exothermic chemical reaction to crack stone and reinforced concrete are becoming increasingly popular. We present a case of a chronic and severe bilateral thermal corneal burns following exposure to such a chemical.

CASE PRESENTATION

Mr JP presented with bilateral corneal injuries and hand movement vision in both eyes. One hour earlier a tube of ‘Betonamit’ had exploded into his face. Betonamit, a ‘non-explosive’ cracking agent is a mixture of calcium oxide, silicon oxide, aluminium oxide, magnesium oxide, which when hydrated forms calcium hydroxide in an exothermic reaction. During normal use it is mixed with water and poured into drill holes of 2-3mm diameter. The heat instance then expands and pressures of up to 9000 tonnes/m2 develop, fracturing the surrounding concrete/stone.

The patient had dense white corneal opacities in both eyes with reduced vision in both eyes. There was a good response to treatment with a healthy cornea (Fig 1). Similarly, there were multiple patches of pale conjunctiva. The face and lids were unharmed. He immediately underwent irrigation using normal injection fluid. The corneal material was removed from the fornices. The pH was not lowered; nevertheless, the initial clinical impression was of severe bilateral

Figure 1 White emboli in branches of the right inferotemporal retinal artery with macular oedema and superficial retinal haemorrhage at first presentation.

Figure 2 Close inspection revealed small white emboli in branches of the left inferotemporal, inferotemporal, and superonasal retinal arteries at initial presentation.
alkali injuries with the expected poor prognosis. The patient was therefore started on intensive ascorbate, citrate, dexamethasone, with regular antibiotics and mydriatics.

On re-examination 24 hours later the corneal opacities had enlarged slightly but subsequently remained unchanged. The cornea re-epithelialised over the following week (Fig 2), and 1 month later, when the eye was stable he underwent a successful left penetrating keratoplasty (Fig 3). Histology demonstrated a deep stromal scar consistent with an exothermic reaction (Fig 4).

COMMENT
Vajpayee et al looked at 59 patients presenting with thermal corneal burns and found that 90% of these injuries occurred at home and involved boiling fluids, matches, or fireworks. In 89% the burn was limited to the epithelial layer and only two needed penetrating keratoplasty. During prolonged exposure to heat (for example, during molten metal injuries), full thickness burns are produced.

In our case fragments of Betonamit penetrated into the corneal stroma leading to full thickness scarring. The patient was looking down to examine the drill hole, in this way the upper and central cornea in each eye were most affected by the explosion.

The discrete pattern of corneal damage suggested that thermal damage was the main cause of corneal damage. Particulate matter penetrated the cornea and remained in contact during the exothermic reaction. Alkali injuries tend to produce a diffuse corneal reaction with delays in corneal epithelialisation as a result of permanent metabolic changes in the limbal epithelium. Although the alkalinity of the powder may have contributed to the corneal damage, it was interesting to note that where there was little fluid (such as on the eyelids) there was little tissue damage.

This case illustrates the hazards of using these novel cracking agents, but also the relatively benign course that combined thermal and alkali corneal injuries follow.

granular cytoplasm, and lack obvious cytolytic melanin. Ultrastructurally, the clear cell cytolytic is due to vacuolar degeneration and subsequent coalescence of abortive melanosomes that do not contain melanin pigment.

We present the first case of balloon cell naevus of the caruncle and discuss the differential diagnoses.

CASE REPORT
A 16-year-old girl presented with a 0.4 x 0.2 mm, brownish, and apparently cystic lesion in the left lacrimal caruncle. No other similar lesion was noted in the eyelids or elsewhere. The serum lipid level was normal. The lesion was excised, formalin fixed, and processed to paraffin embedding.

Special histochemical stains included periodic acid–Schiff (PAS), colloidal iron, and Alcian blue. No stains for lipids were performed owing to lack of a wet tissue specimen. Immunohistochemical studies were performed with monoclonal antibodies against HMB-45 and human macrophage CD68 (Dakopatts), HAM56 (Enzo Diagnostics) and polyclonal sera against alpha-I-antichymotrypsin, S-100 protein, lysozyme (Dakopatts). Antibody attachment was identified using a standard avidin-biotin-peroxidase technique, with the enzyme label being visualised as the red final reaction product of aminoethylcarbazole.

Microscopically, haematoxylin and eosin stained sections showed tissue lined by non-keratinising epithelium with goblet cells, consistent with conjunctiva. The substantia propria contained a population of polygonal clear cells with a centrally placed, bland nucleus; occasional cells appeared to be binucleated (Fig 1). Further sections cut at a deeper level revealed a thin rim of characteristic naevus cells, with the formation of few nests, overlying the clear cell component. The clear cells stained weakly positive with PAS and Alcian blue reaction and strongly positive with colloidal iron for acid mucopolysaccharides.

Immunohistochemical stain for S-100 protein was positive in both the naevus and clear cells, while a polyclonal antibody to alpha-I-antichymotrypsin stained the balloon cells only. No positivity to histiocye markers (HAM-56, CD68, lysozyme) and activated macrophages (HMB-45) was observed in the lesion.

COMMENT
Balloon cells do not appear to be as rare in the eye as they are in the skin, having been observed in approximately 4% of a large series of naevocellular naevi of the choroid, and in 10% of the uveal melanomas. Nevertheless, only two cases of conjunctival naevi with balloon cells have previously been reported in the literature, neither involving the caruncle. Of 465 naevus cells diagnosed at the Eye Pathology Laboratory of the Wilmer Institute in Baltimore during a 52 year period, none possessed a clear cell component. Although the presence of balloon cells does not appear to have any intrinsic clinical significance, their occurrence in benign or malignant lesions is interesting because it increases the potential for histological misdiagnosis, particularly when the site of occurrence is uncommon. In the absence of an obvious melanocytic cell population, planar xanthomata and balloon cell naevi can be differentiated since only the former contain fat. Balloon cells, as opposed to xanthoma cells, stain positively with histochemi-