

Ocular Injuries in Earthquake Victims

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Abstract

Background: To determine pattern of ocular injuries sustained during earthquake that hit north of Pakistan in Oct. 2005.

Methods: It was a case-control study which included, all thirty-one patients who presented to or were referred to the eye departments of Rawalpindi General Hospital and Holy Family Hospital (both tertiary care teaching hospitals attached to Rawalpindi Medical College). The injuries and their management were documented and analyzed.

Results: Ocular injuries were 0.19% of the total patients received at these hospitals. Females were twice more affected than males. Children and young adults were more affected. Most of the patients were residents of Muzaffarabad. Most common presenting complaint was esotropia resulting from cranial nerve palsies followed by lacerations of periorbital skin, fractures of orbital and facial bones and the base of skull and ocular penetrating injuries. Associated injuries were cranial nerve palsies, fractures orbit, facial bones and base of skull. Head injury was common among one third of them. Most common diagnosis was multiple cranial nerve injuries followed by isolated 6th nerve palsy.

Conclusion: Pattern of ocular injuries sustained during earthquake is quite different from injuries incurred from other sources of trauma.

Introduction

Each year, approximately 16 earthquakes occur throughout the world that results in significant loss of human life^{1,2}.

People of south Asia especially of Pakistan were hit by its worst natural disaster in the shape of earthquake of magnitude of 7.6 on Richter scale on 8th of Oct 2005. This disaster left more than 73 thousand people dead and about 70 thousand seriously injured. It made about 4 million homeless in Pakistan. It is estimated that damages incurred were well over US \$ 5 Billion (30 Billion

Pakistan Rupees)³.

Earthquake losses, like those of other disasters, tend to cause more financial losses in industrialized countries and more injuries and deaths in undeveloped countries^{5, 6}. Deaths and injuries from earthquakes vary according to the type of housing available, time of occurrence, and population density. Common injuries include cuts, broken bones, crush injuries, and dehydration from being trapped in rubble. Stress reactions are also common⁶⁻⁸.

Disaster of such magnitude was new to this area. We observed and analyzed pattern of ocular injuries in patients received at Rawalpindi General Hospital and compared our results with other studies.

Patients and Methods

All 31 patients who presented to or were referred to the eye departments of Rawalpindi General Hospital and Holy Family Hospital with significant ocular problems (those resulting in visual and structural handicap) from 8th October 2005 onwards were included in our study. Patients with mild ocular complaints like congestion and subconjunctival haemorrhage without any other significant clinical feature were not included.

Most of the patients were managed in ophthalmic wards. Penetrating injuries, lid lacerations and orbital injuries were operated under microscope in Eye operation theatre. Patients with major surgical and orthopaedic problems were managed in respective wards. Patients with associated injuries like fractures of facial bones as Lefort fractures were managed jointly with maxillofacial surgeons. Neurosurgeons and neurophysicians were also involved in certain cases.

Blood CBC, Urine RE, X-Ray Orbit and skull were taken. CT scan of orbit and brain was done. Head injury was managed by surgical unit. Patients with cranial nerve injuries were treated medically with systemic steroids and supportive

medicine.

Table 1: Age of Patients (n=31)

Age in years	No. of cases	Percentage
< 5	00	00%
5 - 10	10	32%
11 - 20	04	13%
21 - 30	07	23%
31 - 40	08	26%
41 - 50	00	00%
> 50	02	06%

Table 2: Presenting Complaints (n=31)

Disease	No. of cases	Percentage
Esotropia	12	40%
Lid tear	02	06%
Diplopia	02	06%
Exotropia + Ptosis	02	06%
Lid tear + decreased elevation	02	06%
Unable to close the eye	02	06%
Penetrating injury	04	13%
Unable to see	05	17%

Results

Among the 31 patients studied 21 (68 %) were female and 10 (32%) were male. The most commonly affected age group was between 5-10 years (32%), followed by 21-30 years (23%), 31-40 years (26%) and over 50 years (6%) (Table 1). Two third of patients (66%) were from Muzaffarabad.

Table 3: Associated Injuries (n=31)

Disease	No. of cases	Percentage
Face lacerations	04	13
Head Injury	11	38%
6th nerve palsy	04	13%
7th nerve palsy	02	06%
6th + 7th nerve palsy	02	06%
6th + 8th nerve palsy	02	06%
3rd nerve palsy	02	06%
6th + 3rd nerve palsy	02	06%
2nd nerve palsy	02	06%

Head injury was present in 11 patients (38%), 4 patients (13%) had face lacerations. 6th nerve was the most commonly affected cranial nerve, being affected alone in 4 patients (13%) and with 7th nerve, 8th nerve and 3rd nerve in 2 patients (6%) each.

