

A Retrospective Study of Epidemiological Characteristics and Visual Outcomes of Patient Hospitalised for Ocular Trauma in A Tertiary Care Hospital in Mangalore



Medical Science

KEYWORDS : ocular trauma, epidemiology

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ABSTRACT

Purpose: To determine the epidemiological characteristics and visual outcomes of patients with ocular trauma.

Methodology: All the patients (85 cases) with ocular trauma from January 2014 - December 2015 were included.

This was a retrospective study and was conducted after ethical clearance. Data was analysed using SPSS version 11.5 and Chi square test.

Results: Majority were male (71.8%). Workplace associated injuries accounted for 31.1% of the injuries in men. However in females the most common place of injury was home - 50%. 90.9% of the patients who had good vision initially (>6/18) had final visual acuity of >6/18.

Conclusion: Males are more often afflicted in all age groups because they are more exposed to occupational and outdoor hazards, whereas women are at risk at home signifying social and cultural factors in our country. Most of the injuries at work place and thus loss of sight could be prevented.

INTRODUCTION: Trauma to the eye and ensuing visual disability is an important cause of preventable mono-ocular blindness in developing countries. However most of the estimates on analysis of risk factors, incidence, prevalence and impact of eye injuries in terms of visual outcome are based on information from more developed countries. Though studies conducted in developed countries show a higher incidence of eye injuries associated with recreational activities and occupation, most of the Indian studies depict a high rate of home related eye injuries.

Due to the rapid pace of industrialisation and mechanized farming happening in the country, the incidence of ocular trauma is likely to increase significantly. The setting for the occurrence of trauma is most commonly the workplace and increasingly road accidents, whereas domestic accidents are probably under-reported. Of particular importance in some developing countries is the occurrence of superficial corneal trauma in agricultural work, often leading to rapidly progressing corneal ulceration and visual loss. This necessitates the importance of understanding various contributory factors for ocular trauma for better planning of preventive and management measures.

Since studies in Mangalore are very few, this study retrospectively analyses the epidemiology and the visual outcomes of patients with ocular trauma. This study was conducted in a tertiary hospital in Mangalore, which is a referral centre.

PURPOSE: To determine the epidemiological characteristics and visual outcomes of patients with ocular trauma.

MATERIALS AND METHODS: Retrospective tertiary centre based analysis of all the patients who came to the ophthalmology department with ocular and orbital trauma from 1st January 2014 to 31st December 2015. In this study, ocular injury is defined as any injury affecting the eye and adnexa. Data collection included demographic profile of the patients, cause of injury, type of injury, setting of injury, treatment, initial and final visual acuity. Patients were divided into 3 groups based on age - less than 16 years, 16 to 39 years and ≥ 40 years of age. Injuries were divided into occupational and non-occupational type. Amongst the occupational, different groups were identified. Time of reporting to the hospital (in hours) and the duration of hospitalisation (in days) was noted. The place of injury varied between home, workplace, school, road and outdoors.

Cause of injury was classified into blunt objects, sharp objects, foreign body, vegetative matter, chemical and road traffic accidents. The type of injury could be physical or chemical. Physical/Mechanical injuries were further classified based on Birmingham Eye Trauma Terminology System (BETTS). Initial visual acuity (at the time of presentation) and final visual acuity (at the last outpatient follow up) was noted. Treatment procedure done for each patient was noted and broadly, 5 groups were made - medical management and simple repair of wounds, complex repair of wounds (corneoscleral wounds), anterior segment procedure, posterior segment procedure and evisceration. Complications that patient developed were also mentioned. Data was analysed using SPSS version 11.5 and chi square test. Study was conducted after ethical clearance.

RESULTS

Out of 85 cases of eye injuries majority were male (61 cases, 71.8%). Male to female ratio is 2.5:1.

34 patients (40%) belonged to the age group of 16-39 years. The average was 25.8 years. 36.5% of the patients were children < 16 years of age.

