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Epidemiological study of ocular trauma in tertiary care center and role of Ocular Trauma Score (OTS) to determine final visual outcome

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Abstract

Background: Ocular trauma is a medical emergency, if not managed early it may lead to permanent loss of vision, disfigurement, sympathetic ophthalmitis, etc. OTS estimates the specific visual function 6 months after the ocular trauma. It is useful for guiding treatment and rehabilitation of patients.

Aim: The aim was to study epidemiology of ocular trauma and expected visual outcome achieved according to initial OTS.

Material and Methods: Prospective study conducted on 72 cases of ocular trauma involving the eye and the adnexal injury of the patient seen in the ophthalmology department, S.S.G. Hospital, Vadodara during october,2009-october,2011. The OTS was calculated and applied to determine visual outcome.

Results: Ocular trauma was more common in males(86.11%) and in 11-20years age-group(31.95%), most common object being metal body(25%), followed by wooden stick(20.83%) and stone(15.27%). 26/72 patients presented with closed globe injury, 46/72 patients presented with open globe injuries.60% patients had visual outcome from HM (hand movement) to 20/200.

Conclusion: Based on data from our study the ultimate visual outcome correlated with initial OTS calculated for each patient.

Keywords: OTS, Closed globe injury, Open globe injury, Visual outcome.

Introduction

Ocular trauma is a medical emergency, if not managed early it may lead to permanent loss of vision, disfigurement, sympathetic ophthalmitis, etc. Ocular trauma is a social, economical and financial burden to the society as in human unhappiness, economic insufficiency and expenditures on health. A significant number of blindness cases worldwide are related to ocular trauma. Globally, there are approximately 1.6 million people who are blind from eye injuries, 2.3 million are bilaterally visually impaired and 1.9 million have unilateral visual loss.^{1,2} In India, over 500 lakh people suffer from blindness, and every year the blind population increases by 38 lakhs. A rural population (4.5%) may have a higher prevalence of blindness compared to an urban one (3.97%).³

Ocular trauma often have a medico legal implication. The irreversible nature of visual loss and immense morbidity associated with it needs to be emphasized and publicized. The prevention of trauma therefore, is of paramount importance. It has been estimated that 90% of all ocular injuries are preventable.⁴

The system for classifying ocular injuries was devised in 1997, classifying them into open and closed globe injuries. An advantage of this system is that it does not require specialized instruments and it helps in standardizing the description of eye injuries, required for comparison in different studies. In 2002, the ocular trauma score (OTS) was devised, which estimates the specific visual function 6 months after the ocular trauma. This scale is useful for guiding treatment and rehabilitation of patients with ocular trauma and to provide information and advice. According to the score obtained in this scale, the traumatized eye may be placed into one of the five categories, each of which has a distinct probability of reaching a range of visual function.⁵

INTERNATIONAL OCULAR TRAUMA CLASSIFICATION AND ITS SCORING.⁵

A separate classification system is used for open and for closed globe injuries. The system evaluates four variables:

1. Type (based on the mechanism of injury)
2. Grade (based on the initial visual acuity)
3. Pupil (depending on the presence or absence of an afferent papillary defect)
4. Zone (based on the location of the wound in open globe injuries and on what the most posterior tissue that has been damaged is in closed globe injuries)

Present study was done with an aim to study epidemiology of ocular trauma and expected visual outcome achieved according to initial OTS.

Materials and Methods

Study design and sample size

We conducted a clinic-epidemiological prospective study on 72 cases of ocular trauma involving the eye and the adnexal injury of the patient seen in the ophthalmology department, S.S.G. Hospital, Vadodara during OCTOBER 2009 TO OCTOBER 2011.

Inclusion criteria

We included patients with blunt trauma of anterior / posterior segment involving AC reaction, vitreous haemorrhage, retinal detachment, macular hole, angle recession, traumatic hyphema / corneal epithelial defects, traumatic cataract, sealed corneal perforation / sealed wound with anterior segment complications, perforating corneal, corneo-scleral, scleral injury, globe rupture, Intra-ocular foreign body (IOFB) and old trauma cases.

Exclusion criteria

Patients that had absconded, incompletely treated, lost follow up or admitted in surgery wards with associated ocular trauma but not transferred and lost follow up in Ophthalmology ward were excluded. Patient who had refused for treatment were also excluded. The cases of thermal or chemical injuries were not included in this study.

