

SPECTRUM OF COMBAT OCULAR INJURIES IN PAKISTAN ARMED FORCES PERSONNEL FIGHTING WAR AGAINST TERRORISM

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ABSTRACT

Objective: To describe spectrum of ocular injuries occurring in soldiers taking part in war against terrorism in Khyber Pakhtunkhwa province of Pakistan.

Study Design: Descriptive study.

Place and Duration of Study: Combined Military Hospital Peshawar, from August 2009 to August 2011.

Patients and Methods: The study population comprised of 95 serving soldiers who sustained ocular trauma isolated or in association with other war injuries and were evacuated to CMH Peshawar. Their detailed ophthalmic examination was carried out. Laterality, type, pattern and extent of ocular injuries were recorded.

Results: All the patients were male from 18-40 years of age. Isolated ocular injuries were found in 36.8% whereas ocular injuries associated with other injuries were in 63.2% of patients. Both eyes were damaged in 44.2% where as monocular involvement was observed in 55.8% of patients. Open globe injuries with or without adnexal involvement were more common (56.8%). Primary evisceration/enucleation was performed in 11.6% of cases. There were no cases of sympathetic ophthalmitis or endophthalmitis.

Conclusion: There is a wide spectrum of type and pattern of ocular injuries occurring as a result of combat ocular trauma. In modern warfare, number of open globe injuries is persistently increasing probably due to advanced weaponry.

Keywords: Combat Ocular Trauma, Open Globe Injuries, Evisceration.

INTRODUCTION

Ocular trauma is a major cause of visual morbidity and has become the most frequent reason for hospitalization of ophthalmologic patients¹. Approximately 2 million eye injuries occur in United States each year² where it is the leading cause of monocular blindness and is second only to cataract in cases of visual impairment³. There is a large preponderance of combat ocular injuries affecting males⁴. In addition to physical morbidity there are profound social implications of combat ocular trauma (COT) due to lost productivity by the young men and subsequent economic setback. Fights / war campaigns causing ocular morbidity not only leave deep psychological setback to the injured person but also overburdens health care facilities. The spectrum of COT ranges from trivial, non-sight

threatening to extremely serious and potentially blinding consequences⁵. Birmingham Eye Trauma Terminology System (BETTS) has classified ocular injuries into closed globe and open globe injuries⁶. Open globe injuries are usually caused by flying fragments and the extent of injury varies according to the size and velocity, the depth of penetration and the site of impact of the flying fragments. As compared to the closed globe, open globe injuries have worst prognosis and their management is one of the most challenging and rewarding aspects of ophthalmic care⁷.

From last one decade, cases of combat ocular trauma in Pakistan Armed Forces Personnel are persistently increasing due to their involvement in war against terrorism being fought in Khyber Pakhtunkhwa. These casualties, in large, are evacuated to and managed in Combined Military Hospital Peshawar. In this way the authors got a novel experience in dealing with combat ocular injuries of all types and severity. This study focuses on the pattern and types of these

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injuries and their common ocular manifestations and complications.

PATIENTS AND METHODS

A hospital based descriptive study was carried out in the Eye Department of CMH Peshawar from August 2009 to August 2011. Ninety five patients who sustained ocular injuries in isolation or along with other injuries were evaluated for laterality, type, pattern and extent of injuries. These casualties were evacuated from operational areas like Mahmand agency, Bajour agency, North and South Waziristan to CMH Peshawar. Initial resuscitative care was provided in collaboration with the surgical team in trauma centre. All the patients were admitted and the extent and severity of ocular damage was evaluated. In cases, where an intraocular foreign body was suspected, computerized tomographic scan was done urgently before planning any surgical procedure. Primary debridement and repairs were carried out in cases where required. At the same time, injuries inflicted on the rest of body were evaluated and managed by the surgical team. After immediately necessary procedures, a detailed ophthalmic examination was carried out including assessment of visual acuity, slit lamp biomicroscopic examination of anterior and posterior segment and measurement of intraocular pressure (where feasible). All the information obtained including demographic data, laterality of ocular injury, activity at the time of injury and whether eye protection was used or not was endorsed. Type, location, pattern and extent of injuries were also recorded. Pattern of ocular injuries was described by using internationally accepted "Birmingham Eye Trauma Terminology" (BETT). Radiological studies including X-ray orbit and face, ultrasound B-scan and computerized tomographic (CT) scan were done in cases of suspected intraocular foreign body (IOFB), fracture of orbital and facial bones and eyes with hazy media. Patients with posterior segment injuries and retained intraocular foreign bodies were referred to vitreo-retinal surgeon. Subsequent treatment for the rest of patients was individualized and comprised conservative treatment (topical /

systemic antibiotics, steroids, cycloplegics and anti glaucoma medications) and /or secondary surgical procedures for various ocular complications. On each subsequent follow up visit, detailed ocular examination of all the patients was done and recorded. Statistical analysis of the data was done by using SPSS version 10. Descriptive statistics were used to describe the data.

