FIELD MEDICINE

SPECTRUM OF MINE BLAST OCULAR INJURIES

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ABSTRACT

Objective: To describe the pattern of injuries and common ocular manifestations due to landmine explosion in patients evacuated to Combined Military Hospital Pano Aqil.

Study Design: Prospective, observational case series.

Place and Duration of Study: Eye Department, CMH Pano Aqil from Jan 2006 to Aug 2007.

Patients and Methods: Thirty seven consecutive patients with mine blast ocular injuries were evaluated for types, pattern and extent of ocular damage. A detailed ophthalmic examination was carried out and all the relevant information was endorsed on a pre devised proforma. Patients were managed conservatively or surgically according to their ocular condition.

Results: All the patients were male with most of them (59%) in 3rd decade of life. Most common ocular injuries were closed globe injuries with or without adnexal involvement. Penetrating injury was found in 14(27%) eyes with poor visual outcome. Major vision threatening complications were corneal opacity (29%) and cataract (19%).

Conclusion: The morbidity relating to mine blast ocular injuries is quite high. Exercising strict preventive measures and use of internationally recommended protective gear during move and maneuvers in high risk areas would provide better protection in case of such eventualities.

Keyword: Mine Blast Injury, Anti-personnel mine, Eye Injuries

INTRODUCTION

The menace and mutilation caused by landmines remain one of the most unmet challenges of the modern day preventive medicine. An estimated 110 millions landmines currently exists on earth in around 70 countries, killing or wounding around 2000 people every month[1-3]. There are two main types of landmines; (i) Anti-personnel mines and (ii) Anti vehicle/anti tank mines. Production cost of a landmine may be as little as 3 US dollars, but as many as 300-1000 US dollars may be require to clear one[4,5]. Anti-personnel landmines are one of the deadliest weapons developed so far that have crippled individuals, handicapped families and distorted entire societies. One of the Khmer Rouge general narrates "a landmine is a perfect soldier, ever courageous, never sleeps, never misses"[4].

Landmines injuries are classified into three common patterns by international committee of red cross (ICRC); Pattern 1-traumatic amputation of a foot or leg with less severe injuries elsewhere, Pattern 2- multiple fragment wounds, Pattern 3- upper limb and face, eye, and chest injuries[6,7]. Landmines injuries are primarily blast injuries as a result of the blast wave pressure effects on the body tissues, but secondary fragmentation injuries do occur as the high velocity mine fragments or surrounding environmental debris are blasted at the victim[3,8,9]. Flying fragments usually cause penetrating ocular injuries and the explosive blast force causes concussion of the eyeball. The extent of injury varies according to the size and velocity, the depth of penetration and the site of impact of the flying fragments.

This study focuses on the pattern and types of injuries and the common ocular manifestations and complications of mine blast injuries.

PATIENTS AND METHODS

A hospital-based observational study was carried out in Eye department of CMH Pano Aqil from Jan 2006 to Aug 2007. Thirty seven consecutive patients who sustained mine blast injuries were prospectively evaluated for type, pattern and extent of ocular injuries. All the casualties were received from the mine laden areas of Dera Bugti, Sui and Kohlu in Balochistan. All the patients were admitted in

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the hospital and provided with prompt initial resuscitative care in collaboration with surgical team, where required. The extent and severity of ocular damage was assessed and managed accordingly in each case. Primary repairs and debridements were carried out where required, often in co-ordination with the surgeons who performed the required surgical procedures during same general anesthesia. After the initial life and limb saving procedures, a detailed ophthalmic examination was carried out including assessment of visual acuity, slit lamp examination, 90 D fundus examination, direct/indirect ophthalmoscopy and measurement of intraocular pressure (where feasible). Information recorded on a formal proforma that included demographic data, details of eye injury, activity at the time of injury, whether eye protection was used, and the type, location and pattern of injury. Internationally accepted "Birmingham Eye Trauma Terminology" (BETT) was used to describe the pattern of ocular injuries[10] (Fig.1).

Radiological studies including X-ray orbit and B-scan ultrasonography were done in cases of suspected intraocular foreign body (IOFB) and eyes with hazy media. Subsequent treatment varied from patient to patient and included conservative treatment (topical and systemic antibiotics, steroids and anti-glaucoma drugs) and/or secondary surgical procedures for various ocular complications. Patients with posterior segment damage and retained IOFB were transferred to tertiary care hospital where facilities of vitreo-retinal surgery were available. Frequency and duration of follow up visits varied according to the ocular condition of individual patients.

