VISUAL OUTCOME IN PATIENTS OF OCULAR TRAUMA IN TERTIARY CARE HOSPITAL, UTTARAKHANDSwati Gupta¹, G. S. Titiyal², Vijay Joshi³, Rishi Jhalani⁴**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: Ocular trauma is an important public health hazard. A study done at a teaching referral hospital in Haldwani revealed 14.54% of blindness to be attributed to trauma alone. The objective of the study was to determine the pattern of ocular trauma among patients presenting in Dr. Sushila Tiwari Government Hospital, Haldwani. A 1 year retrospective review of records of 165 patients with ocular trauma seen from 1st Feb 2011 to 31st Jan 2012 was done using a structured format. Association between variables were checked by Chi square test and significance was considered when $p < 0.05$. Ocular trauma accounted for 165 (1.03%) of the 15,970 ocular patients seen at OPD and Emergency in the aforementioned 1 year period. Of the studied 165 cases, 93 patients were below 30 years of age. M: F ratio was 10:1.21 (12.7%) patients presented to hospital within 2-7 days of injury. Duration of presentation has significant association with the presence of infection & other complication ($p < 0.05$). The cause of injury were road traffic accidents, sports playing & recreational activities and occupational in 54 (32.7%), 42 (25.5%) and 33 (20%) respectively. Closed globe injuries accounted for 54 (32.7%) and open globe for 75 (45.4%) and adnexal injuries constituted 36 (21.8%). Delay in presentation was associated with complications.

KEYWORDS: Ocular Trauma, Blindness, Open globe injury, Close globe injury.

INTRODUCTION: Trauma to the eye and its surrounding structures remains a leading cause of visual morbidity and blindness. Many ocular traumas are an avoidable cause of blindness and visual impairment.¹

Worldwide there are approximately 6 million people blind from eye injuries, 2.3 million bilaterally visually impaired and 19 million with unilateral visual loss; these facts make ocular trauma the most common cause of unilateral blindness.² The age distribution for the occurrences of serious ocular trauma is bimodal with the maximum incidence in young adults and a second peak in elderly.^{3, 4}

Even though, ocular trauma has been described as a neglected issue,⁵ it was highlighted as a major cause of visual morbidity more recently. According to estimates by WHO, about 55 million eye injuries restricting activities for more than one day occur each year, 750,000 cases requiring hospitalization which includes 200,000 open globe injuries.⁴

The typical male to female ratio is 4:1 worldwide.⁶⁻⁸ Open globe injury is said to be more common worldwide.¹⁰⁻¹³

Recognition of the public health importance of ocular trauma has sparked growing interest in studies on eye injuries.¹⁴ Ocular injuries can assume unusual social and economic importance involving a huge cost in human unhappiness, economic inefficiency and monetary loss.

However, no studies had been carried out on patterns of ocular trauma in the study area. So, in view of public health importance, this study will provide information on magnitude and pattern of

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ocular injuries at Dr. Susheela Tiwari Government Hospital, Haldwani, Uttarakhand. It will serve as the basis for designing and implementing preventive measures to be undertaken by respective authorities.

METHODS AND MATERIALS: A 1- year retrospective study was conducted on patients of ocular trauma in Department of Ophthalmology, Dr. Susheela Tiwari Government Hospital, Haldwani, Uttarakhand from 1st Feb 2011 to 31st Jan 2012. Ocular trauma accounted for 165(1.03%) of the 15, 970 ocular patients seen at OPD and emergency in the aforementioned 1 year period. Every patient was selected for the study.

Data were collected from the clinical records using a structured data collection format. It was edited, cleaned, checked for completeness and cross checked for accuracy to ensure quality and was analyzed using SPSS for Windows version 16.0. Associations between variables were checked by Chi-Square test and significance was considered when $p < 0.05$. The patients' records were kept confidential.

Operational definitions were according to World Health Organization (WHO) and Bermingham Eye Trauma Terminology System (BETTS).⁶

Blindness: Visual acuity $< 3/60$.

Eye Wall: Cornea and Sclera.

Closed globe injury: No full thickness wound of the eye wall:

- Contusions: no full thickness wound, direct energy delivery (e.g. choroidal rupture) or due to change in shape of the globe (e.g. angle recession).
- Lamellar laceration: partial thickness wound of the eye wall.

Open globe injury: full thickness wound of the eye wall:

- Laceration: full thickness wound at the impact site of a sharp object by outside- in mechanism.
- Penetrating: entrance wound only.
- Perforating: entrance plus exit wound.
- Intra- ocular foreign body: technically a penetrating injury, but grouped separately because of different clinical implications.
- Rupture: Full thickness wound by blunt object by inside out mechanism due to increased intraocular pressure.
- Adnexal injuries: Eyelid and/or conjunctiva injuries.

