Original Article

Epidemiology of Ocular Trauma in a Tertiary Hospital Setting

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Purpose: To determine the Epidemiology of Ocular Trauma in a Tertiary Hospital Setting.

Study Design: Cross-Sectional Study.

Place and Duration of Study: Ophthalmology Department, DHQ Teaching Hospital Gujranwala from December 2016- December 2017.

Material and Methods: All patients included in the study had the following data recorded at presentation and follow up; date, age, gender, location and nature of injury, residence place, cause of injury, duration of hospitalization, anatomical site, adjuvant treatment, initial and final best-corrected (Snellen) visual acuity. Data was classified into five groups on the basis of place of eye injury.

Results: The total numbers of patients was 95. Mean age of patients was 31.9 ± 18.1 years. Out of these patients, 80 (84.2%) were males and 15 (15.8%) were females. There were 23 (24.2%) patients in 1-18 years age group, 40 (42.1%) patients in 18-35 years age group and 32 (33.7%) in >35 years age group. The tissues involved during trauma included 22 (33.8%) lid tears, 30 (46.2%) corneal tears, 2 (3.1%) scleral tears and 8 (12.3%) corneo-scleral tears. The most common location of ocular trauma was workplace (31.5%), household injuries (27.4%), sports injuries (7.3%), animal related injuries (8.4% and miscellaneous (25.2%). Best corrected visual acuity (BCVA) improved in 28 (29.5%) cases, deteriorated in 8 (8.4% cases and remained same in 59 (62.1%) cases.

Conclusion: Young patients (18-35 years) are at more risk of ocular trauma especially at work, and this translates into a higher economic burden for the country at large.

Keywords: Ocular Trauma, Road injuries, Domestic injuries.

Ocular trauma is an injury or damage to the eye. The injury may have been due to chemical agents, radiation (ultraviolet or ionizing) and mechanical trauma (penetrating or blunt)[1].

Infiltrating objects can cause slashes of the cornea and sclera, can affect or involve iris, lens, choroid, retina & optic nerve. At times prolapse of vitreous and uvea is also observed[2]. Patients presenting with damage to the posterior segment have a poor prognosis compared to patients with anterior segment damage[3].

Coup, Countercoup and Ocular Compression are the three underlying mechanisms by which blunt trauma can harm the eye. Local harm at the site of effect is Coup, while countercoup alludes to damage at the contrary side of the eye. Ocular compression may cause scleral burst in eyes at zones where Sclera is thin (At sites of Muscle insertions)[4].

As per statistics, in young population a chief cause of visual loss is Ocular trauma. Study results of ocular trauma vary based on study design, geographical and societal factors. Every year, approximately 2.5 million eye injuries occur in the United States, of which, more

than 40 thousand results in permanent visual impairment. Rates have ranged from 8- 57/100,000, when eye injuries require hospital admission[5-7].

A population based investigation in USA showed a prevalence rate of 19.8% and a normal yearly rate of 3.1×1000 population[8]. Different Reports in Australia have assessed the yearly rate of all damages at 11.8/100,000 in rural setting and 15.2/100,000 in urban setting[9]. There are 200,000 open globe injuries a year estimated by the WHO Programme for the Prevention of Blindness[10-11].

In general, it seems that ocular trauma follows a bimodal age distribution, affects more males than females and occurs more frequently in the lower socioeconomic groups. A higher male prevalence might be relevant to work-related disclosure, interest in unsafe games and pastimes, liquor utilization, and hazard taking behaviour[12,14].

As most ocular injuries are preventable, epidemiological studies are useful in informing prevention of blindness programs. From a general well being and injury anticipation point of view, current data on eye injury rates can help to devise plans for general public to reduce their occurrence and to give guidelines on safety measures. This can save a major group of public from getting blind because of this preventable cause[13,15-18].

In this paper, we present the clinical profile of patients with ocular trauma presenting to the Ophthalmology Department at DHQ Teaching Hospital, Gujranwala, over a period of one year.

MATERIAL & METHODS

Study area included the city of Gujranwala, located to the north of Lahore in Pakistan. Gujranwala district is spread over an area of 3,622 km Square. Gujranwala is an industrial city with a large portion of population working in factories and related to industry for their household. The current population is just over 5,014,196.

A cross-sectional study was conducted at Ophthalmology Department, DHQ Teaching Hospital Gujranwala from December 2016 - December 2017. All patients who were admitted in Ophthalmology from December 2016 to December 2017 with ocular trauma were included in the study.

Ophthalmic unit of DHQ Hospital is the major adult eye trauma centre which serves as a major referral centre for a large geographic area. Data Collection was done from patient files through a pre devised Performa. There was no discrimination of age and gender among the patients. Patients with history of previous ocular trauma were excluded from the study.