Parameters studied

A standard proforma was developed for each patient which included Preliminary data of age, sex, residential address, occupation, history of injury, date of trauma, mode of trauma, the circumstances in which it occurred, causative agent responsible for the injury and if any previous treatment taken or not. Ophthalmological examination included determination of best corrected visual acuity on snellen chart, slit lamp examination, ocular tension measurement and fundus examination. Specific ocular investigations included tension, sac syringing and USG B-scan, X-ray / CT orbit where required.

Then patients were managed after obtaining informed consent form. The patients were followed up at regular intervals, initially at one week and subsequently at three and six weeks. Entries were made at each follow up and detailed ophthalmological examination was carried out on each follow-up.

Grading and scoring of patients

Each patient was graded depending on the type of injury – open globe injury or closed globe injury, performed calculating the OTS and convert of total raw points into % chances of vision outcomes.

Results

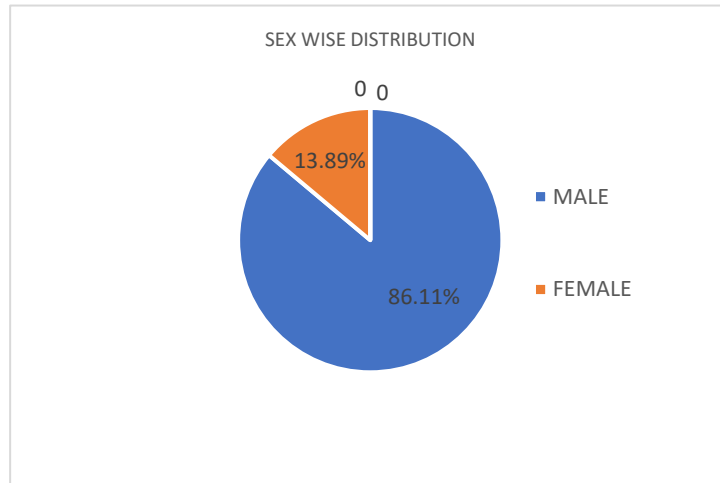
Hereby in our study ocular trauma was most common in the age group 11yrs-20yrs (31.95%), followed by 21yrs-30yrs age group (13%) and 31 yrs -40 yrs age (10%). It was least common in 61yrs-80yrsage group (4%).

Table 1: Age-wise Distribution of Cases of Trauma

Age	No	Percentage
0-10 YRS	11	15.28%
11-20 YRS	23	31.95%
21-30 YRS	13	18.06%
31-40 YRS	10	13.98%
41-50 YRS	8	11.11%
51-60 YRS	3	4.17%
61-70 YRS	2	2.78%
71-80 YRS	2	2.78%
81-90 YRS	-	-

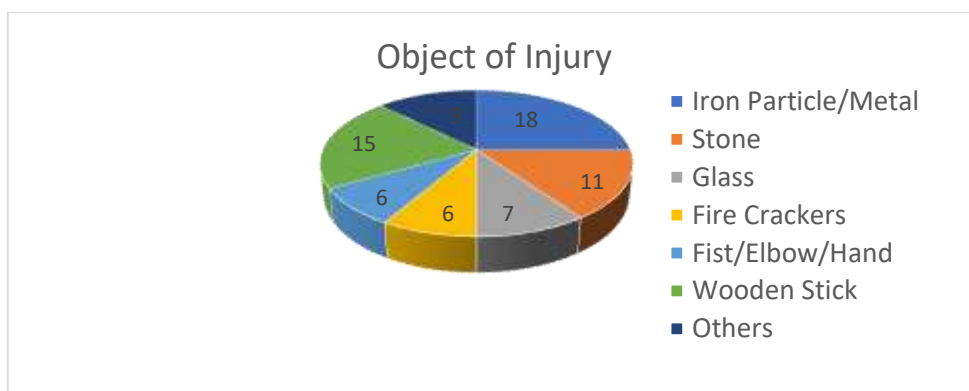
Males accounted for 86.11% of the patients in our study, since they are more involved in outdoor work, they accounted for the majority of our patients.

