Epidemiological Characteristics and Visual Outcome of Ocular Trauma in Southern Assam in a Tertiary Care Center

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ABSTRACT

Introduction: Ocular trauma is a major cause of preventable monocular blindness and visual impairment in the world. Timely intervention can make huge difference in the final visual outcome of the patient of ocular trauma. Aim and objective of the present study was to study the epidemiology, clinical characteristics and health- seeking behavior following ocular trauma in Southern part of Assam for designing and implementing improved methods of prevention to minimize long term ocular morbidity.

Material and methods: Total 1463 patients of ocular trauma visiting Department of Ophthalmology in Silchar Medical College and Hospital from January 2015–March 2016 were prospectively reviewed for open- or closed-globe injury (OGI or CGI).

Result: Road traffic accident was the most common cause of ocular trauma followed by sports related injuries. Of the 1463 evaluated for ocular trauma 469 patients who presented within 6 hours of ocular trauma when compared with patients presenting after 6 hours (994 patients) showed significant improvement with more than two grade improvement in visual acuity in Snellen chart. Perception of light was lost in 18 patients of which road traffic accounted for maximum number of cases. Work related injury was the group which if counselled and educated properly could lead to dramatic reduction in cases of ocular trauma.

Conclusion: Road safety law enforcement and eye protective device use could bring down the ocular trauma cases significantly. Patient should be educated about early consultation to ophthalmologist following ocular trauma to minimize damage.

Keywords: Eye protective devices, Work place injury

INTRODUCTION

Ocular trauma is a major cause of preventable monocular blindness and visual impairment in the world. Trauma has become the most common reason for extended hospitalizations of ophthalmic patients in industrialized nations. There are almost 2.5 million incident cases of eye injuries each year in the United States alone.[1] While most studies have found increased incidence of injuries in young males,[2-4] others have found a bimodal distribution.[5] The most frequent causes of injuries was road traffic accidents, sports and work related activity in men where as domestic fall and other home related activities were more frequent in women.[6] Reported risk factors for ocular trauma in most of the studies are male gender, workplace, road accidents, alcoholism and lower socioeconomic class.[6,7] Differences have also been reported in the frequency of closed and open globe injuries presenting to the outpatient and emergency departments of tertiary care hospitals.[8,9]

Although hospital discharge and surgical procedures data provide good estimates of the morbidity of severe ocular injury but like other retrospective studies they have their limitations. These studies are biased and misleading. Very useful information on etiology of trauma, treatment and prognosis is usually not available. Besides this less severe injuries not requiring admission to hospital or ophthalmic surgery are usually missed. These injuries should not be neglected because they can be sight threatening such as in case of corneal ulcer and retinal detachment where early intervention can make huge impact on final visual outcome. It is important to have prospective study to design various methods which can be later used in prevention of ocular trauma and minimizing the long term complication following ocular trauma.

MATERIAL AND METHODS

All cases of ocular trauma visiting Department of Ophthalmology in Silchar Medical College and Hospital from January 2015–March 2016 were prospectively reviewed for open- or closed-globe injury (OGI or CGI). 32,188 patients seen during the study period of one year in the department of Ophthalmology out of which 1463 patient presented with a chief complain of ocular trauma. Due permission of the patient was taken before including them in the study.

Exclusion criteria: following patients were excluded from the study-

1. Who did not give consent for study.
2. Patient who was known case of anterior or posterior segment pathology before ocular trauma occurred which could not be corrected.

All the cases were evaluated in detail by history taking, ocular examination using Slit lamp biomicroscopy and posterior segment evaluation by indirect ophthalmoscopy. Any additional investigation if needed was done.

