An interesting case of grenade blast splinter injury—in peace

Lt Col Avinash Mishra*, Col VK Baranwal†, Brig JKS Parihar, SM, VSM#

MJAFI 2012;68:187–189

INTRODUCTION

The eye casualty rate in combat is around 20–50 times greater than expected based on the body surface area.¹ Military databases of combat casualties reveal that eye injuries have increased to disturbing proportions. The largest study of combat-related eye trauma (5,320 cases), from the Iran–Iraq War (1980–1988), revealed that there are mainly two groups of eye injuries: retained foreign bodies (17%) and posterior segment injuries (59%).² In operation Desert Storm, the incidence of ocular injury was 13% of the total combat injuries³ that is 48 times greater than would be expected based on body surface area. While the incidence of ocular injuries among the British Armed Forces in Iraq and Afghanistan (2004–2008) were to the tune of 10% of all battle injuries.⁴

In past military conflicts, definitive surgery was not an issue as it is today. Enucleation was the more prevalent treatment for these extensive eye injuries. In World War II and the Vietnam War, reports were common of enucleation of nearly 50% of the eyes sustaining penetrating injuries.

Here we report of a case of severe eye injury associated with a large retained intra-orbital grenade splinter. This recruit underwent an emergency ocular surgery whereby the splinter was extracted in toto and he was finally discharged with a normal vision and no residual ocular complication.

CASE REPORT

A 19-year-old Indo Tibetan Border Police (ITBP) recruit was brought to the hospital with severe pain and swelling in the right periorbital region, following a grenade blast injury, incurred during a routine training exercise. The time lag between sustaining the injury and reporting to the hospital was about five hours.

*Classified Specialist (Ophthalmology), Military Hospital, Dehradun, Uttanchal, †Senior Advisor (Ophthalmology), Command Hospital (CC), Lucknow, #Consultant (Ophthalmology), Head, Department of Ophthalmology, Army Hospital (R&R), New Delhi.

Correspondence: Lt Col Avinash Mishra, Classified Specialist (Ophthalmology), Military Hospital, Dehradun, Uttanchal.
E-mail: avim27@yahoo.com

Received: 12.08.2011; Accepted: 18.11.2011
doi: 10.1016/S0377-1237(12)60031-8

Ocular examination revealed severe right orbital swelling, with the patient not being able to open his eye. Even with mild forceful opening the inside of the eye could not be examined, making it impossible to record his vision or examine the status of the globe. A large 3 mm sized entry wound was seen in the middle one third of the eyebrow, just inferior to the superior orbital rim (Figure 1). There was no active bleeding around the wound. The radiograph orbit, anteroposterior (AP) view revealed a single, large about 7 mm splinter lying in the central orbital region (Figure 2); however, the lateral view showed the splinter located peripherally. There were no associated fractures of the orbital bones. To confirm the exact location of the splinter a B-scan ultrasonography (USG-B) scan was carried out which revealed the splinter to be lying embedded inside the soft tissues, just outside the globe.

The patient was immediately taken up for surgery to extract the splinter, under local anaesthesia, the opening of the wound was approached under complete asepsis and a passage was created along the suspected line of path of the splinter. Every effort was being made to prevent injury to the globe. After proceeding nearly 3 cm into the wound the splinter was finally located using a forceps, lying just adjacent to the globe. After several unsuccessful attempts, the splinter was grasped carefully, to prevent it from inadvertently penetrating the globe or breaking into smaller pieces. The passage was then gradually enlarged and a large 0.9 cm × 0.5 cm splinter was extracted

Figure 1 Patient prior to the surgery. The entry wound can be seen in the middle one third of the eyebrow.

Figure 2 Grenade blast splinter injury (right orbit).

Figure 3 Large splinter (0.9 cm × 0.5 cm) after removal from the right eye.

in toto (Figure 3). The wound was finally closed in layers and the patient was started on systemic broad spectrum antibiotics and analgesics.

Radiographs as well as USG-B scan taken postoperatively revealed the successful removal of the complete splinter along with an intact globe. The skin sutures were removed on the eighth day postoperatively and he was discharged, with no residual visual or ocular motility disorder, with just a rapidly healing superficial scar.

DISCUSSION

Ocular blast injuries can be primary, from the blast wave itself; secondary, from fragments carried by the blast wind; tertiary; due to structural collapse or being thrown against a fixed object; or quaternary, from burns and indirect injuries.⁵ In our case the cause of injury was mainly due to the secondary cause, i.e. fragments from the blast.

Retained intra-orbital splinter injuries are quite commonly seen in the modern day wars and may be due to gunshot wound (GSW), high velocity missile injury, improvised explosive device (IED) blast injury, and splinter and shrapnel injury from enemy small arm firing/artillery shelling.^{6,7} Management and prognosis depends on the size, composition and location

of the foreign body and whether there is any secondary infection.^{8,9}

Though there is no doubt that computed tomography is the best initial mode of imaging; however, this facility was not available at this centre and we had to make our diagnosis on the basis of history, clinical assessment as well as the basic radiological investigations like radiographs and orbital ultrasound.

