

CASE REPORT

Spontaneous Foreign Body Extrusion Following Perforating Eye Injury

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Abstract

A structured approach to the management of a perforating ballistic eye injury is illustrated in this case, where initial treatment was limited to simple corneal wound closure and antibiotic prophylaxis. A pellet had passed completely through the globe but the retina remained attached, and it was decided to manage the case conservatively. Two retained foreign bodies were extruded spontaneously some months after the injury when suture removal and delayed cataract surgery led to a virtually perfect visual outcome. The patient has had no further complications at least three years after initial injury. The management of this civilian case illustrates some basic concepts in treating ballistic eye injuries that may be applicable in a military setting.

Introduction

Amongst combat troops, reported injuries to the eye have increased compared to other body parts with each succeeding conflict during the Twentieth Century (1). Eye injuries accounted for about 2.5% of all battle casualties during the First and Second World Wars (2), 5-9% during the Vietnam War (3,4) and 13% in the Gulf War (5). Undoubtedly these figures also reflect the increased survival and therefore reporting of eye injuries in troops with other major injuries, but the nature of warfare is changing and this too may increase the prevalence of eye injuries. The eyes and face remain preferentially exposed when body armour is worn or when fighting in armoured vehicles (1). Most eye injuries during the Yom Kippur and Lebanon Wars were seen in tank crews (6,7).

The outcome of an open eye injury can be very favourable if the eye is closed with adequate antibiotic prophylaxis at an early stage. The decision whether or not to intervene with primary vitrectomy for posterior eye injuries is still debatable (8). Here we report a case of a 27 year old man who was shot through the eye at close range with a shotgun leading immediately to an almost complete loss of vision. Following globe repair, conservative management of his vitreoretinal injury and modern small incision cataract surgery, he made an excellent recovery to see better than 6/6 unaided.

Case Report

A 27 year old man was accidentally shot in the right eye at about 25 metres during a game shoot. At presentation less than an hour later, the visual acuity in the right eye was perception of light only. On examination there was a central corneal perforation leaking aqueous humour and a total hyphaema but no iris or retinal prolapse. The posterior segment could not be visualised. Plain X-ray films showed a radio-opaque pellet in the sphenoid sinus, which was assumed to have entered via the nose as there were several other superficial pellet injuries. Subsequently, however, CT scanning suggested it had passed directly through the eye and the ethmoid air sinus.

The patient was commenced immediately on topical ciprofloxacin 0.3% two-hourly and oral ciprofloxacin 750mg twice per day. Later that day the corneal perforation was closed with seven 10/0 nylon sutures and the anterior chamber hyphaema was washed out with balanced salt solution. Injury to the iris was evident at the three o'clock position but the lens appeared intact, a clear view of the peripheral fundus was not possible. No open scleral laceration was detectable at the time of surgery and, in the absence of a radio-opaque intraocular foreign body, it was assumed that the wound was limited to the cornea. A subconjunctival injection of betamethasone 20mg and gentamicin 40mg was administered at the end of surgery. On the first post-operative day, a diffuse hyphaema prevented assessment of the retina. Treatment was continued with topical dexamethasone 0.1% six hourly, ciprofloxacin 0.3% hourly and oral ciprofloxacin 750mg twice per day. An ultrasound scan showed the retina was flat and confirmed the absence of any intra-ocular foreign body.

At review the following week the hyphaema had cleared and vision had improved to 6/12 with pinhole. A traumatic subcapsular cataract was noted. The fundus could now be seen and a well-defined exit wound was noted in the pre-equatorial retina in the same quadrant as the iris injury but no signs of retinal detachment were seen around the hole. After review with a vitreoretinal specialist, it was decided not to intervene further surgically with the retina and the pellet was left lodged in the sinuses, although it was later sneezed out spontaneously by the patient.