Data collection and definition

During the study period, a standardized data form was designed to collect the following information regarding presenting complaints, presenting visual acuity, clinical diagnosis, management and consultation outcome. In addition, for ocular trauma cases, information on etiology of injury was collected. If the injury occurred at work, questions were also asked regarding the use of Eye Protective Devices. Data was also

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collected about the age, sex, residence, initial and final visual acuity (VA), time elapsed between trauma and first consultation, cause and treatment of injury. Follow up of patient was done for as long duration needed as per the type and severity of trauma and final visual outcome was noted. Patient who received ocular trauma during work inquired about the use of Eye Protective Devices use behavior was inquired and was classified into three categories:

(1) **Category A:** used Eye Protective Devices at the time of injury

(2) **Category B**: not used Eye Protective Devices because they were not provided

(3) **Category C**: not used although Eye Protective Devices were provided.

When the person did not use Eye Protective Devices, further questions were asked regarding the reason for not using them and possible solution as suggested by the patient was noted in free text form. In our study, WHO definition of blindness is used for vision less than 3/60 whereas impairment is used for vision less than 6/18 but more than 3/60 of Snellen chart.

STATISTICAL ANALYSIS

Data were analyzed with Epi Info version 6.0 (CDC, Atlanta, GA, US) and SPSS version 14.0 (SPSS, Inc., Chicago, IL, US). Frequency distributions were created for type of injury and cause. Frequency analysis was performed by the chi-square test. Correlation analysis for initial and final visual acuity was performed with Spearman's test. Categorical evaluations were done for the numeric scores representing the likelihood of the final visual acuity in the OTS study and this study group. Chi square test or Fischer exact test were used as appropriate. P-values less than 0.05 were considered statistically significant.

Vision on final visit	Number of patients
6/12 or better vision Poor visual outcome	706
Visual impairment (6/18 to 6/60)	441
Blindness (<3/60)	298
No perception of light	18
Total	1463

Table-1: Final visual outcome of patients.

Cause of injury	Total number of cases	Patient with blinding outcome
Work place injury	237	3
Sport related injury	289	5
Road traffic accident	376	7
Physical assault	103	1
Domestic fall	202	0
Chemical injury	49	0
Fire cracker injury	23	2
Other	183	0
Total	1463	18

Table-2: Blinding outcome among different causes of ocular trauma

RESULT

Out of 1463 patients 994 were male (67.94%) where as 469 were female (32.05%).Open globe injury occurred in only 147 cases and had worst prognosis whereas 1289 patients had close globe injury and had better visual outcome.

Patients who presented within 6 hours of ocular trauma (469 patients) when compared with patients presenting after 6 hours (994 patients) showed significant improvement (ie. More than two grade improvement in visual acuity in Snellen chart) (Odds ratio 2.5787 ; 95% CI =2.0037 to 3.3187, p value < 0.0001)

The final visual acuity was 20/40 (6/12) or better in 706 patients (48.25%), 20/40–20/200 (6/18–6/60) in 441 patients (30.14%), and <20/200 (3/60) or less in 298 eyes (20.3%). Eighteen eyes (1.23%) had a final acuity of no light perception. Initial visual acuity was found to be correlated with final visual acuity (Spearman's correlation coefficient = 0.658; p < 0.001).

Road traffic account for 376 (25.70%) cases of ocular trauma. Poor road condition being one of the contributory in this part of Assam. Patients not getting proper treatment in the initial period was one of the factor which contributed to poor visual outcome

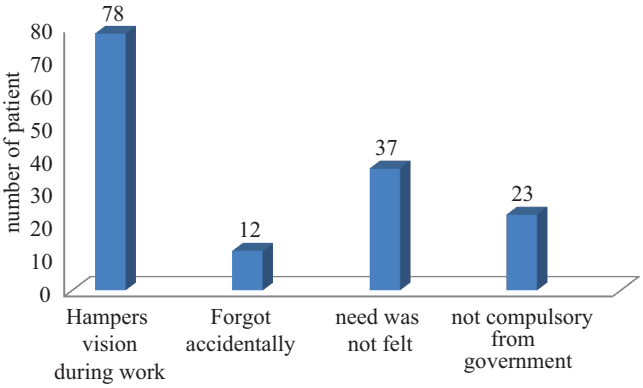

Figure-1: Bar diagram showing reason for avoiding Eye protection devices during work