Statistical analysis of the data was done using SPSS version 13.0. Descriptive statistics i.e. mean ± standard deviation for numerical values and frequencies along with percentages for categorical variables were used to describe the data.

RESULTS

A total of 52 eyes of 37 patients were affected by mine blast injuries. Bilateral ocular involvement was present in 15 (41%) patients (Fig 2). All the victims were male with 27 patients being on active military duty while 10 were civilians. Age spectrum ranges from 5 years to 45 years, with mean age being 28.27 ± 7.33 years (Fig 3). The youngest and the oldest casualties were both civilians. Almost all the casualties resulted during patrolling, working or moving on foot/vehicle through the mine laden areas. None of the victims was wearing internationally recommended protective eye gear at the time of accident. Mean duration of hospital stay was 22.86 ± 16.01 days (Range 4 to 55 days).

Pattern of ocular morbidity is given in table 1. Most common ocular injuries were closed globe injuries with or without adnexal involvement. Most frequent ocular manifestations of mine blast injuries were corneal odema (35 %), hyphaema (29%), iris

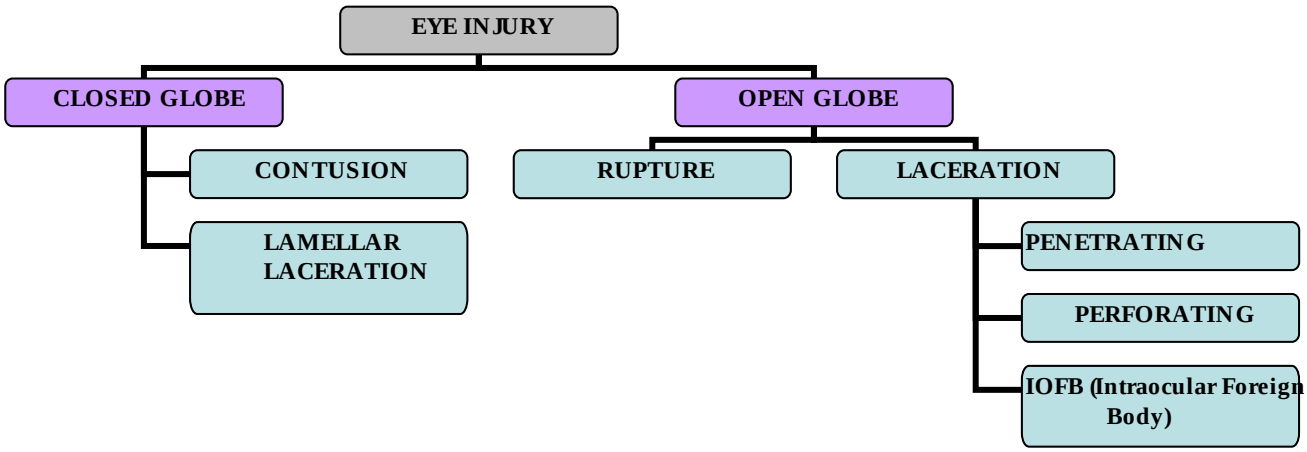

Fig 1: BETT Classification of Ocular Injuries

damage (38 %) and vitreous loss / hemorrhage (29%) (Table-2). Major vision threatening complications developed during early post injury period or later on included cataract (19%), glaucoma (10%) and visually significant

