

Causes and Clinical Profile of Cases of Ocular Trauma Attending a Tertiary Medical Center

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Abstract

Purpose: Study of demographic and clinical profile of patients with ocular injury in developing countries.

Study Design: This was an observational, descriptive study of cross-sectional design.

Place and Duration of Study: The study was conducted in R.G. Kar Medical College and Hospital, Kolkata, 1 year - June 2013 to May 2014.

Materials and Methods: This study was conducted at the Ophthalmology Department, R.G. Kar Medical College, Kolkata, West Bengal, India. All patients are attending our emergency and outpatient department between March 2014 and February 2015, with a history of ocular trauma, were included in this descriptive observational study with cross sectional in design. All the patients were examined by ophthalmologists of the department. Examination included best corrected visual acuity and detailed anterior and posterior segment evaluation.

Results: Distribution by the age of ocular injury cases showed gradual decline with age with maximum number of patients in 21-40 years of age group. Temporal spectrum showed a bimodal peak in March and November. The majority were males 960 (74.7%) cases, work-related trauma accounted in 541 (42.1%) patients. Sharp pointed object related injuries were the most common and observed in 494 (38.4%) cases. Corneal complications were mostly noted. However, visual loss, i.e., visual acuity <6/18 was found in 51 (3.9%) cases. Unsatisfactory health care in workplaces and poor access to ocular emergency care was noted.

Conclusion: Primary eye care services need to be strengthened.

Key words: Ocular trauma, Primary eye care, Sharp pointed object, Work place trauma

INTRODUCTION

Ocular injury is a major cause of treatable visual impairment and blindness.¹ However, up to 5% of all blindness occurs due to direct result of trauma.² According to an estimate under the WHO program for the prevention of blindness, the incidence of open globe injuries in the world is about 2 lakh cases per year which were largely preventable. Ocular trauma

has a major socioeconomic and psychological impact on the patients and their families. The eye injuries both in adults and children are mainly physical assault or accident. Males are more frequently injured than females because males are more active in indoor and outdoor activities.^{3,4} Children are more commonly injured than adults due to their curiosity and underdeveloped motor skills. Nearly 90% eye injuries can be prevented by relatively simple measures.⁵ However, the use of ocular - protective devices in India is very low.⁴ Various studies on ocular trauma in developed⁶⁻¹¹ and developing countries have been conducted. There is a lack of data regarding pattern of eye injuries in developing countries.¹² This necessitated to conduct this study. The patients which need immediate hospitalization ranges from 4.9 to 89 per 100,000.¹³ Estimation of clinical profile and causes of injury can help us to plan the preventive measures.

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MATERIALS AND METHODS

The study was conducted in the Ophthalmology Department of a tertiary eye care hospital in India between June 2013 and May 2015. This was an observational, descriptive study of cross-sectional design. Patients attending the hospital outpatient department or emergency with a history of ocular trauma to one or both eyes or foreign body in either eye, within 15 days of occurrence were eligible for this study. Necessary approval from the Ethics Committee of the hospital was taken. Written informed consent was taken from each patient on a printed form before any examination. Detailed history was taken regarding age, sex, and residence, time of occurrence of injury, place, and type of injury inflicted. All patients underwent detailed anterior and posterior segment evaluation using slit lamp and direct and indirect ophthalmoscope, respectively. The intraocular pressure was measured (when indicated). Orbit was examined for any fracture that could be noted on palpation. Data were recorded on a pretested format and were analyzed in EPIINFO 6.04 software. Statistical calculations were done using EpiCalc calculator. Frequency and percentage were calculated using bar diagram and pie chart for data presentation.

RESULTS

In this study, 1285 patients with injury either in one or both eyes were clinically examined between March 2014 and February 2015. Among 1285 cases, total number of eyes affected was found to be 1435.

Age

Out of 1285 cases sustaining trauma, 423 (32.91%) were in 0-20 years, 569 (44.28%) cases in 21-40 years, 249 (19.37%), 40 (3.11%) in 61-80 years, and 4 (0.31%) cases over age of 80 years, respectively. Maximum numbers of patients (569 = 44.3%) were seen in 21-40 years age group (Figure 1). The mean age of the patients was 29.81 ± 16.57).

Sex

There was male preponderance in patients sustaining ocular trauma and it was 1118 (87.00%) in comparison to female which was 167 (12.99%). The male and female proportion between 0-20 years were 367 (86.76%) and 56 (13.23%), 21-40 years 492 (87.76%) and 77 (13.53%), 41-60 years 221 (88.75%) and 28 (11.25%), 61-80 years 35 (87.50%) and 5 (14.28%), and over the age of 80 years 3 (75%) and 1 (25%), respectively (Table 1). A trend of male preponderance in all age group was observed.