RESULTS: It was found that the ocular trauma accounted for 165 patients (1.03%) of the 15, 970 ocular patients seen at OPD and Emergency in the time period from 1st Feb 2011 to 31st Jan 2012. Of the studied 165 cases, 93(56.5%) patients were below 30 years with mean age of 28.8(SD± 17.1) years. Male to female ratio was 10:1.

123(74.5%) presented within 2 days, 21(12.7%) presented in 2-7 days while 21(12.7%) after 7 days of injury. 30 patients who presented after 2 days of injury were associated with complications with significant association ($p=0.001$).

Right eye was involved in 72(43.6%) patients, left eye was involved in 84(50.9%) patients. 9 patients had bilateral injury.

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Among the causes of injury, road traffic accidents accounted for maximum number of cases, i.e., 54(32.7%), followed by sports, playing and recreational activities which accounted for 42(25.5%) patients and occupation related 33(20%) and others like domestic accidents, violence related were other identified causes.

Regarding the material of injury the commonest material accounting for trauma was wooden stick in 27(16.7%)patients, followed by stone in 18(10.9 %), followed by finger nail trauma, fall from height and playing with ball in 6 cases each. Other miscellaneous mode of injury included fire cracker injury, injury with hot oil, blunt trauma, iron rod.

Open globe injuries were found to be more common accounting for 75(45.5%) patients than closed globe injuries which accounted for 54(31.9%) patients. Adnexal injuries were present in 36(21.8%) patients.

Complications such as traumatic cataract, endophthalmitis, hyphaema, raised intraocular pressure, hypopyon were present in 72(43.6%) patients. Out of these, only 30(32.2%) patients presented within 24 hours. Presence of complications was found to have significant association with the duration of presentation (p value = 0.001).

Coming to the visual acuity at presentation, 54(32.7%) had visual acuity of 6/6- 6/18 while 93(56.5%) patients were blind at presentation i.e., visual acuity <3/60. Visual acuity was NPL in 24(14.5%) cases. Final visual outcome (1 week after treatment) was difficult to analyze as in 21(12.7%) cases, it was not documented and 9 (5.6%) were not cooperative.

Out of the remaining 135 cases, 66(40%) cases had visual outcome of 6/6 – 6/18, but 51(30.9%) patients were documented to have a blinding outcome i.e., visual acuity of <3/60, in spite of the best operative procedures and management which could be given to the patients.

Age group (years)	Male No. (%)	Female No. (%)	Total No. (%)
<5	6(66.7)	3(33.3)	9(5.5)
5-14	18(85.7)	3(14.3)	21(12.7)
15-24	36(100)	0	36(21.8)
25-34	36(92.3)	3(7.7)	39(23.6)
35-44	27(90)	3(10)	30(18.2)
45-54	15(83.3)	3(16.7)	18(10.9)
55-64	3(100)	0	3(1.8)
>=65	9(100)	0	9(5.5)
TOTAL	150(90.9)	15(9.1)	165(100)

Table 1: Age group and Sex distribution of ocular trauma patients seen at STM from Feb 1st 2011 – Jan 31st 2012

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Cause of injury	Male No. (%)	Female No. (%)	Total No. (%)
Violence related	12(8)	0	12(7.3)
Occupation related	30(20)	3(20)	33(20)
Domestic accidents (fall...)	12(8)	3(20)	15(9.1)
Sports, playing, recreational	36(24)	6(40)	42(25.5)
Road traffic accidents	51(34)	3(20)	54(32.7)
Others	9(6)	0	9(5.5)
TOTAL	150(90.9)	15(9.1)	165(100)

Table 2: Cause of injury and sex distribution of ocular trauma patients seen at STM from Feb 1st 2011 – Jan 31st 2012

DISCUSSION: The magnitude of ocular trauma was found to be 1.03% out of total ocular patients seen in the outpatient department. This figure is significantly lower as compared to a study done at JUDO, south west Ethiopia,¹³ where it was found to be 6.9%. It was found in this study that 63.8% patients were below 30 years of age with mean age of 25.5(SD±15.6) years and male to female ratio of 3.2:1.

In our study we found 93(56.5%) patients were below 30 years with mean age of 28.8(SD±17.1) years with male to female ratio was 10:1. The explanation for this could be the greater risky, occupation and stimulus to aggressiveness given to males in almost all societies and better access to health services.