Of all the ocular injuries, non-occupational constituted 58.8% (50) cases and 28.3% (24) were occupational injuries. Of the occupational injuries, agriculturists and students each accounted for 25% and 16.67% occurred in carpenters. Data was not available for 11 cases.

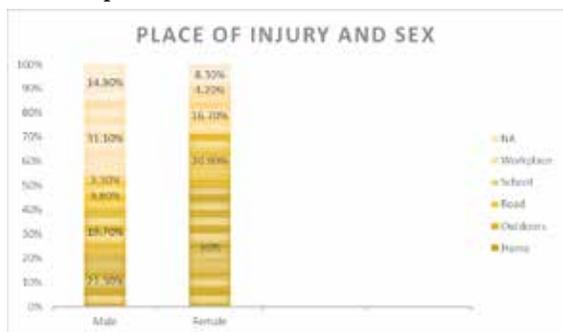
Majority of the patients -70.6% reported to the hospital within 24 hours of injuries compared to 14.1% individuals reporting after more than 2 days of injury.

The duration of hospitalisation differed with the type of injury acquired. 63.5% of the open globe injuries and 47.6% of the closed globe injuries were hospitalized for 2 to 5 days. There was only one case of chemical injury, which was hospitalized for 2-5 days.

A large number of injuries occurred at home (29%); workplace and the outdoors were responsible for 24% and 20% of the injuries, respectively. An equal number of injuries (7%) each occurred in school and on the road. Data was not available for 13% of the cases.

There was a correlation between the place of injury and gender (P value = 0.003). Details shown in graph (1) below.

Table/Graph 1



An association between the place of injury and age was also significant, P value -0.001, showing that outdoor related injury was the most common mode of injury in children (<16 years). 32.3% of the injuries in children occurred at home and 19.4% at school. Workplace was the most common setting of injury for young adults (38.2%) and the elderly (30%).

58.8% of the injuries were caused by sharp objects and 17.6% of the injuries by blunt objects. Road traffic accidents accounted for 7.1% injuries and 8.2% injuries were due to vegetative matter. There was only 1 case of chemical injury.

Vegetative matter (33.3%) and non-metallic sharp objects (33.3%) caused the greatest number of injuries among agriculturists. Among school children, non-metallic objects were the commonest cause of injury (88.3%). 75% of the injuries in carpenters were due to sharp objects and rest due to blunt objects.

Of the 85 cases, 84 were due to mechanical injuries. Only 1 case was due to chemical injury. Open globe injuries accounted for 74.1% of all injuries.

Among the closed globe injuries, contusion injuries (62%) were more common than lamellar laceration (38%) and penetrating injuries accounted for 65.08% of the open globe injuries.

The incidence of open globe injuries and closed globe injuries differed according to the setting of injury. 85% of the injuries occurring at the workplace were open globe injuries and the rest were closed globe. At home 60% were open globe, 36% closed globe and 4 % were chemical injuries. Open globe injuries also constituted 83%, 67%, 82% of all the injuries occurring at school, on road and in outdoors respectively.

41 of the 85 patients had a visual acuity of 1/60 to PL at the time they reported to the hospital with the injury. 11 patients had a visual acuity of >6/18. 2 patients had no PL. Penetrating injury occurring in the outdoors and perforating type of injury occurring at home were responsible for no PL in 2 of the cases. For 12 patients, the initial visual acuity could not be obtained either because the patient was uncooperative at that time or was not listed in the records.

Treatment: Details given in the table below.

Table 2

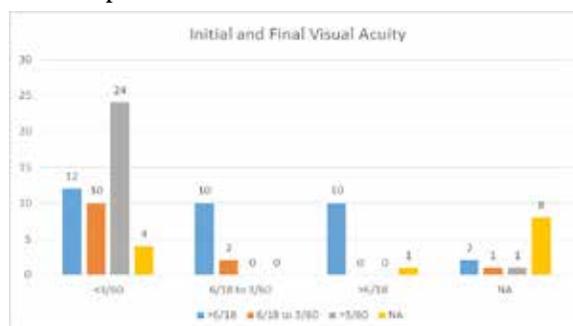
TREATMENT	Frequency	Percent
Anterior segment procedure	8	9.4