Temporal Spectrum

Monthly-wise distribution of ocular trauma showed two spikes in the months of March and November. There was

total cases reported in the month of March and November was 576 (44.82%) and 653 (50.81%), respectively, and 66 (5.13%) cases were in rest of months.

Residence

In this study, 860 (66.9%) people attended from rural areas and 425 (33.1%) people from urban areas.

In majority of cases, there was occupation-related injury and was accounted in 539 (41.94%) cases. Injury to eye sustained in road traffic accident was noted in 346 (26.92%). Apart from this, injury sustained while playing in school and home was also observed in 179 (13.92%) cases. In few cases, the exact location of occurrence of injuries could not be remembered by the patients at the time of reporting.

Type of Injury

Injury by sharp pointed object occurred in 494 (38.4%) patients. Blunt trauma occurred in 275 (21.4%) patients of whom there were 145 (11.3%) cases of fist blow, 130 (10.1%) cases of hit against solid object and cracker and stove burst. Extraocular foreign bodies were detected in 155 (12.1%) patients; however, only 3 (0.2%) cases of intraocular foreign body (IOFB) were seen in this study. Corrosive burn by acids and alkalis were found in 59 (4.6%) patients. Injury by coloring agent found in 52 (4.1%) patients. In addition, there were 110 (8.5%), 16 (1.3%), 33 (2.6%), and 24 (1.9%) cases of oil burn, arc welding injuries, insect bite and injury by vegetable matter, respectively (Figure 2).

Ocular Structures Involved

Injuries were noted in one eye in 1135 patients and in both eye in 150 patients making number of injured eyes

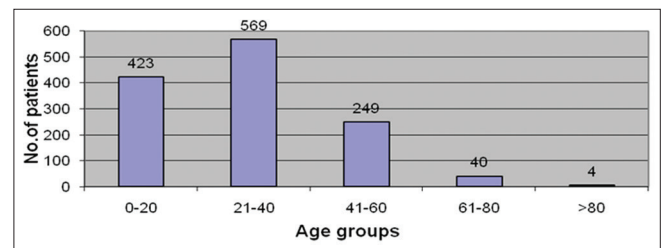


Figure 1: Number of patients in different age group

Table 1: Distribution of patients in different age group

Age group	Number of patients	Male (%)	Female (%)
0-20	423	367 (86.76)	56 (13.23)
21-40	569	498 (87.52)	77 (13.53)
41-60	249	221 (88.75)	28 (11.24)
61-80	40	35 (87.50)	5 (14.28)
>80	4	3 (75)	1 (25)
Total	1285	1118 (87.00)	167 (12.99)

1435 in 1285 patients. Again a single patient might have injuries at multiple structures of the eye. Corneal injuries accounted for the highest number of cases - 1049, of which there were epithelial abrasions in 618 cases and superficial foreign body in 49 cases. Lid injuries of all types accounted for 732 cases, 40 cases of globe rupture, 693 cases of subconjunctival hemorrhage, 52 cases of traumatic iridocyclitis, and 22 cases of lens subluxation or dislocation. In posterior segment, a good number of eyes could not be examined adequately. As the patients of this study were examined once only at first presentation, only a few injuries could be identified. Vitreous hemorrhage (10) and orbital fracture (19) were important ones.

Visual Loss

A total of 558 (43.4%) of the patients suffered no visual loss at presentation, 324 (25.2%) had a visual loss of one line, 158 (12.3%) patients had a visual loss of two lines, 132 (10.3%) patients had a visual loss of three lines, 62 (4.9%) patients, and 51 (3.9%) patients had visual loss of 5 and 7 lines, respectively.

DISCUSSION

In this study, it was evident that a huge number of patients regularly attend a tertiary care government hospital for treatment of eye injuries.

The most involved age group was 21-40 (44.3%) with mean age of 29.81 ± 16.57 . The age wise distribution of ocular trauma cases showed gradual decline in number with increasing age.

In most studies, the mean age varied between twenties and thirties.¹⁴⁻¹⁶ The risk-taking behavior, the lack of experience and knowledge of dangers in this age group were responsible in addition to nonavailability of facility of first aid. However, the number of patients presenting with trauma showed a linear decline with age. This can be explained by the fact that, during festival season, there is active involvement of younger population in making fun

and enjoyment in outdoor activities with fireworks and another means, while older peoples prefer to stay in indoor. The bimodal pattern seen in various western studies did not show up here. This was probably because of the low number of cases in the age group of more than 70 years, corresponding to India's life expectancy.

The male predominance of ocular trauma continued to prevail in this study. A male preponderance was reported by almost all authors working on ocular injuries.^{15,17-19} This is more relevant in Indian setting, where the majority of the population is rural and a considerable number of women are home makers with limited travel, work and sports. The higher incidence in males may be related to the injuries associated with assault, road traffic accidents, work, and sports.