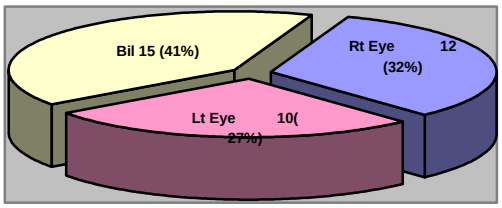

Fig 2: Ocular involvement

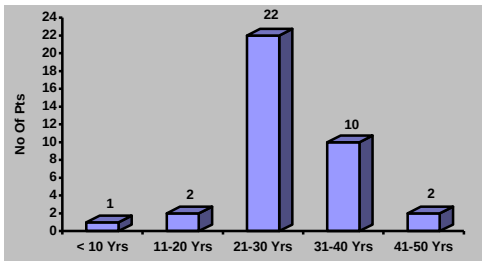

Fig 3: Age Spectrum

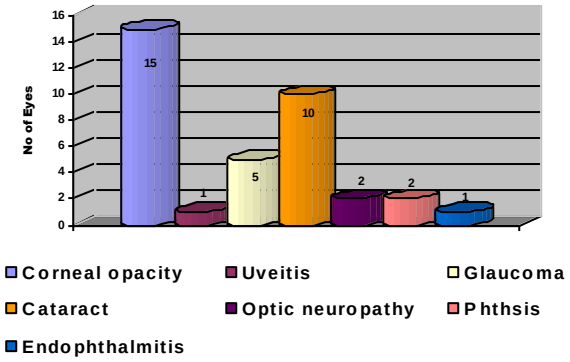

Fig-4: Ocular complications (n = 52)

corneal opacity (29 %) (Fig. 4 & 5)

DISCUSSION

The results of this study indicates that ocular trauma due to mine blast explosion is a significant cause of ocular morbidity. All patients in this series were male. This pattern of male predominance with incidence of 100%, 97% and 95% is also quoted by other studies[4,9,11]. Outdoor occupational hazards in males are the reason for high incidence of ocular trauma in males. 22 (59%) patients in our study were in their 3rd decade of life. In Khan's study, 68.3% patients were aged 16-30 years, whereas Zerihum observed 65% of cases

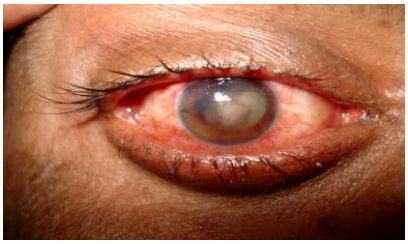

Fig 5: Traumatic Cataract

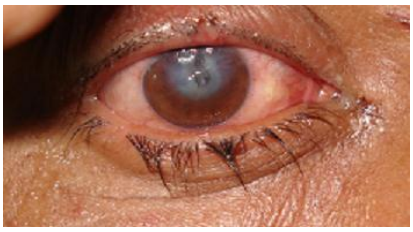

Fig 6: Penetrating eye Injury

Table 1: Types of ocular injuries

Type of Injury	No of Eyes (n = 52)	Percentage*
Closed Globe Injury		
Superficial Foreign Body	32	62%
Lamellar Laceration	9	17%
Concussion	12	23%
Open Globe Injury		
Penetrating/perforating injury	14	27%
IOFB	8	15%
Adnexal Injury	21	40%

* The occurrence of multiple manifestations simultaneously accounts for the % distribution of > 100%

Table 2: Ocular Manifestations

Ocular Finding	No of Eyes (n = 52)	Percentage*
Conjunctival Laceration	9	17%
Sub Conjunctival Hemorrhage	10	19%
Corneal Odema	18	35%
Corneal perforation	10	19%
Hyphaema	15	29%
Iris damage/prolapse	20	38%
Traumatic Mydriasis	8	15%
Scleral rupture	5	10%
Vitreous Hemorrhage/Loss	15	29%
Retinal Detachment	5	10%

* The occurrence of multiple manifestations simultaneously accounts for the % distribution of > 100%

were between 15-25 years of age[11,12]. Bilateral ocular damage was present in 15 (41%) patients, which is quite lower than the figures of 78.4% and 72% observed in other studies[4,9]. However, an incidence of 30% bilateral ocular involvement quoted by another study nearly corresponds with our results[12].

The ocular surface measures only 0.1% of the erect frontal profile of the body, but the incidence of battle eye injuries varies from 8-17%[8,13-15]. The eye injury is sustained from the fragments, mud or sand thrown up by the explosion. Open globe injuries are fairly common traumatic ocular emergencies with an incidence of 73.4% and 46.15% reported by Jan S et al and Babar TF et al in their studies[16,17]. Fourteen (27%) eyes in our series had penetrating eye injuries with unfavorable visual outcome despite timely and adequate treatment (Fig. 6). Incidence of penetrating eye injuries due to mine explosion was 89%, 77%, 48%, and 39.4% as quoted by various other authors in their studies[9,11,13,14]. In our study retained IOFB with significant ocular damage accounts for 15% of eyes, compared with an incidence of 20.5% due to bomb and dynamite blasts reported by Khan et al[18].