The available literature is quite clear about the urgent need to surgically remove all orbital organic foreign bodies¹⁰ as they can lead to potentially serious orbital or intracranial complications. However, in case of the inorganic foreign bodies most of the authors support the theory that the inorganic orbital foreign bodies should be only removed if causing complications or if located anteriorly. Posteriorly located inorganic foreign bodies should be left alone, unless they are causing significant orbital complications.^{11,12}

In this case there was clinical as well radiological evidence that this was an inorganic foreign body, i.e. grenade splinter. However, an early surgical extraction was considered because of the following reasons:

1. The radiographs showed the splinter appeared to be lying peripherally.
2. The entry wound was a very large one and appeared severely contaminated with dirt particles.
3. A long time had also elapsed between the injury and the patient reporting to this centre so the chances of the wound becoming infected subsequently were very high.
4. The orbital ultrasound showed that the splinter was lying just next to an intact globe and any delay would have resulted in the splinter migrating and penetrating the globe, with more serious consequences.¹³

In this particular case even though the splinter was very large neither did it penetrate the globe nor did it even cause damage to the surrounding bony orbit. Also timely appropriate surgical intervention and postoperative antibiotic prophylaxis prevented any untoward complications.

As prevention is better than cure, these types of injuries are mostly preventable by increasing awareness and reduction of risk factors. We recommend that the officers and soldiers involved in these kinds of battle exercises be better educated about the risks involved as well as the possible disastrous consequences. We also recommend that during conducting such dangerous battle exercises all possible precautionary measures should be strictly adhered to.

CONFLICTS OF INTEREST

None identified.

REFERENCES

1. Owens BD, Kragh JF Jr, Wenke JC, Macaitis J, Wade CE, Holcomb JB. Combat wounds in operation Iraqi freedom and operation enduring freedom. *J Trauma-Injury Infect Crit Care* 2008;64:295–299.

2. Lashkari K, Lashkari MH, Kim AJ, Crane WG, Jalkh AE. Combat-related eye trauma: a review of 5,320 cases. *Int Ophthalmol Clin* 1995;35: 193–203.
3. Heier JS, Enzenauer RW, Wintermeyer SF, Delaney M, LaPiana FP. Ocular injuries and diseases at a combat support hospital in support of operations desert shield and desert storm. *Arch Ophthalmol* 1993; 111:795–798.
4. Blanch RJ, Bindra MS, Jacks AS, Scott RA. Ophthalmic injuries in British Armed Forces in Iraq and Afghanistan. *Eye (London)* 2011; 25:218–223.
5. Scott R. The injured eye. *Philos Trans R Soc Lond B Biol Sci* 2011; 366:251–260.
6. Chowdhury RSK, Murali Mohan S. Maxillofacial injuries in counter proxy war posture of the Armed Forces. *MJAFI* 2004;60:357–362.
7. Nowroozadeh MH. An unusual intraorbital foreign body: a brake lever. *Indian J Ophthalmol* 2009;57:400–401.
8. Santos Tde S, Melo AR, Moraes HH, Almeida Júnior P, Dourado E. Impacted foreign bodies in orbital region: review of nine cases. *Arq Bras Oftalmol* 2010;73:438–442.
9. Eladioui K, Benjelloun A, Chekkoury-Idrissi A. An unusual foreign body in the orbit. *Rev Stomatol Chir Maxillofac* 2009;110:371–373.
10. Prazeres S, Jacomet PV, Galatoire O, et al. Diagnosis and therapeutic management of an intraorbital organic foreign body. *J Fr Ophtalmol* 2009;32:8–15.
11. Fulcher TP, McNab AA, Sullivan TJ. Clinical features and management of intraorbital foreign bodies. *Ophthalmology* 2002;109:494–500.
12. Ho VH, Wilson MW, Fleming JC, Haik BG. Retained intraorbital metallic foreign bodies. *Ophthal Plast Reconstr Surg* 2004;20:232–236.
13. Mendes PD, Fariña EG, de Aguiar GB, Telles C, Acioly MA. Changes in management strategies after spontaneous migration of a retained intraorbital metallic foreign body. *J Craniofac Surg* 2010; 21:1295–1296.

Best article award 2011

The BEST ARTICLE AWARD for the year 2011 was awarded to:

Title: Does Catheter Choice during Embryo Transfer Alter the Pregnancy Rate

Col Pankaj Talwar, VSM, Senior Advisor (Obstetrics & Gynaecology), INHS Asvini, Mumbai
 Maj Nikita Naredi, Graded Specialist (Obstetrics & Gynaecology), Army Hospital (R&R), Delhi Cantt.
 Lt Col Sandeep K, Classified Specialist (Obstetrics & Gynaecology), Army Hospital (R&R), Delhi Cantt.
 Air Mshl GS Joneja, VM, Director and Commandant, AFMC, Pune – 40
 Col BS Duggal, Senior Advisor (Obstetrics & Gynaecology), Army Hospital (R&R), Delhi Cantt.

The SECOND BEST ARTICLE AWARD for the year 2011 was awarded to:

Title: A Clinical Evaluation of Midface Advancement Using Intra-oral Distractors in Management of Bone Stock Deficiencies

Brig Ramen Sinha (Retd), Professor and Vice Principal, Sri Sai Dental College, Vikarabad (AP)
 Col P Suresh Menon (Retd), Professor and Head of Department, Vydehi Institute of Dental Sciences, Bengaluru
 Maj MG Venugopal, Graded Specialist (Oral & Maxillofacial Surgery), MDC, Base Hospital, Delhi Cantt.