RESULTS

A total of 95 patients with ocular and adnexal injuries either isolated (36.8%) or combined with other injuries (63.2%) were evacuated to CMH Peshawar. In 42(44.2%) patients both eyes were damaged whereas single eye involvement was found in 53(55.8%) patients (total 137 eyes were injured). All the patients were male from 18 to 40 years of age. Most of these injuries occurred due to splinters (Fig.1). Explosion of improvised explosive devices (IED) was responsible for most of these injuries. Open globe injuries with or without adnexal involvement were more common (56.8%). Various types of ocular injuries are described in Table1. Primary evisceration /enucleation was performed in 11.6% of cases. There were no cases of sympathetic ophthalmitis or endophthalmitis.

DISCUSSION

Combat ocular injuries are usually severe

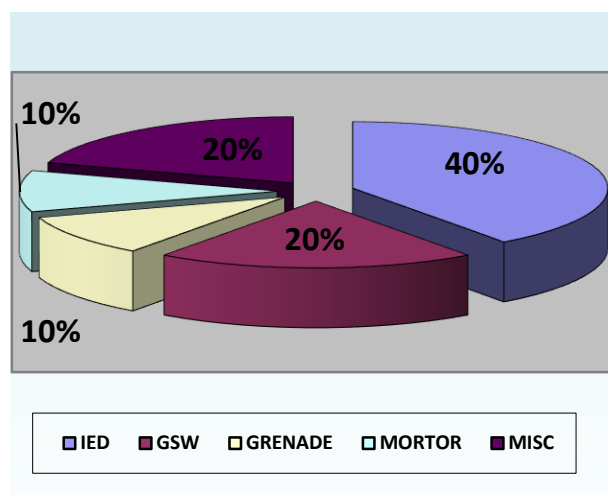


Fig 1:- Causes of ocular injuries (n=95)

IED Improvised explosive device
 GSW..... Gunshot wound
 MISC..... Miscellaneous e.g. dust, stone particles

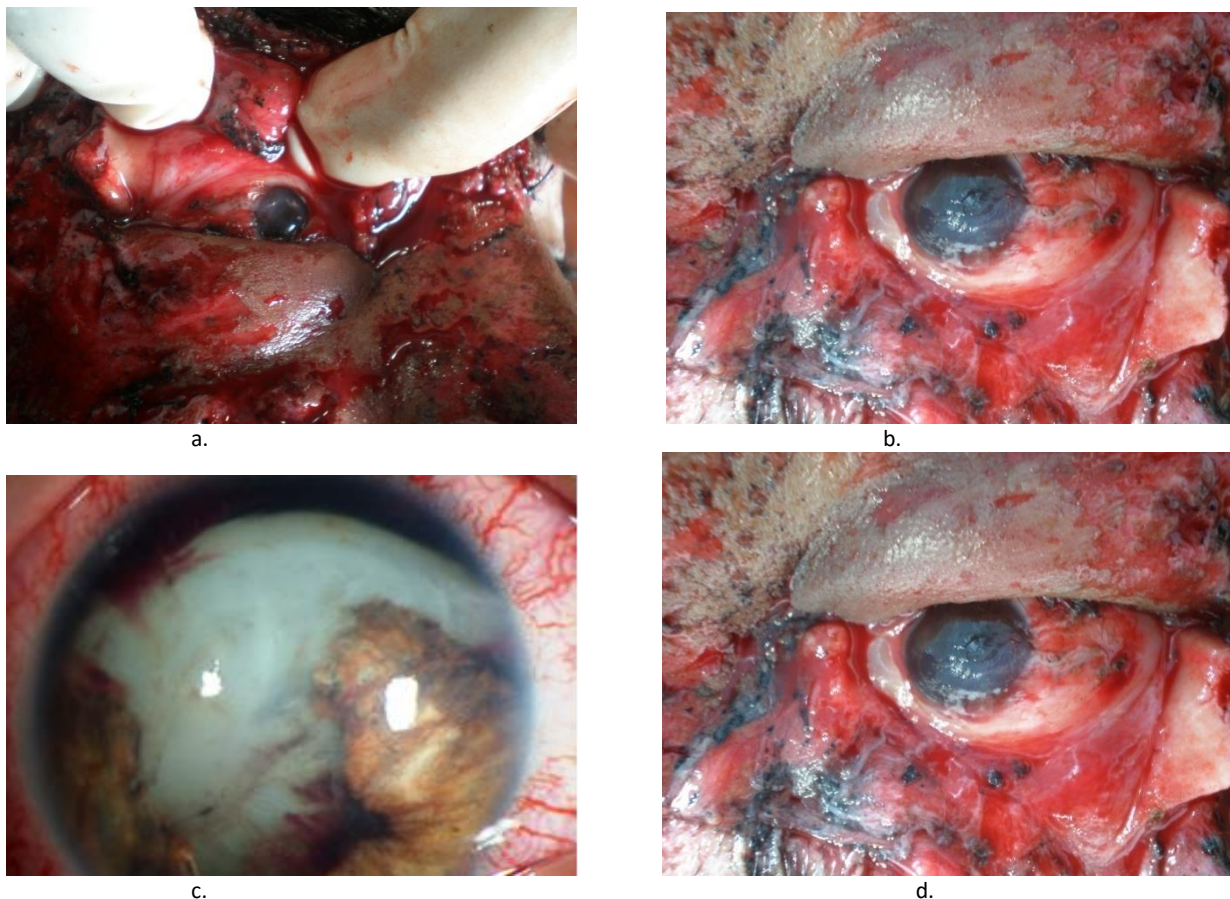


Fig 2:- (a&b) Severe ocular and adnexal injuries (c) Traumatic cataract along with traumatic iridectomy (d) Splinter injuries of eyes and face.