All patients included in the study had the following data recorded at presentation and follow up; date, age, gender, location and nature of injury, residence place, cause of injury, duration of hospitalization, anatomical site, adjuvant treatment, initial and final best-corrected (Snellen) visual acuity.

Data was classified in five groups on the basis of place of eye injury: Injuries which happened at home (Door Strike, fall from bed & others), Injuries which happened while at work (Occupational), Injuries which happened during recreational activities (Sports Injuries), Injuries related to the animals & others / Miscellaneous (road accident related injuries, assault related injuries, and various outdoor activities related injuries).

Injuries were classified according to the Birmingham Eye Trauma Terminology system. Data collection included; Demographic details (age, gender), Tissues involved during Trauma, Clinical features at the time of presentation. (Frequency of Iris prolapse, Traumatic Cataract, Retinal Detachment, IOFB, Visual Axis Involvement), Frequency distribution of form of object, Comparison of BCVA, as per Snellen's Chart, before and after treatment, relation with gender and age group.

RESULTS

Total numbers of patients was 95. Mean age group of patients was 31.9 ± 18.1 years. Out of 95 patients, 80 (84.2%) were males and 15 (15.8%) were females (Table 1). There were 23 (24.2%) patients in 1 - 18 years age group, while 40 (42.1%) patients in 18 - 35 years age group and 32 (33.7%) in > 35 years age group respectively (Table 2).

Table 1: Frequency distribution of gender.

Gender	Frequency	Percent
Male	80	84.2
Female	15	15.8
Total	95	100.0

There were 65 patients with full thickness lacerations. Out of these 22 (33.8%) were lid tears,

Table 2: Frequency distribution of age groups.

Age Groups	Frequency	Percent
1-18 years	23	24.2
18-35 years	40	42.1
>35 years	32	33.7
Total	95	100.0

while 30 (46.2%) were corneal, 2 (3.1%) were scleral and 8 (12.3%) were corneo-scleral respectively. Remaining 30 patients were admitted with other complaints following trauma including hyphema (10), Preseptal/orbital Cellulitis (5), Corneal Abscess after H/O Foreign Body (9), macular Hole (2), Retinal Detachment (5) and Others (4), (Table 3).

Table 3: Type of Tear & Tissue Injured

Type of tear	Frequency	Percent
Lid	22	33.8
Corneal	30	46.2
Scleral	2	3.1
Corneo-scleral	8	12.3
FB	2	3.1
Perforation	1	1.5
Total	65	100.0

Intraocular foreign bodies (IOFB) were found in 10 (12.7%) and iris prolapse in 19 (24.1%). Visual axis was involved in 27 (35.5%), Incidence of traumatic cataract was 22.5%. Retinal detachment occurred in 5 (6.3%) patients (figure 2).

In type of object, 34.7% of trauma was related to sharp objects, 64.2% to blunt objects and 1.1% to liquid (Table 4).

The most common location of ocular trauma was Work place (31.5%), this was followed by household injuries (27.4%). Sports injuries accounted for (7.3%) of the total ocular trauma cases, animal related injuries (8.4%) and others (25.2 %) (Outdoor activities, RTA) (Table 5).

Table 4: Frequency distribution of form of object.

Object Form	Frequency	Percent
Sharp	33	34.7
Blunt	61	64.2
Liquid	1	1.1
Total	95	100.0

Table 5: Frequency distribution of Place of Injuries.

Place of Injuries	Frequency	Percent
Occupational	30	31.5
House-hold	26	27.4
Sports injuries	7	7.3
Animal related	8	8.4
Others	24	25.2
Total	95	100.0

Best corrected visual acuity (BCVA) improved in 28 (29.5%) cases, BCVA deteriorated in 8 (8.4%), Pre-operative and post-operative BCVA was same in 59 (62.1%) (Table 6).

Table 6: Frequency distribution of post-operative BCVA.