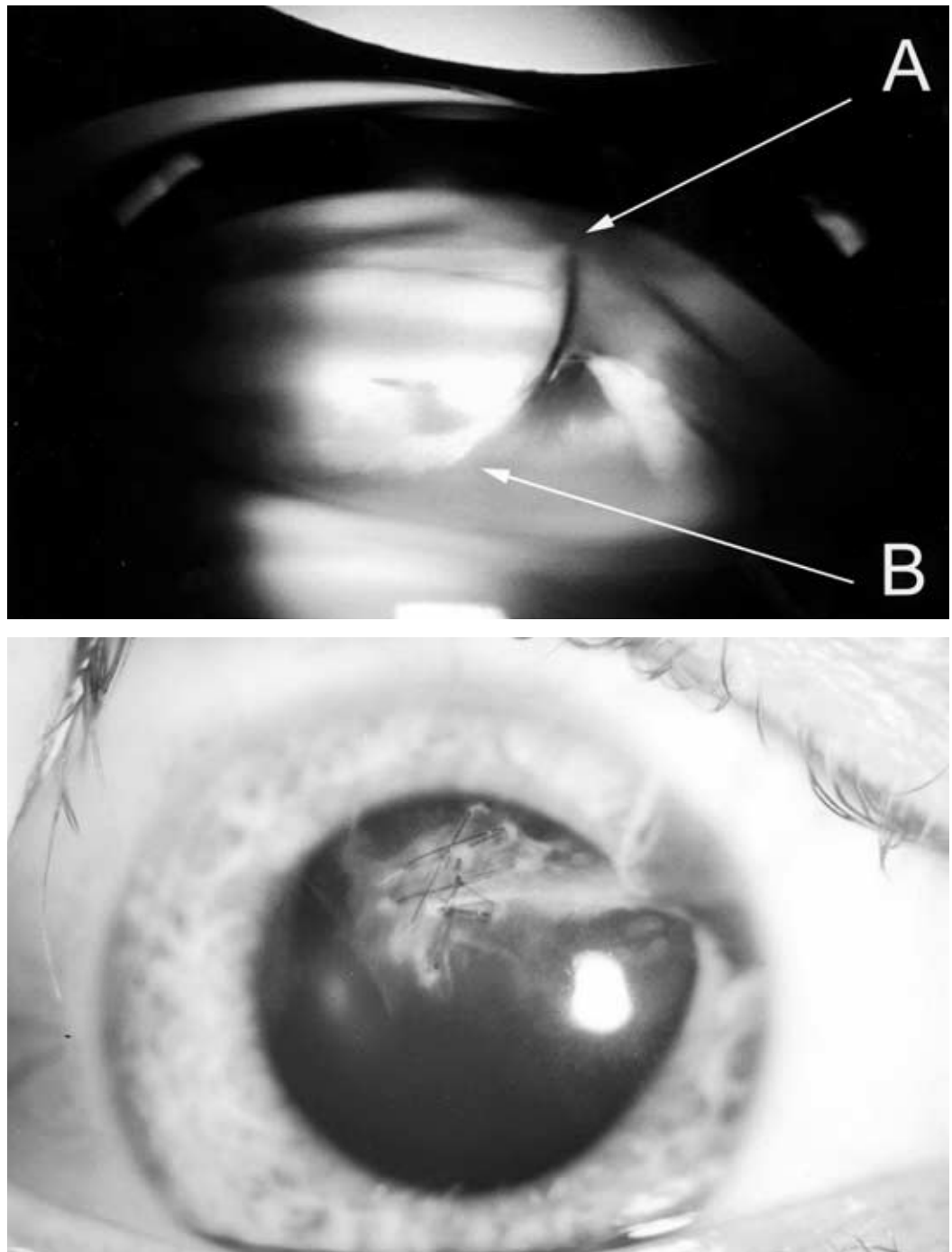
Four months later, the retina remained

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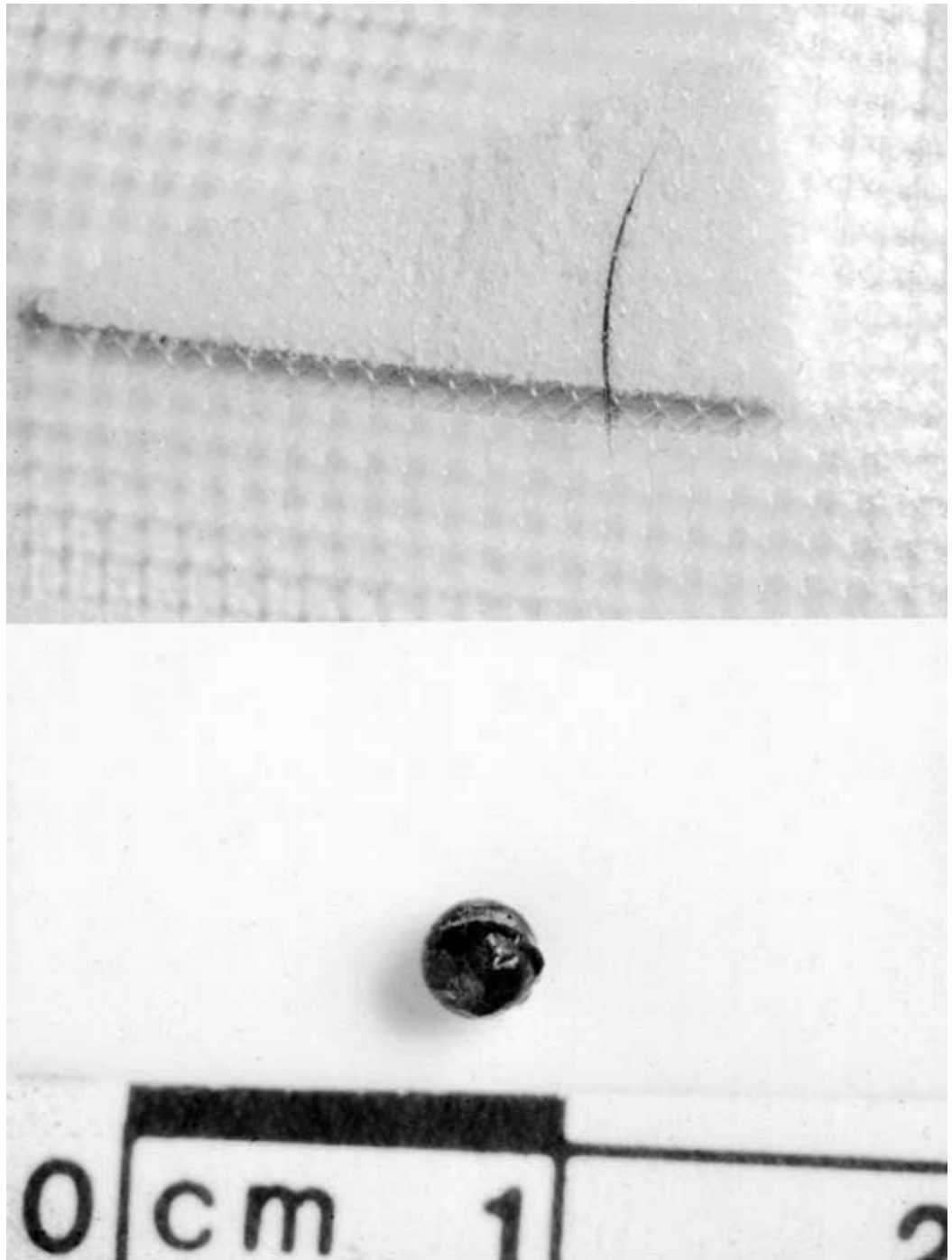
Right eye four months after injury. Above: a gonioscopic view shows the hair lodged in the corneal wound (A) emerging from the iris root (B) back along the original course of the pellet at the initial time of injury. Below: a view of the anterior cornea shows the hair emerging centrally. This caused discomfort when the patient blinked.