Incidentally, the monthly distribution of ocular trauma corresponded to the festivals Holi (Doljatra) and Diwali. Holi is usually celebrated in March and Diwali in October/November. A further analysis on a daily basis over this period showed a higher incidence of trauma closer to the festival periods. Seasonal variation observed in this study will help in planning and increasing health effort in health education during these seasons.

The majority of the patients were from rural areas (66.9%) and few from urban areas (33.1%).

The hospital where the study was undertaken was semi-urban. Hence, findings as to nature, types and causes of injuries in this study differed on many situations in studies reported exclusively from rural population¹⁰ or developed countries.^{11,17}

The other epidemiological studies on ocular trauma have shown work related trauma to predominate.²⁰ In our study, work-related injuries were found to be 42.1%.

Injury by sharp objects (38.4%) can be compared to that reported as 42% and 36.4%, respectively, in the Singapore and Indian eye study.^{16,21} A large number of sharp object or stick injury was not unexpected in an agricultural society where the predominant occupation is a daily wage laborer in the agricultural field. Furthermore, firewood was the fuel used for cooking in rural areas and injuries occurred when breaking sticks and cutting wood for fire. Blunt trauma occurred in 275 (21.4%) patients, which corroborate with the findings of a population-based study in rural South India¹⁹ and other studies.¹⁷ Extraocular foreign bodies were detected in 155 (12.1%) cases; this is in contrast to 4.5% patients in Singapore study.¹¹ Very few cases of IOFB 3 (0.23%) presented to our hospital. This was usually associated with industrial

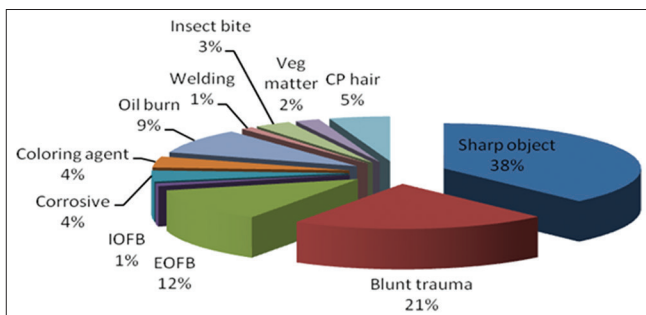


Figure 2: Mode of injury

trauma, construction works, lathe machine works, and stone cutters. This may be due to the majority of the patients from rural areas, and such types of injuries are more common in urban areas like industrialized urban area in Singapore where nearly 15% of the injuries were due to intraocular foreign bodies²⁰ or an Army General Hospital in China.¹³ Injury due to corrosive acids and alkalis in this study (4.6%) differed widely from Singapore eye study.^{5,11} This might be due to increase in the growth of industries in Singapore which led to more corrosive injuries than in this developing country. Injury by coloring agent occurred in Holi season. Injury by hot oil was higher in females. Insect bites were marked in both males and females. Caterpillar hair induced corneal injury was very common as caterpillars are very common in rural setting in this part of the country.

The patients were examined and data recorded only once and at first presentation. Further, follow-up and management were not in the scope of this study. Hence, even if any perforating injury was there, it could not be confirmed during the first examination.

According to the standardized classification of ocular trauma,¹⁶ all the ocular injuries presented in this study were categorized as shown in Table 2.

On the first presentation, blindness in one eye (<6/60) was noted in 51 (3.9%) eyes. This should not be concluded as the ultimate effect of trauma as there was no follow-up done. Trauma in both eyes was less common compared to trauma in one eye, similar to another study.¹³

The most significant finding was that majority of patients with foreign body did not know that they had foreign body in the eye and was diagnosed during eye examination. They reported for symptoms only. Another finding was that the maximum number of patients did not receive any first-aid before attending ophthalmologists of this tertiary care hospital. This indicates lack of consciousness or nonavailability of primary or secondary eye care services in

this area. Corneal complications which were very common can only be reduced by improving primary eye care and eye health education.

The patients were examined only once at the first presentation. The number of cases and the various types of injuries were noted, and the different types of data collected during the study, would help in getting an impression about the types, causation, and the relationship of different social status on injuries. These findings may be important for recommending future plans for managing injuries and also preventing blindness due to trauma. The most important is to conduct a well-designed study on this most important issue.

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Table 2: Different ocular injuries among affected eyes (n=1435)

Status of globe	Type of injury	Affected eyes number (%)
Closed globe injuries (n=1348)	Contusion	901 (66.84)
	Lamellar laceration	447 (33.16)
Open globe injuries (n=87)	Penetrating	44 (50.57)
	IOFB	3 (3.44)
	Perforation	0 (0.0)
	Rupture	40 (45.97)

IOFB: Intraocular foreign body

Ranjan, *et al.*: Causes and Clinical Profile of Cases of Ocular Trauma Attending a Tertiary Medical Center

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