Table 4: Fractures (n=31)

Disease	No. of cases	Percentage
Lateral + inferior orbital wall	06	22%
Base of Skull	04	14%
Roof of orbit	02	08%
Blow out fractures	02	08%
Mandible + nasal bone	02	08%
Greater wing of sphenoid	02	08%
Occipital bone	02	08%
Lefort	02	08%

2nd nerve, 3rd nerve and 7th nerve were also affected alone in 2 patients (6%) each (Table 3). Presenting complaint was esotropia in 12 patients (40%), penetrating injuries in 4 (13%), loss of vision in 5 (17%), lid tear 2 (6%), diplopia, exotropia with ptosis, decreased elevation, unable to close eye and cellulitis in 2 (6%) patients each (Table 2).

Regarding fractures, lateral and inferior orbital wall was involved in 6 patients (22%), base of skull in 4 patients (14%), with roof of orbit, blow out fractures, greater wing of sphenoid, mandible and nasal bone, occipital bone, Lefort 3 involved 2 patients (8%) each. 2 patients (8%) had soft tissue swelling of brain and 2 (8%) had sub-dural haematoma (Table 4).

Final diagnosis was multiple cranial nerve injuries in 11 patients (19%), 6th nerve palsy in 8 patients (15%), corneal tear in 4 patients (7%), lid tear in 2 patients (4%), 3rd nerve in 2 patients (4%), 7th nerve palsy in 2 patients (4%) and cellulitis in 2 patients (4%) (Table 5).

Discussion

Morbidity and mortality from earthquake vary according to the type of housing available, time of occurrence and population density. The houses mostly built in hilly areas are made of stones mounted on stony earth. Foundation is not dug deeply because

of the hard stony nature of land. The worst affected areas are rural areas where people build houses on their own without any planning and proper engineering design. Possibility of earthquake is also not taken into consideration. Unfortunately most affected buildings were of schools, colleges, hospitals and other government offices.

Females and the elderly have consistently been identified as having increased risk for death and injury in an earthquake, but few studies are controlled for seismic or building confounders⁵.

Table 5: Final Diagnosis (n=31)

Disease	No. of cases	Percentage
Multiple nerve injuries	11	35%
6th nerve palsy	08	25%
Corneal tear	04	12%
Lid tear	02	06%
3rd nerve palsy	02	06%
7th nerve palsy	02	06%
Cellulitis	02	06%
Shearing of optic nerve	02	06%
Fractures	22	71%

Timing of earthquake is also important. This one occurred at about 9.00 am when most of family members were away working in fields. This is the reason why more females were affected. Being a working day the schools and colleges were open so more children and young adults were affected.

The types of injuries were different from those usually encountered. Most common presenting complaint was esotropia and most common final diagnosis was 6th nerve palsy. This was because most of the injuries sustained were due to collapsed buildings and involved trauma to head and neck. Sixth nerve palsy can be a false localising sign as it is the most commonly affected nerve due to its special anatomical position. Fractures of orbital and facial bones were among the second most common diagnosis. Penetrating injuries were less common as compared to fractures and cranial nerve injuries.

Although the common occurrence of multiple cranial nerve palsies and isolated 6th nerve palsies may seem strange and different from patterns observed in other kind of disasters, it is actually sufficiently explained by the number of head injuries

sustained and their direct and indirect consequences. These injuries have been seen to be of a reversible nature in most cases with improvement seen as early as after one month in some. Penetrating injuries or globe ruptures were less commonly seen as compared to cranial nerve injuries and fractures. This probably was due to the natural protective reflex of man to cover the eyes and face at the time of disaster. It must be pointed out that the patients presenting to us were mostly those who had received moderately severe injuries. Those who had sustained severe crush injuries of the head and face probably did not live long enough.

The importance of psychological issues associated with other physical injuries should not be underestimated. One of our patients had an unexplainable visual loss in one eye. Quite remarkably her vision suddenly improved when her visual acuity was re-documented along with appropriate reassurance. This only highlights the need of provision of psychological support by doctors of all specialties.

The authors are grateful to Prof. S. Imtiaz Ali for his guidance and supervision of this paper.

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