Post-operative BCVA	Frequency	Percent
Same	59	62.1
Improved	28	29.5
Decreased	8	8.4
Total	95	100.0

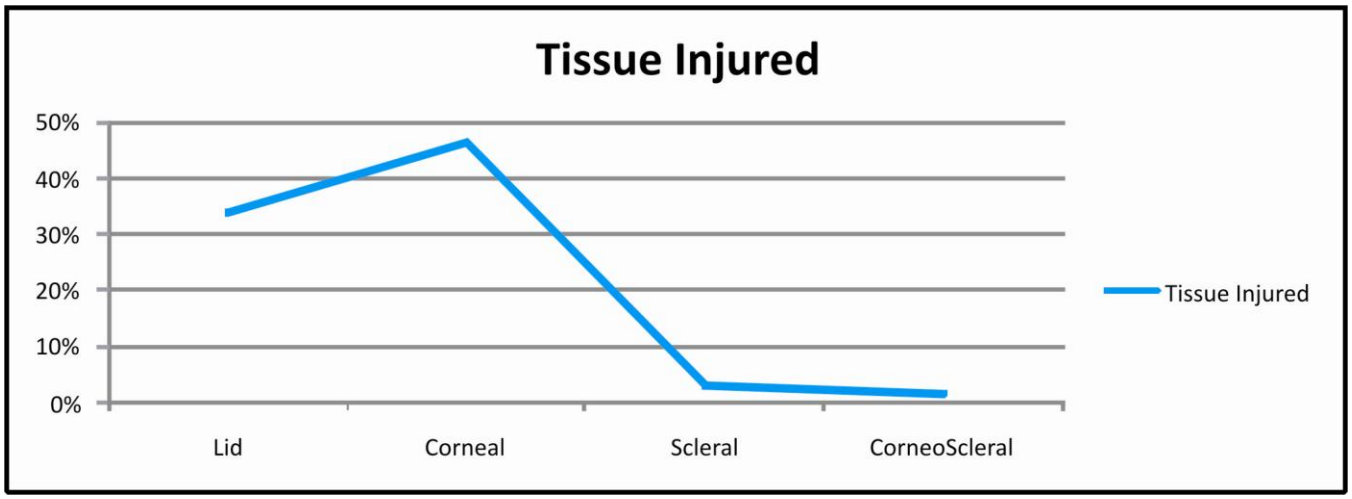

Fig. 1: Tissues involved/injured during trauma

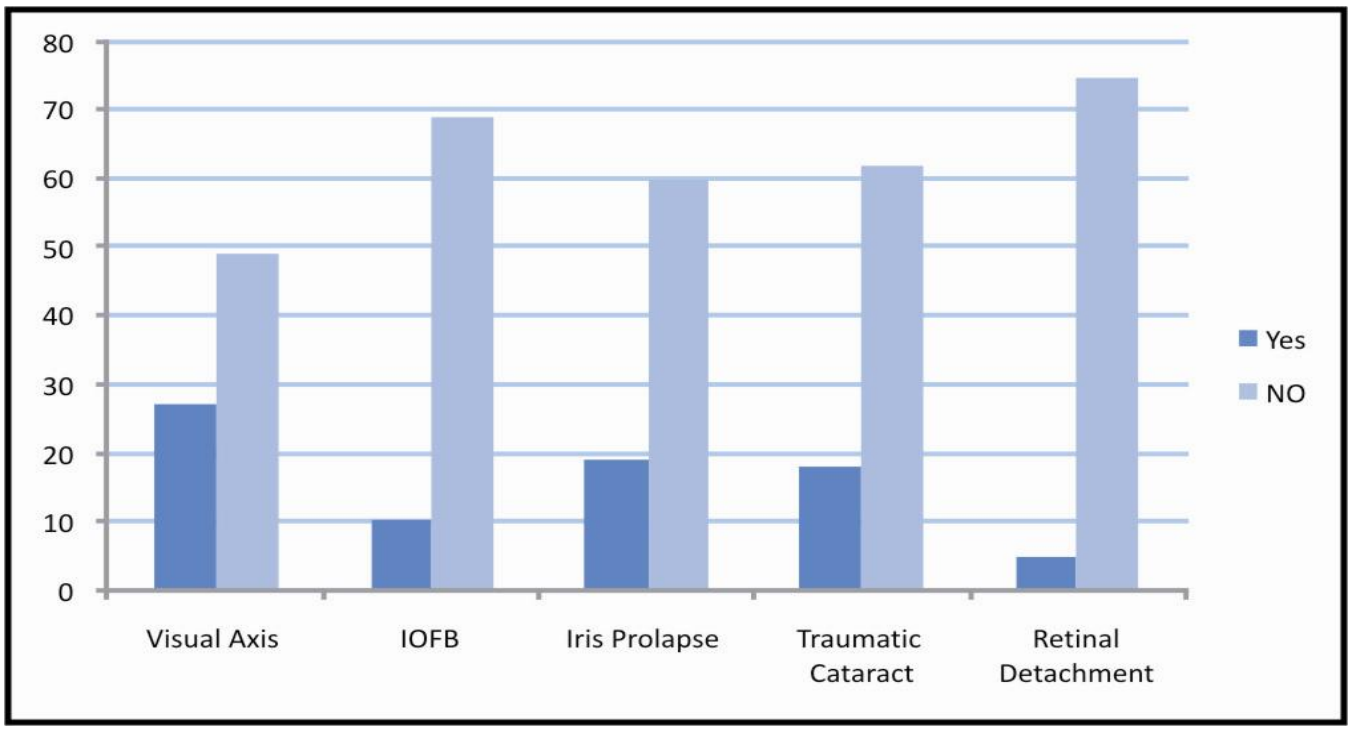

Fig. 2: Frequency distributions of Visual Axis (Involved/Not Involved), IOFB (Yes/No), Iris Prolapse (Yes/No), Traumatic Cataract (Yes/ No), Retinal Detachment (Yes/ No).

Improvement in post-operative BCVA in male (24%) was better than females (7%) (Table 7).

Improvement in post- operative BCVA in age group 18 - 35 years was (15%) better than age groups < 18 Years (8%) and < 35 years (5%) (Table 8).

According to injury distribution (as per Birmingham Eye Trauma Terminology), 34 (46.6%) were closed globe injuries, while 39 (53.4%) were open globe injury. Among closed globe injury, Contusion were 23 (67.6%) and 11 (32.4%) were Lamellar Lacerations. Among Open globe injury, Lacerations were 28 (71.8%) and 11 (28.2%) were Ruptures. According to laceration distribution, 23 (82.1%) were penetrating, while 5 (17.9%) and 0 (0.0%) were IOFB and perforating respectively (Figure 3).

Table 7: Comparison of post-operative BCVA with gender.

Gender	Post-operative BCVA			Total	p-value
	Same	Improved	Decreased		
Male	49	24	7	80	0.917*
	83.1%	85.7%	87.5%	84.2%	
Female	10	4	1	15	
	16.9%	14.3%	12.5%	15.8%	
Total	59	28	8	95	
	100.0%	100.0%	100.0%	100.0%	

*Applying Chi-Square test

Table 8: Comparison of post-operative BCVA with age.

Age Groups	Post-operative BCVA			Total	p-value
	Same	Improved	Decreased		
1-18 years	15	8	0	23	0.137*
	25.4%	28.6%	0.0%	24.2%	
18-35 years	21	15	4	40	
	35.6%	53.6%	50.0%	42.1%	
> 35 years	23	5	4	32	
	39.0%	17.9%	50.0%	33.7%	
Total	59	28	8	95	
	100.0%	100.0%	100.0%	100.0%	