Prolonged and extensive medical care and rehabilitation is usually required for landmine victims, which is not often available from already exhausted and overstretched health resources. Mean hospital stay of patients in our study was approximately 3 weeks. Prolonged hospital stay in case of mine blast victims ranging from 2 to 8 weeks has also been quoted in other studies[1,5,8]. Prolonged hospitalization of such patients has profound psychological implications and economic setbacks for the societies. There is a dire need to address the preventive aspect of occupational injuries and mandatory use of protective eye gears and clothing during such operations is likely to reduce the risk of mine blast injuries.

CONCLUSION

Landmine injuries bring about an arduous challenge to both victims and treating surgeons. The complications and morbidity rate due to landmine ocular injury is quite high causing tremendous social, economic, health and political constraints on the affected societies. Hence, a conscious and sincere effort is required to enforce preventive measures and use of protective gears to avoid the legacy of blinded young individuals in our society.

REFERENCES

1. Khan MI, Zafar A, Khan N, Saleem M, Mufti N. Outcome of tissue sparing surgical intervention in mine blast limb injuries. J Coll Phys Sugr Pak 2006; 16: 12: 773-6.
2. Horrock C, Brett S. Blast Injury. Current Anesthesia and Critical Care 2000; 11: 2: 113-9.
3. Khan JA, Majeed FA. Association of mine blast injury with radiopaque foreign body on radiology and assessment of the severity and area involved. Pak Armed Forces Med J 2006; 56: 4: 351-6.
4. Muzaffar W, Khan MD, Akbar MK, Khan MD, Malik AM, Durrani OM. Mine blast injuries : Ocular and social aspects. Br J Ophthalmol 2000; 84: 626-30.
5. Andersson N, Sousa CP, Paredes S. Social cost of land mines in four countries: Afghanistan, Bosnia, Cambodia and Mozambique. Br Med J 1995; 311: 718-21.
6. Hanevik K, Kvale G. Landmine injuries in Eritrea. Br Med J 2000; 321: 1189.
7. Coupland RM, Korver A. Injuries from antipersonnel mines: the experience of the international committee of the Red Cross. Br Med J 1991; 303: 1509-12.
8. Harjai MM, Agarwal DC, Dave P, Jog SS, Arora P. Mine blast injuries - our experience. Med J Armed Forces India 2005; 61: 143-7.
9. Jackson H. Severe ocular trauma due to landmines and other weapons in Cambodia. J Comm Eye Health 1997; 10: 23: 37-9.
10. Kuhn F, Morris R, Witherspoon CD. Birmingham Eye Trauma Terminology (BETT): terminology and classification of mechanical eye injuries. Ophthalmol Clin North Am 2002; 15: 2: 139-43.
11. Khan MD, Kundi N, Mohammad Z, Nazeer A, Gulab A. Ocular war trauma in Afghan refugees of Russian invasion. Pak J Ophthalmol 1987; 3: 75-8.
12. Zerihum N. Blast injuries of the eye in Ethiopia. J Comm Eye Health 1997; 10: 23: 40-42.
13. Pillgram-Larsen J, Mellesmo S, Peck R. Injuries from mines [Article in Norwegian]. Tidsskr Nor Laegeforen 1992; 112: 17: 2183-7.
14. Singh NB, Madan VK, Deshpande M, Gupta RP, Shrivastava SK. Ocular injuries in IPKF in Srilanka. Med J Armed Forces India 1990; 46: 3: 159-64.
15. Ari Ab. Eye injuries on the battlefields of Iraq and Afghanistan: Public health implications. Optometry 2006; 77: 7: 329-39.
16. Jan S, Khan S, Khan MN, Iqbal A, Mohammad S. Ocular emergencies. J Coll Phys Sugr Pak 2004; 14: 6: 333-6.
17. Babar TF, Khan MT, Marwat MZ, Shah SA, Murad Y, Khan MD. Patterns of Ocular trauma. J Coll Phys Sugr Pak 2007; 17: 3: 148-53.
18. Khan MD, Kundi N, Mohammed Z, Nazeer AF. A 6 1/2-years survey of intraocular and intraorbital foreign bodies in the North West Frontier province, Pakistan. Br J Ophthalmol 1987; 71: 716-9.