Graph 1: Gender-wise distribution of Cases of Trauma



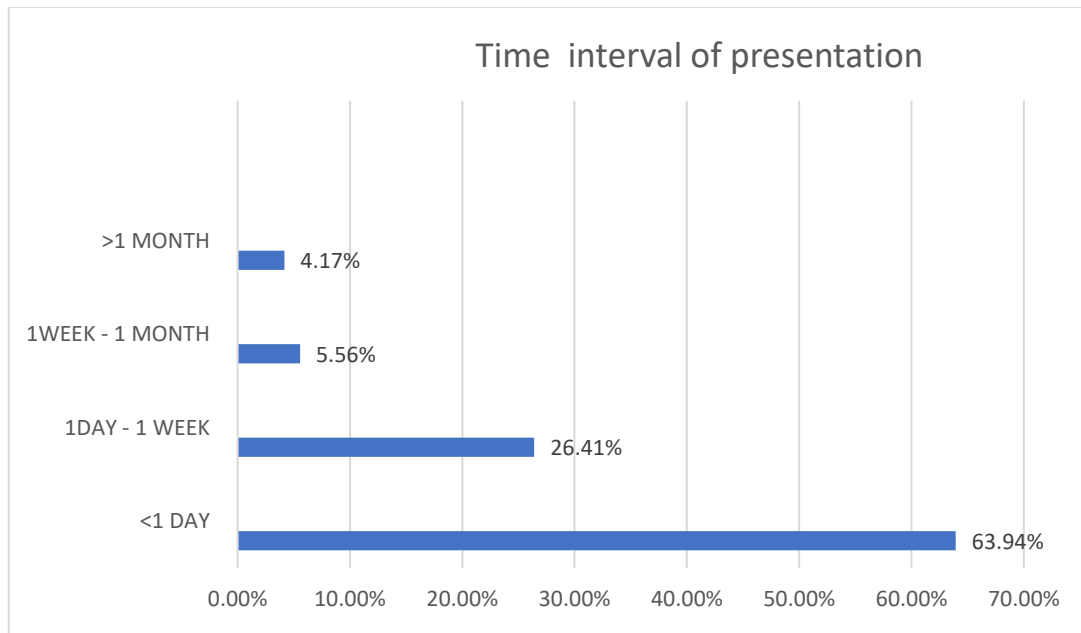
The most common object of injury was metal body (commonly iron), which accounted for 25% of the cases, followed by wooden stick (20.83%) and stone (15.27%).

Graph 2: Object of Injury



Most of the patients in our study (46 patients i.e. 63.94%) presented within 24 hours of the injury while only 4.17% (3) of the patients presented more than 1 month after the injury.

Graph 3: Time Interval of Presentation



77.84% (56) of the patients presented with visual acuity group FC 20 ft to HM-PL. While more importantly, 11.12% (8) of the patients had no PL on presentation, which was the second common presenting group, 4.17% (3) of the patients had vision on Snellen’s chart but <20/60 and 6.95% (5) of patients had vision in the range 20/40 – 20/20.

Table 2: Vision on Presentation

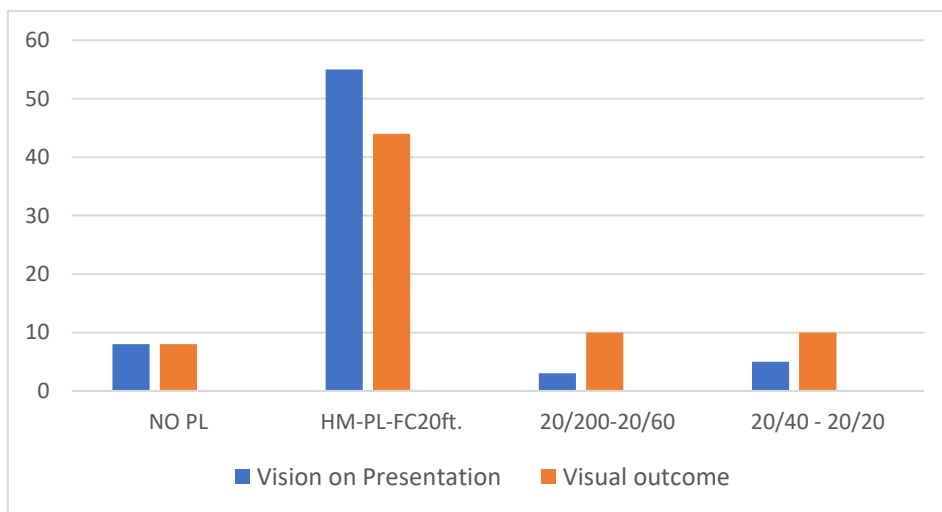
Vision on presentation	No	Percentage
NO PL	8	11.12%
HM-PL-FC 20 FT	56	77.84%
20/200-20/60	3	4.17%
20/40-20/20	5	6.95%
TOTAL	72	100%

