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Sir,

The origin of posterior vitreal gas bubbles following the high velocity impact of a metallic fragment

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Intraocular foreign bodies are a common and potentially devastating sequelae to the impact of high velocity solid objects upon the globe. Here we report the unusual finding of small gas bubbles closely related to the location of the foreign body, but well away from the site of entry. The possible origins of the bubbles are discussed in relation to the clinical picture.

Case report

A 25-year-old male was admitted having been hit in the right eye by an object dislodged whilst hammering a metal machine punch. The patient complained of right visual blurring and his initial Snellen visual acuities were 6/9 in the right eye and 6/5 in the left. Ocular examination revealed a 1.5 mm conjunctival laceration immediately temporal to the limbus, with surrounding subconjunctival haemorrhage obscuring view of the underlying sclera. There was a mild cellular response in the anterior chamber, and intraocular pressures were 11 and 19 mmHg in the right and left eyes respectively. Fundoscopy revealed a small area of pre-retinal haemorrhage overlying the infero-nasal vessels, with blood extending from this site antero-inferiorly into the vitreous (Figure 1). Of particular note were a number of bubbles lying adjacent to the retina in the posterior vitreous, and superior to the above retinal lesion. These bubbles were only present in this one location, and slowly reabsorbed over the next 48 h. Plain radiographs of the orbits suggested the presence of a radio-opaque foreign body within the right eye, and this was supported by CT scan. The patient was therefore commenced on oral ciprofloxacin 750 mg b.d. and two hourly Predforte drops, together with topical Chloramphenicol and Atropine. By day 4 a metallic foreign body could be observed within the clot overlying the area of



Figure 1 Fundus photograph taken on day 1 showing area of preretinal and intravitreal haemorrhage with associated gas bubbles.

preretinal haemorrhage, and this was subsequently removed during a pars plana vitrectomy (Figure 2). Although the postoperative recovery was complicated by further vitreous haemorrhage, the patient made a good visual recovery with an acuity of 6/9 when discharged 6 months later.

Comment

The presence of free gas bubbles within the vitreous following the passage of a high velocity fragment has not been previously reported to our knowledge, and it is interesting to speculate on the origins of the bubbles seen in this patient. Free gas bubbles associated with both *Clostridia* sp and *Bacillus cereus* panophthalmitis have been reported, but such cases involved extensive inflammation with necrosis throughout the globe.^{1–3} In this case there was no evidence of vitritis and the bubbles were present within 1 h of injury, and it is therefore likely that the presence of the bubbles was



Figure 2 The metallic foreign body recovered from the patient.

related to the passage of the metallic fragment as it passed into the eye. A number of possible mechanisms for this can be postulated. Firstly the low pressure zone immediately following a high velocity projectile would draw air in its wake down an induced pressure gradient. This could have resulted in air being drawn into the eye, although the absence of air at the entry site or related to the path between this and the presumed site of impact is against this. The second possibility is that the bubbles represent the result of cavitation induced by the passage of the solid fragment through the semi-liquid vitreous medium.⁴ A low pressure region in the wake of a fast moving object can result in dissolved gases coming out of solution. Again though, it is odd that they are solely related to the final resting site of the fragment. Thirdly, a thermal or chemical reaction between the fragment and the vitreous gel could result in the liberation of free gas, and this cannot be excluded.

It therefore remains uncertain as to the exact mechanism that induced this interesting phenomenon. The authors would be pleased to hear of any further cases where similar findings were observed.

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Sir,

Palliative vitrectomy for intraocular metastasis from cutaneous melanoma

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Primary cutaneous melanoma metastatic to the eye is rare.^{1–4} Still rarer is melanoma metastasis to the vitreous cavity. A review of the literature showed only seven such cases—Robertson *et al*⁵ (two cases), Cole *et al*⁶ (one case) and Gunduz *et al*⁷ (four eyes of three patients). Diagnosis in one was by primary enucleation for a painful blind eye.⁶ Two underwent fine needle aspiration biopsy and three had diagnostic vitrectomy. Neither external beam radiotherapy nor chemotherapy was successful in achieving tumour control, with these eyes ultimately being lost as a result of neovascular glaucoma. Non-ocular systemic metastatic disease was usually present at the time of ocular diagnosis. The patients tended to develop cerebral metastases and had a mean survival of 5 months from the time of development of ocular metastases.^{5,7,8} The present case shows how vitrectomy may have a therapeutic role by providing functional vision and preventing neovascular glaucoma from developing.

Case report

An 87-year-old Caucasian lady was referred with a history of floaters and progressive decrease in vision in the left eye over a 4-week period. She had previously been operated in both eyes for cataract and had good postoperative vision.

She had undergone excision of a cutaneous melanoma from the right cheek 15 months earlier. This was followed by radical neck dissection and radiotherapy. Six months before her ophthalmic presentation, several metastatic lesions were excised from the back of the neck, left arm and anterior abdominal wall.

On examination, the visual acuity was 6/6 in the right eye and hand movements in the affected left eye. Anterior segment examination showed bilateral, quiet pseudophakia. Numerous pigmented clumps were seen on the anterior hyaloid face. The vitreous cavity showed multiple brown cannon-ball opacities. No retinal details were discernible. B scan ultrasonography showed several echogenic points in the vitreous cavity with a flat retina. No choroidal thickening was seen.

The patient underwent a diagnostic and therapeutic pars plana vitrectomy under local anaesthesia. The vitreous cavity showed a dense collection of brown cannon-ball opacities. No choroidal or retinal masses