Type of injury		Number of cases	Percentage
Closed globe injury (n=1289)	Contusion, abrasion and laceration of periorbital region and adnexa	727	49.63%
	Ocular surface abrasion and superficial laceration	689	47.09%
	Superficial intraocular foreign body	157	10.73%
	Chemical burn	47	3.21%
	Thermal burn	34	2.32%
	Blast injury with intact eyeball	23	1.57%
Open globe injury (n=147)	Rupture	13	0.88%
	Penetrating injury	91	6.22%
	Perforating injury	27	1.84%
	Intra ocular foreign body	9	0.61%
	Blast injury with eyeball rupture	7	0.47%

Table-3: Showing type of injury(n=1463)

later.

Work-related injuries accounted for 237 (16.19%) cases of ocular trauma, where grinding, cutting metal and drilling were the specific activities in more than 63% (i.e. 149 patients) of the cases.

Only 12% of patients (28 patients) with work-related injuries used Eye Protective Devices; 54.94% (150 patients) were provided with Eye Protective Devices, but did not use them at the time of injury; and the remaining 31.13% (85 patients) reported that Eye Protective were not provided.

Of the 237 cases of work related ocular injury, 10 patients were excluded because Eye Protective Devices use was not considered appropriate for the activity at the time of injury (e.g. injury from falling at the work site). Patients who were using eye protective devices (28 cases) had superficial injuries and had better vision when compared with patients who presented with severe ocular trauma following failure to use eye protective devices.

Use of Eye Protective Devices was associated with less likelihood for hospital admission.

Farming related activity accounted for approximately 23% cases. Most of the cases presented late and were associated with poor visual outcome.

DISCUSSION

Ocular trauma is an important worldwide cause of preventable morbidity. Whilst the epidemiology of ocular trauma has been described in the United States, Europe and Australia, among other countries, limited data on ocular trauma in Asia are available.[10-12]

Previous study in Singapore was focused on severe ocular trauma among Singapore residents, using hospital discharge and surgical procedures data. This study holds importance because it highlights the section of population that is in immediate need of medical and administrative attention for prevention of catastrophic loss of vision.

In the study, higher risks in young men appear to reflect a combination of a higher risk of work-related, assault related, sports related and motor vehicle crash-related ocular injuries. This population is economically most productive among all age group so needs special attention for prevention of permanent ocular impairment.

The proportion of ocular trauma occurring at work varies between studies, with figures ranging from as low as 15% of all ocular trauma. Cases at an urban trauma center in Los Angeles (where the most common etiology was related to assault) to as high as 70% reported in the United Kingdom.[13] Beyond the medical implications, including the risk of blindness, work-related eye injuries are associated with socioeconomic costs, including the direct cost of medical care and indirect costs such as time off work, loss of income and long-term disability. For severe injuries requiring hospitalization, one study estimated annual hospital charges (excluding professional fees) of US $ 14.6 million in the United States when work-related ocular trauma was the principal admitting diagnosis, and US$40 million when ocular trauma was either a principal or secondary diagnosis.[14]

The magnitude of work-related ocular trauma among workers of Iron and cement industry deserves special attention from industrial safety Agencies. Awareness programs for use of eye Protective devices and early consultation to specialist doctor following ocular trauma should be encouraged.

Another disturbing fact was that only 12% of patients with work-related eye injuries used Eye Protective Devices. The low prevalence of Eye protective device use has been a consistent finding in almost every ocular trauma survey in different settings. Work place injury related issue can be easily addressed. First, work practice policy and legislation allow implementation of strict guidelines, including mandatory use of eye protective devices. Second, most work-related ocular injuries occur in well-defined, predictable and consistent settings and activities. For example, grinding, welding and cutting metal, drilling and hammering were the specific activities in 63% of our work-related injuries and more than 75% of work-related injuries in a UK study. This therefore allows precise identification of specific work related activities in which Eye Protective Device should be used. Third, the vast majority of work-related eye injuries are minor with excellent visual prognosis if managed properly.