*Applying Chi-Square test

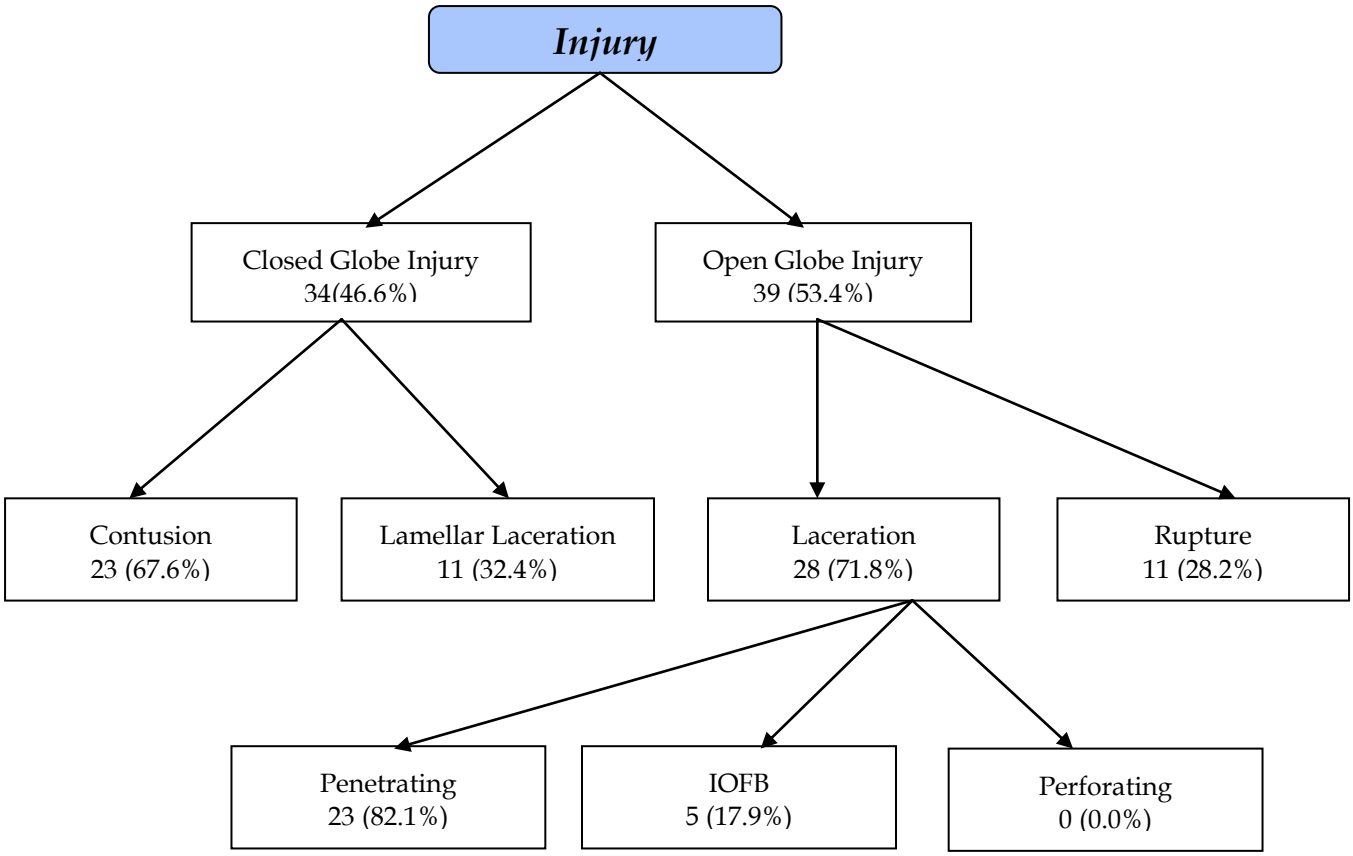

Fig. 3: Flow Chart. (Birmingham Eye Trauma Terminology)

DISCUSSION

This study found that most injuries occurred in males 80%. Mean age of patients was 32 years. Blunt objects accounted for most of the injuries with the cornea being the most affected tissue followed by eyelids. Open Globe Injuries occurred in 53.4% of patients. Most common place of ocular trauma was Occupational Injuries followed by house hold injuries including fall, door injuries and accidental injuries.

Our study found that Improvement in best corrected visual acuity (BCVA) occurred in 29.5% cases, BCVA became worse in 8 (8.4%), Pre-operative and post operative BCVA was same in 59 (62.1%). It was also noted that improvement in Post Operative BCVA was more in those falling in age group 18-35 years (53%) as compared to age groups 1-18 years (28.6%) and age group > 35 years (17.9%).

About (80%) of the ocular injuries occurred in men, in age groups 18–35 years of age. This is the most productive age group. Similar results are observed in other studies around the globe.

Kikira, et al., found that, retina, optic nerve injuries and posterior vitreous are accounted for 12.7% of all blunt trauma eye injuries[19]. In another study by Soliman M in Egypt reported that, out of 153 eyes, after blunt trauma, 2.5% had vitreous haemorrhage with retinal detachment[20].

The site of visual injury in the USA is taking a move from work environment to domestic established wounds. This is because of laws implementing the utilization of defensive wear at the work environment and an expansion in the quantity of elderly individuals[21]. Attack is the reason for eye damage in 19% of injuries in the USEIR, 1% of which are self inflicted[22].

Kikira, et al. in Kenya watched low speed rockets to represent the primary etiological factors.[19] High speed rockets like explosive and slings represented less cases in contrast with Oluwole Omolase in Nigeria who discovered metallic things to cause the vast majority of the injuries with 21.2%[23].

This study is limited by its relatively small size for internal sub-group comparison and the retrospective design. Data extracted included information which

was available from patient's record files. A few things like the Nature of job, Primary health care facility contact or referral information use of any eye protection device were not mentioned in few cases. Although DHQ Teaching Hospital is a main tertiary eye hospital in Gujranwala Division the statistics are not representative of the whole country.

CONCLUSION

This study has a number of implications nationally and internationally. On a local level, there needs to be collaboration between the different health-care facilities to collect population-based data and informing the need for establishing an ocular trauma registry where by standardization of documentation is possible.

The young (18-35 years) are more at risk of ocular trauma, and this translates into a higher economic burden to the country at large. Work related injuries, especially among the working class are preventable, and there needs to be a public health initiative to promote the importance of protective eyewear.

Health related education and mindfulness about the quality of life following blindness is required. Delayed presentation need to be addressed. In underdeveloped area of the country this campaign is needed on a large scale. The staff of Basic health care Units and Rural health care Centers should be trained to provide initial care and timely referral to the tertiary health care facilities.

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Hamza Iqbal
Data Collection from hospital record and transfer of data to Performa.

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