Complex repair of ocular injuries	29	34.1
Evisceration	2	2.4
Medical therapy and simple repair of ocular injuries	43	50.6
Posterior segment procedure	3	3.5
Total	85	100

34 patients had good vision (final visual acuity >6/18) after treatment. However, 25 cases resulted in blindness (visual acuity of <3/60 by WHO standards). Out of the 5 cases with no PL, 2 eyes were eviscerated. Final visual acuity could not be recorded for 13 patients, because some patients were lost in follow up.

Of those who presented with visual acuity of less than 3/60, 48% of them had final visual acuity of <3/60, 20% had a vision >6/18. 90.9% of the patients who had a good vision initially (>6/18) had final visual acuity of >6/18 (graph 3).

Table/Graph3



Majority of patients (61.2%) developed no complications. Traumatic cataract was the most common complication – 24.7% of all the injuries, followed by subluxation of lens (7.1%), retinal detachment (4.1%), corneal opacity (1.2%) and choroidal detachment (1.2%).

There was no significant association between the age and the complications (p value=0.306). However most of the complications occurred in 16-39 age group.

DISCUSSION:

Analysis of 85 patients in our study shows that males (71.8%) are more often afflicted in all age groups because they are more exposed to occupational and outdoor hazards. This is in accordance with many other reports (Singh et al⁹, Krishaniah et al⁴). 40% of our patients belonged to the age groups of 16 to 39 years of age and 36.5% were less than 16 years of age. The average age of eye injuries was found to be 25.8 years which is in accordance with the result of the study by Vats et al³, Lavanya et al¹¹ and Jain et al⁶. A high incidence of ocular injuries in these age groups could be because of a higher incidence of accidents amongst children and occupational injuries among adults. This emphasizes the fact that young adults and males are more vulnerable to eye injuries as has also been reported by Jain et al⁶, Vats et al³.

About 70% of the patients reported early (within 24 hours) to the hospital after being injured, indicating a good level of awareness among people. This agrees with the findings of Malik et al¹, as opposed to the study by Singh et al¹⁰ that shows that nearly half (45%) patients reported to the hospital after 8 to 30 days of injury.

Most patients were hospitalized for 2-5 days, average being

3.65 days, which is quite a significant loss of work days, as compared to the study by Vats et al³ where the average duration of hospitalization was 1.25 days. More number of open globe injuries were hospitalized for 2 to 5 days as compared to closed globe, signifying that open globe injuries are more severe.

As reported by other Indian authors (Malik et al¹, Shukla et al²) occupational injuries accounted for only 28.3% of all injuries and non-occupational for 58.8% suggesting a lower level of industrialization in our country. Amongst the occupational injuries, 25% were of agricultural origin and this is due to predominance of farmers in our country. Vegetative matter and non-metallic sharp objects cause most of the injuries in agriculturalists. This is consistent with the findings of the study by Mukherjee et al⁵, Krishnaya et al⁴, Vasu et al⁷. A large number of students (16.67%) were also at risk and non-metallic sharp objects cause these injuries – consistent with the findings of Singh et al¹⁰. This could be because of the fact that a considerable section of the population in the state where the study was conducted belongs to the school going age group. Non-metallic sharp objects (mainly wood pieces) caused half the injuries in carpenters whereas metallic sharp objects caused injuries in manual labourers. Incidence of road traffic injuries was as low as 7.1%, also demonstrated by Malik et al¹ and Shukla et al². As indicated by Vats et al³, our study too, showed that occupational injuries (85%) account for significant number of open globe injuries.

Home accidents accounted for nearly one third of all injuries, next common setting being the work place, followed by accidents during outdoor activities. Accidents at home were most common among females (50%) whereas those in the workplace (31.1%) were most common among males. This is due to the social and cultural factors in our country which means that most of the female population works at home. This corresponds to the results of the previous studies done in rural Nepal⁸ and Israel⁹. In children, injuries mainly occurred outdoors followed by home injuries whereas in adults, injuries in the workplace were more common because of a higher incidence of accidents during recreational activities in children and occupational exposure in adults correlating with the findings of Jain et al. Road traffic accidents were a common cause of eye injuries in people above 40 years of age.