61.11% (44) of the patients regained visual acuity in group HM-PL to FC 20ft. Also approx. 27% of the patients had post treatment vision on Snellen’s chart of which 13.8% each belonged to the group 20/200-20/60 and 20/40-20/20. Yet 11% (8) had still no PL vision.

Table 3: Visual Outcome

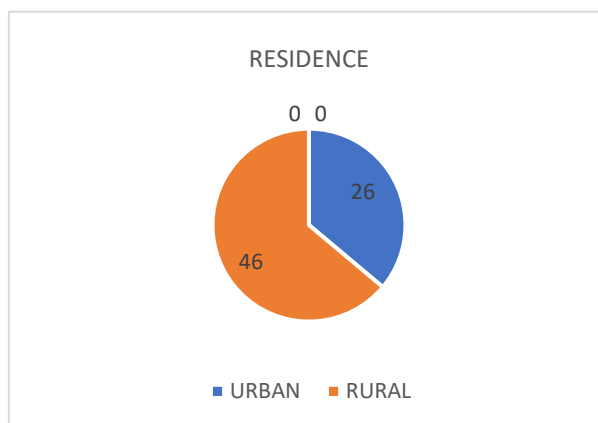
VISUAL OUTCOME	NO.	PERCENTAGE
NO PL	8	11.11%
HM-PL-FC 20FT	44	61.11%
20/200 -20/60	10	13.88%
20/40-20/20	10	13.88%
TOTAL	72	100%

Graph 4: Comparison of vision on presentation with visual outcome



Out of 72 cases 46 cases (63.88%) were from urban population and rest(36.11%) from rural population

Graph 5: Relation of Ocular Trauma with Residence



66 of the cases i.e. 91.74% were accidental ocular injuries and only 6 patients (8.34%) were intentional injuries. 26 of the 72 patients presented with closed globe injury (most common being AII4), while the rest i.e. 46 patients presented with open globe injuries (most common being BII4). Of the 15 patients in our study, which fall in Group A of closed globe injuries, 10 patients (66%) belonged to grade-I. 7% each in Grade-2 and Grade-3 and 20% in grade-4 injuries.

In group B of closed globe injuries, there were 4 patients of which 3 belonged to grade-2 and only 1 patient in grade-1. There were no patients in Group-C in closed globe injuries.

In Group-D of the closed globe injuries, there were 7 patients of which 2 (29%) belonged to Grade-3 and 5 (71%) belonged to Grade-4. There were no patients in grade-1 and 2 in this group

46 patients in our study suffered open globe injuries. In group A, there were 12 patients of which 6 had grade-4 injury and 3 each in grades-3 and 5. 56 patients had undergone surgical treatment, while 16 patients only were managed conservatively in this study.

Table 4: Surgical Management

SURGERY	NUMBER	PERCENTAGE
CE WITH ACIOL	2	3.56%

CE WITH PCIOL WITH SYNECHIOLYSIS	1	1.78%
CA WITH SYNECHIOLYSIS WITH SPHINCTROTOMY	1	1.78%
CE WITH PCIOL	4	7.12%
CNJUNCTIVAL TEAR SUTURING	1	1.78%
EVIScerATION	1	1.78%
EXPLORATION WITH REPAIR	1	1.78%
FB REMOVAL	1	1.78%
LID TEAR REPAIR	2	3.56%
PARACENTESIS	1	1.78%
PERFORATION SUTURING	32	56.96%
RD SURGERY	1	1.78%
GLOBE RUPTURE REPAIR	5	8.9%
SCRAPPING	1	1.78%
SUBLUXATED LENS REMOVAL WITH ACIOL	2	3.56%
TOTAL	56	100%

(CE: Cataract extraction, PCIOL: posterior chamber intra ocular lens, ACIOL: anterior chamber intra ocular lens, FB: foreign body, RD: retinal detachment)