Most of the patients who had eye protective devices and still did not use it because it hampers with their field of vision. This section of workers should be educated about the safety that these eye protective devices offer and possible disadvantage of avoiding them. A behavioral analysis of similar Eye Protective Device use in the military setting indicated that provision of Eye Protective Device without organizational and community involvement was ineffective in the prevention of ocular trauma. Similar analysis may be needed to identify factors to increase effectiveness of Eye Protective Device use in the workplace.

Similarly Tea state workers are a neglected lot who are given treatment to ocular trauma following exposure to chemicals very late. This problem needs to be addressed urgently by the government law enforcing agencies.

CONCLUSION

Ocular trauma in Silchar Medical College and hospital involved mainly young and middle aged male. As per our study they constitute the population under risk for ocular trauma. This is the same population that is economically most productive so utmost care should be taken to prevent any visual impairment in this population.

Administrative intervention is needed for strict implementation of norms related to use of Eye Protective Devices in welding and grinding workers. Besides this awareness should be created among farmers and daily wage laborer to prevent them from using over the counter drugs for treatment of ocular trauma which in some cases leads to permanent loss of vision.

Road maintenance should be given priority and mass should be educated about the traffic rule and strict implementation should be ensured.

REFERENCES

1. Vision problems in the US: Data Analysis. National Society to Prevent Blindness. 1980:25-6.
2. Framme C RJKMA. Epidemiology of open globe injuries. 1999;215:287-93.
3. CassonR WJ, Newland H. 4-year review of open eye injuries at the Royal Adeliade Hospital Clin Exp Ophthalmol. 2002;30:15-8.
4. Kuhn F MR, Mester V, Witherspoon D. Epidemiology of ocular trauma. Ocular Traumatology Springer-Verlag.

2005:47-77.
5. Schein OD VPEapISB, Hersh PS, Kenyon KR. Eye Trauma.USA: Mosby year. 1991.p396. b.
6. CillinoS C, Pace FD, PillitteriF, Cillino G. A five-year retrospective study of the epidemiological characteristics and visual outcomes of patients hospitalized for ocular trauma in a Mediterranean area. BMC Ophthalmol. 2008;8:6.
7. McCarty CA FC, et al. Epidemiology of Ocular Trauma in Australia. Ophthalmology. 1999;106:1847-52.
8. Mishra A VA, Baranwal VK, Aggarwal S, Bhargava N, Parihar JS. The pattern and visual outcomes of ocular trauma in a large zonal hospital in a non-operational role: A 36 months retrospective analysis. J Clin Ophthalmol. 2014;2:141-4.
9. Titiyal GS PC, Gupta S, Joshi V. Pattern of Ocular Trauma in Tertiary Care Hospital of Kumaon Region, Uttarakhand. Indian Acad Forensic Med. 2013;35:116-9.
10. B. T. Epidemiological patterns of ocular trauma. Aust NZ J Ophthalmol. 1992;20:95-8.
11. Zagelbaum BM TJ, Kerner DJ, Hersh PS. Urban eye trauma: a one-year prospective study, Ophthalmology. 1993;100:851-856
12. Tielsch JM PL, Shankar B. Time trends in the incidence of hospitalized ocular trauma. 1989;107:519-23.
13. Macewan CJ. Eye injuries: a prospective survey of 5671 cases. Br J Ophthalmol. 1989;73:888-94.
14. Baker RS, Wilson RM, Flowers CW Jr, Lee DA, Wheeler NC.A population-based survey of hospitalized work-related ocular injury: diagnoses, cause of injury, resource utilization; and hospitalization outcome. Ophthalmic Epidemiol. 1999;6:159-69.

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