Table- 1: Description of different types of ocular injuries and their frequencies

Sr No	Type of ocular injury	Frequency (%)
1	Adnexal injuries	85 (89.5%)
2	Conjunctival laceration	20 (21%)
3	Conjunctival foreign body	12 (12.6%)
4	Subconjunctival haemorrhage	34 (35.8%)
5	Corneal oedema	22 (23.2%)
6	Corneal perforation	45 (47.4%)
7	Corneal foreign body/partial thickness laceration	23 (24.2%)
8	Scleral penetrating injury	9 (9.5%)
9	Hyphema	16 (16.8%)
10	Traumatic mydriasis/iridodialysis	17 (17.9%)
11	Traumatic cataract	23 (24.2%)
12	Subluxated crystalline lens	3 (3.2%)
13	Vitreous haemorrhage	38 (40%)
14	Foreign bodies in posterior segment	22 (23.2%)
15	Retinal detachment	8 (8.4%)
16	Choroidal detachment	4 (4.2%)
17	Totally ruptured and disorganized globe	11 (11.6%)

and sight threatening and generally result in poor visual outcome and cosmetic disfigurement even with immediate and planned surgical intervention^{1,7}.

Ocular trauma accounts for a significant percentage of the morbidity despite consistently improved therapeutic techniques for the management of such cases. Wong et al⁸ documented an increase in combat ocular injuries compared with other body part which is attributed to technologically advanced weaponry. A wide variety of explosive materials like thermobaric 'enhanced-blast explosives', explosive-formed projectiles, rocket-propelled grenades, land mines along with different devices such as improvised explosive devices (IED's) have been used for destructive purposes by terrorists / suicide bombers⁹⁻¹². The pattern of combat ocular trauma differs from that occurring in routine civil life in many respects. Male to female ratio is 24:1 in combat ocular trauma whereas in non combat ocular injuries it is only 4:1¹³. Bilaterality and associated injuries are also found more in combat ocular trauma⁵. The spectrum of types of ocular injuries is wide depending upon the explosive material used¹, circumstances under which the injury occurred and whether the victim was wearing protective polycarbonate glasses or not.

This study elaborates spectrum of ocular injuries incurred to Pakistan Armed Forces Personnel fighting against militants in various operational areas like Mahmand agency, Bajour agency and Waziristan. In this study all patients were male (18-40 years of age). Sixty six patients (69.5%) in our study were between 18-28 years of age, because of active involvement of young soldiers and officers in war. This pattern of male preponderance is frequently observed in war injuries and is also documented by some other studies^{7,14,15}. In our study, bilateral ocular damage was found relatively less (44.2%) as compared to monocular damage (55.8%). In contrary to it, high frequency of bilateral ocular damage was reported by Muzaffar W et al¹⁴. Open globe injuries occurred in 56.8% of our patients. This high frequency is attributed to more exposure to splinters. Open globe injuries meet more frequently and with more severity in combat related trauma leading to high rates of complications, poor visual outcome and increased number of primary enucleation^{1,7,12}.

A high frequency of open globe injuries occurring in various war campaigns like Operation Iraqi Freedom and mine explosion is also reported in literature^{12,14}. In our study, retained intra ocular foreign body cases account for 23.1%. Frequency of retained intraocular foreign bodies is reported to be 43.4% by Weichel et al¹⁶ and 20.5% by Khan et al¹⁷. Primary enucleation was performed in 11.5% cases where eye ball was severely traumatized and disorganized. Frequency of primary / secondary enucleation or evisceration is high in cases of open globe injuries⁷. During operation Iraqi Freedom, 38% eyes of patients with perforating globe injuries underwent primary enucleation and 18.5% underwent secondary enucleation within 2 weeks of injury¹².

It is worth mentioning that none of the injured soldiers was wearing protective eyewear. This protective eyewear, as proven by international studies, has a protective role against open globe injuries^{7, 14}.

CONCLUSIONS

In modern warfare, combat ocular trauma is presenting with various manifestations, from trivial non sight threatening injuries to devastating open globe injuries resulting in significant ocular morbidity. This casts long lasting physical, moral, social and economic implications. Prophylactic measures, such as internationally recommended polycarbonate ballistic protective eyewear are helpful in reducing the likelihood of perforating injuries.

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