Incidence of mechanical injuries was 98.8% as compared to chemical injuries which constituted only 1.2%. Open globe injuries accounted for the maximum number of injuries in all types of settings. Contusions (62%) and perforating injuries (65.08%) caused the highest number of closed and open globe injuries respectively. However studies by Malik et al¹ and Shukla et al² found that perforating and contusion injuries were more common.

Anterior segment was a common site of involvement with 81% patients similar to a study by Mukherjee et al⁵.

Those who came with a visual acuity of less than 3/60 generally had a bad prognosis as most of them did not improve much whereas those who had initial visual acuity of more than 6/18 had a good prognosis. This initial visual acuity is an important factor in determining the prognosis of ocular trauma – Lavanya et al¹¹ (Table -3). However there was no correlation between any delay in seeking treatment and final visual acuity which is in accordance with the study by Vats et al³(Table-4). Ocular injuries caused 23.5% of the patients to become partially blind (3/60 to PL) and 5.9% become totally blind (No PL, PR) which corresponds

to the incidence of blinding trauma in a study by Krishnaya et al⁴.

Half of the patients (50.6%) were treated conservatively and the rest underwent surgery. Two eyes were eviscerated. Although 60% patients did not develop any complications, traumatic cataract resulted in 24.7%. The study by Singh et al¹⁰ also shows similar results. Subluxation of the lens and pain and thus preventive measures are necessary.

References

1. Malik S, Gupta AK, Chaudhry S.A study on pattern of ocular injuries in Delhi. *Indian J Ophthalmol* 1968; 16: 178-82.
2. Shukla IM, Verma RN.A clinical study of ocular injuries. *Indian J Ophthalmol* 1979; 27:33-6.
3. 7.S Vats,MD,G V S Murthy,MD,corresponding author M Chandra,MS,S K Gupta,MD,P Vashist,MD, and M Gogoi,MD. "Epidemiological study of ocular trauma in an urban slum population in Delhi, India" *Indian J Ophthalmol*.2008 Jul-Aug; 56(4):313-316.
4. 10.Krishnaiah S, Nirmaln PK, Shamanna BR, Srinivas M, Rao GN, Thomas R. Ocular trauma in a rural population of southern India: the Andhra Pradesh Eye Disease Study.*Ophthalmology*.2006 Jul;113(7):1159-64.
5. Mukherjee AK, Saini JS, Dabral SM.A profile of penetrating injuries. *Indian J Ophthalmol* 1984; 32: 269-71.
6. Jain BS, Soni SR. Ocular injuries: An analytical study in a teaching general hospital. *Indian J Ophthalmol* 1987; 35: 112-6.
7. 13.Vasu U,Vasnaik A, Battu RR, Kurian M, George S. Occupational open globe injuries .*Indian J Ophthalmol* 001;49:43-7.
8. 14.S K Khatri, A E Lewis ,O D Schein, M D Thapa, E K Pradhan and J katz. The epidemiology of ocular trauma in rural Nepal.*Br J Ophthalmol*.2004April; 88(4):456-460.
9. The Israeli Ocular Injuries Study.A nationwide collaborative study. *Arch Ophthalmol*.1998 Jun; 106(6):776-80.
10. D.V.Singh, Yog Raj Sharma, R.V.Azad, Dinesh Talwar, Rajpal. Profile of ocular trauma at tertiary eye centre. *JK Science, Journal of Medical Education and Research*, Jan-Mar, 2005, Volume 7, Issue 1.
11. Lavanya G Rao, Anju Niann, and Krishna A Rao. Descriptive study on ocular survival, visual outcome and prognostic factors in open globe injuries. *Indian J Ophthalmol*.2010 Jul-Aug; 58(4):321-323.