intact, although the vision had deteriorated to 6/36 and the patient complained of a pricking foreign body sensation in the right eye. Examination revealed a dense cataract and a thick hair was seen protruding through the corneal wound. This hair extended across the anterior chamber from behind the iris in the ciliary body region close to the retinal hole. Under general anaesthesia, the hair was avulsed from its root behind the iris and the tip withdrawn from the cornea with intraocular forceps entering the anterior chamber from a self-sealing corneoscleral tunnel. This tunnel was then used for phacoemulsification cataract extraction with insertion of an intraocular lens (the lens

power was calculated from corneal curvature readings of the fellow eye). Corneal sutures were also removed at this stage. Recovery was uneventful and the final visual acuity returned to 6/5 unaided, the patient has no reported problems 3 years after the injury.

Discussion

High speed perforating eye injuries with retained intraocular foreign bodies are not normally associated with a favourable visual outcome. In this case, involvement of the pre-equatorial retina (rather than macula-disc area) and relatively clean rupture of the cornea were critical factors. Presumably vitreous incarceration at the exit site



The two retained foreign bodies are seen, both had passed through the eye at the initial time of injury some months before. The hair shown above was extruded through the iris and anterior chamber; scale bar = 5cm. The pellet shown below was sneezed out through the paranasal air sinuses; scale bar = 1cm.

prevented the entry of subretinal fluid and early retinal detachment. Fortunately no secondary retinal detachment has occurred in the following three years. Early and accurate closure of the corneal wound prevented the development of significant astigmatism and an intact posterior capsule allowed subsequent small incision cataract surgery with implantation of a posterior chamber intraocular lens.

It is assumed that the intraocular foreign body was an eyelash taken through the eye with the pellet and lodged in the outer choroid or sclera. Eyelash hairs are radiolucent and the peripheral location of the hair probably explains why it was not

detected by ultrasound. Over time, the hair was extruded backwards along its original course of entry.

From a military perspective, this case demonstrates the importance and relative simplicity of early globe closure and administration of subconjunctival antibiotics following an apparently devastating perforating eye injury. In the presence of an open corneal wound, a metallic foreign body detected in the paranasal sinuses may indicate a posterior globe perforation even in the absence of an obvious breach of the conjunctiva. It cannot simply be associated with other facial injuries. Whether or not primary vitrectomy would help in similar

cases is uncertain (8). A study of 240 cases of ocular trauma showed the timing of vitrectomy had no effect on final visual outcome (9). Early vitrectomy would have been difficult through a traumatised anterior segment and would carry a high risk of intraoperative haemorrhage (10). Furthermore in this case lensectomy may have been necessary and would have rendered the patient aphakic, causing subsequent problems for secondary intraocular lens implantation.

The outcome of this single case illustrates how more complicated ophthalmological procedures might be deferred to specialist hospital care some weeks after injury with an excellent visual result. Availability of early ocular ultrasound may help in the detection of an intraocular foreign body or traumatic retinal detachment (11), but the debate on whether primary vitreoretinal intervention leads to a favourable visual outcome remains unresolved (8). A study of 123 eyes with metallic intraocular foreign bodies showed that only 4.1% developed endophthalmitis (12). This rate was shown to be much higher when the intraocular foreign body was organic, which would be better detected by ultrasound rather than X-ray (13).

The increasing prevalence of eye injuries associated with modern warfare (and favourable outcome following early external repair) emphasizes the importance of co-locating ophthalmological suturing facilities with field surgical teams. Whether or not definitive vitreoretinal surgery needs to be performed at presentation of a traumatic eye injury is still debated in civilian practice. In a military setting, the presence of intraocular

gas after vitreoretinal surgery would severely compromise further evacuation by air. Unless the benefits of early intervention are unequivocal, vitreoretinal surgery should probably be reserved for Role 4 (mainland) hospital care.

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