Type of injury	Final Visual Outcome, VA					
	6/6 - 6/18 No. (%)	<6/18 - 3/60 No. (%)	<3/60 - NPL No. (%)	Not documented No. (%)	Not cooperative No. (%)	Total No. (%)
CLOSED GLOBE						
Lamellar laceration	6(40)	3(20)	0	3(20)	3(20)	15(9.1)
Contusion	24(61.5)	3(7.7)	3(7.7)	9(23.1)	0	39(23.6)
OPEN GLOBE						
Penetrating	0	12(17.4)	45(65.2)	9(13.1)	3(4.3)	69(41.8)
Perforating	0	0	0	0	0	0
IOFB	3(50)	0	3(50)	0	0	6(3.6)
RUPTURE	0	0	0	0	0	0
ADENEXAL	33(91.7)	0	0	0	3(8.8)	36(21.8)
TOTAL	66(40)	18(10.9)	51(30.9)	21(12.7)	9(5.6)	165(100)

Table 3: Type of injury and final visual outcome among ocular trauma patients seen at STM from Feb 1st 2011 – Jan 31st 2012

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Duration of presentation	Presence of Complications		Total No. (%)
	Yes No. (%)	No No. (%)	
<24 hrs.	30(32.3)	63(67.7)	93(56.4)
24-48 hrs.	12(40.0)	18(60)	30(18.2)
>48 hrs. – 1wk	15(71.4)	6(28.6)	21(12.7)
>1wk	15(71.4)	6(28.6)	21(12.7)
TOTAL	72(43.6)	93(56.4)	165(100)

Table 4: Association of duration of presentation and presence of complications among ocular trauma patients seen at STM from Feb 1st 2011 – Jan 31st 2012

P – Value = 0.001

In the JUDO study 31.6 % patients presented within 48 hours whereas 28.6% arrived one week or later.¹³ According to our study, 123(74.5%) presented within 2 days, 21(12.7%) presented in 2-7 days while 21(12.7%) after 7 days of injury.

Our study did not show significant association between involvement of either eye. Right eye was involved in 72(43.6%) patients, left eye was involved in 84(50.9%) patients. 9 patients had bilateral injury. The slight predominance of the left eye injuries may be explained by the fact that most people are right handed and the left eye of the victim is the one which is more vulnerable to an attack from a right handed person.

Among the causes of injury, road traffic accidents accounted for maximum number of cases, i.e., 54(32.7%), followed by sports, playing and recreational activities which accounted for 42(25.5%) patients and occupation related 33(20%) and others like domestic accidents, violence related were other identified causes. Study of JUDO showed commonest causes of injury were violence related 37.2% of the documented causes.¹³

But commenting on the comparability of these results is difficult as 54.9% of cases were not documented in the study. The 1994 GC Menelik II hospital study showed assault was the commonest cause accounting for 32.5% cases.¹⁵ Of the documented ones, in the JUDO study, wood is the commonest material accounting 40.9% followed by metal 18.1% and stone 13.3%.¹³ Regarding the material of injury the commonest material accounting for trauma was wooden stick in 27 (16.7%) patients, followed by stone, in our study.

In our study open globe injuries were found to be more common accounting for 75(45.5%) patients than closed globe injuries which accounted for 54(31.9%) patients, as according to studies conducted worldwide. Adnexal injuries were present in 36(21.8%) patients. But study at JUDO showed closed globe injuries (45.4%) were encountered more than open globe injuries (22.7%).¹³

Our study showed a significant association between duration of presentation and presence of complication at presentation (Chi square value = 18.2, degree of freedom = 3, p value = 0.001) which may affect the final visual outcome. Final visual outcome (1 week after treatment) was difficult to analyze as in 21(12.7%) cases, it was not documented and 9(5.6%) were not cooperative.

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Out of the remaining 135 cases, 66(40%) cases had visual outcome of 6/6 – 6/18, but 51(30.9%) patients were documented to have a blinding outcome i.e., visual acuity of <3/60. Study of JUDO showed 21.1% of the ocular injuries were documented to have a blinding outcome i.e., visual acuity < 3/60.¹³

According to a study conducted in Haryana, males (76.01%) were more frequently affected than females (23.99%). Among non-occupational injuries (61.74%), those occurring due to playing and sports among children were the main etiological factor (33.67%). In occupational injuries (38.26%), those occurring during agricultural activities (19.9%), were most common followed by industrial accidents (12.24%). Cornea was the most affected part of eyeball (47.6%) followed by iris injury (32.64%).¹⁴

Direct comparison of this study with the data from some of the studies reviewed was difficult in some aspects, due to different classification, definition and methods of reporting used in these studies. However, it is possible to conclude from this study that delay in presentation, has a significant association with presence of complications which may have a detrimental visual outcome.

This study also has shown that road traffic accidents are the commonest causes of ocular injuries followed by recreational activities and occupational accidents.

Thus it is recommended preventive measures advocated by health workers to emphasize the importance of early health seeking behavior and follow up of patients with ocular trauma. Simple safety procedures like wearing seat belts in driving, protective goggles in welding, supervising children while playing, etc. should be advocated using mass media.

It is further recommended that our hospital should design an urgent referral system for emergency care services for ocular trauma patients. It should improve its documentation system by designing a structured and standardized format to be used when clerking, treating and following up of ocular trauma patients which will help in doing more researches on the area which in turn are fundamental in planning its emergency care services.

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