Table 5: Grouping of Patients with Regard to Their Ocular Trauma Score and The Visual Outcome

Ocular Trauma Score Group	Number of Patients	Number of PL-HMPL	10/200-20/120	>20/120
1	6	6		
2	6	3	3	
3	52	12	31	9
4	3		1	2
5	5			5

Of the 72 patients in our study, 6 fell into OTS group-1 and all the 6 patients had NO PL or HM-PL as their final visual outcome. 6 patients fell into Group-2, of which 3 had NO PL or HM-PL vision while 3 patients had vision in the range 10/200-20/120. In OTS Group-3 there were majority of patients, i.e. 52, of which 12 belonged to NO PL or HM-PL group, 31 patients fell into final visual outcome range 10/200-20/120 and only 9 patients out of 52 belonged to the range >20/120.

In OTS Group-4, there were 3 patients, of which 1 had vision in range 10/200-20/120 and 2 had vision over 20/120. In Group-5, there were 5 patients, all of which had final vision >20/120.

Discussion

In our study ocular trauma was found to be most common in young children (11-20 yrs) (31.95%), so was it found to be more prevalent in study by sucheta et al in the age group 6-10 yrs (34.2%).⁶ In the Peshawar study 75.54% patients were below 30 yrs of age, with 50% accounted by children upto 15 yrs of age.⁷ In the Hyderabad study 11-15 yrs age group accounted for 25.5% of the ocular trauma patients.⁸

All the studies conclude in that males are more commonly affected by ocular trauma than females. The males to female ratio in our study was found to be approx. 6:1, while it was 3:1 in study by sucheta et al, 2.5:1 in delhi study, 2:1 in Hyderabad study and 4:1 in Peshwarar study.^{3,6-8}

63.94% of patients belonged to the rural community in our study, similarly in Hyderabad study 60.4% patients were of the rural population.⁸ This accounts for the fact that rural community are more engaged in outdoor activities hence prone to more ocular trauma, while urban people are restricted to indoor activities and profession requiring office work.

In our setup 91.74% of the injuries were accidental, most of which were outdoor injuries. However in Andhra Pradesh study, intentional injuries also accounted significantly (46.4%) Contradicting to our findings, as of 87.1% injuries were accidental in that study.⁸

Most of the ocular injuries in our study (63.94%) presented to us on the day of presentation. In the Hyderabad study 53.4% of patients presented within 1 day of injury and so did 48% of patients in the Peshawar study. Of the late presenters in our study most of i.e. 26.41% presented within 1 week of injury. This delay in presentation could be due to long distances and economic reasons.^{7,8}

63.89% of the ocular trauma patients in our study had open globe injuries, 58.3% in Delhi study, 55.3% in study by Sucheta et al and 64.35% in the Peshawar study.^{3,6-7}

The patients presented with finger counting vision (77.84%). This was also supported by other studies namely, Sucheta et al with 58% and Hyderabad study 51.2%. NO PL vision was found in 11.12% of cases in our study, 16.3% in Hyderabad study and only 4% cases in study by Sucheta et al.^{6,8}

61.11% of patients regained finger counting vision, similarly 35% of patients in the study by Sucheta et al regained vision in this group following treatment. In our study 13.88% patients only gained vision >20/60, which was much less than 42% patients in Sucheta et al study. NO PL vision still remained in 11.11% patients in our study and 4% patients in study by Sucheta et al.⁶

Limitations of The Study

Patients requiring evaluation and management pertaining to lesions involving the posterior segment, which included those requiring IOFB removal via pars plana approach or vitrectomy were referred directly from the outpatient clinic itself to a specialized treatment facility elsewhere, since such facilities are not still developed at the study hospital. Such patients were not included in the present study.

Conclusion

Based on our study, Ocular trauma is cause for concern irrespective of geographic area, economic status, gender and occupation of patients as it causes visual disability that makes person physically, economically and psychologically disabled. Children of 11-20 years were predominantly affected in our study as they are more prone to accidental trauma. Males were found to be more prone to trauma than females as they are engaged in manual labour to earn living which makes them vulnerable to work related injuries. So, providing personal protective equipment and educating them about use of personal protective equipment can avoid such occupational injuries. The time interval between injury and first presentation to hospital greatly affects final visual outcome of patient. So, it is necessary to spread awareness about ocular trauma and getting treatment immediately.

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