

A Study of Visual Outcome after Management of Traumatic Eye Injuries

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Abstract: *Title study of visual outcome after management of traumatic eye injuries .Purpose to determine the mode of injury and the factors affecting visual outcome after management of traumatic eye injuries, to determine preventive measures to avoid the injuries. Materials and Methods A prospective observational study was carried out on 250 patients presented following ocular trauma. A detailed history taking, anterior and posterior segment examination, baseline investigations and assessment of visual acuity were done at time of presentation, after medical and/or surgical treatment, after 1week, 1 month, 2 months and 3 months of follow ups respectively. Results mean age was 32.9 years with male preponderance (70%) occupationally working group (21-60 years) lost total 1619 days and school going children (6-18 years) lost total 488 days of quality life following ocular trauma. Major incidence was occupational (48.4%) injuries. Firecrackers, vegetative material and metallic objects were most common inflicting materials. Out of 250, 171 patients presented before 24 hours of ocular trauma, out of which, 85% had better final visual outcome.78 cases required secondary treatment for better vision and 20 patients ended up with complications and poor visual outcome. Conclusion early presentation and management following ocular trauma is beneficial for better visual outcome. Preventive measures at working places, home and during festivals (e.g. bystanders) are necessary to prevent the ocular trauma.*

Keywords: visual acuity, ocular trauma, occupational injury, bystanders

1. Introduction

An injury is damage to a person or a tissue/organ caused by transfer of energy – mechanical, thermal, chemical, electrical or radiant. The eyeball is a fairly well protected structure in our body. Trauma to eye is trauma to one of the most important special senses of human body, i.e. THE VISION

Most of us commonly see patients with ocular trauma in our daily practice. This may range from a small foreign body on the cornea to a ruptured globe, from a patient presenting with 6/6 vision to a patient with no perception of light. All these patients get treated differently depending upon the part of the country and availability of medical support. All of us have different levels of involvement in treating them. There have been numerous individual reports on ocular trauma. WHO has reported 55 million eye injuries causing restriction of daily activities, of which 1.6 million go blind every day[1].The course of events and final visual outcome following ocular trauma depends on multiple factors like the nature of trauma, immediate effects on the ocular tissues, presence of intraocular foreign body and infection. Immediate anatomical restoration of the ocular coats, prevention of post traumatic endophthalmitis or institution of it's prompt treatment if already present remain the most important emergency goals along the continuum of management of ocular trauma.[2]

Objectives of the Study

The objectives of the study are as follows:

- To determine the mode of injury affecting the visual outcome after management of traumatic eye injury.
- To determine the factors affecting the visual outcome after management of traumatic eye injuries such as duration of treatment, infection profile.

- To determine the preventive measures that should be taken to avoid the traumatic eye injuries.
- To assess the amount of disability due to ocular trauma.

2. Literature Survey

M. A. Rani Sujatha et al. studied prevalence of blunt ocular trauma in tertiary care centre and found that early treatment and prevention of ocular trauma should be a public health priority.[4] In a study conducted by Shailaja Karve et al. Blunt ocular trauma was most common mode of injury and economically earning young population was more affected than any other age group.[5] In Odisha, Dr Ashish Bhoi et al. conducted a study of chemical eye injuries and found that being those injuries minor in majority of cases, early intervention can lead to better visual outcome.[6] Amar Pujari et al. studied prevalence of firecracker injuries in the eyes following ban on firecrackers in Delhi in 2017. They found that following ban, the incidence of ocular trauma and resulting ocular morbidity was less and stringent protocol during diwali or other occasions can prevent such injuries specially in bystanders.[3]

3. Materials and Methodology

A prospective observational study was carried out in 250 patients who presented to Department Of Ophthalmology, P.D.U. Govt Medical College following ocular trauma from January 2018 to June 2019.A written informed consent was taken from each and every patient and detailed history was taken regarding the mode of injury, type of inflicting material, occasion of injury and time interval between incidence of trauma and time of presentation at our department or initiation of treatment if taken elsewhere before. Associated ocular and systemic history was also taken. Basline investigations were carried out such as Complete Blood Count, Serology tests, random blood sugar,

blood pressure, x ray orbit of the affected eye. A thorough ocular examination of anterior segment using slit lamp biomicroscopy and posterior segment examination using ophthalmoscopes was done and Bscan, intraocular pressure and ocular movements examination were done accordingly. The visual acuity of both the eyes, being the prime parameter of the study, was taken carefully at the time of presentation following ocular trauma, after giving primary treatment, at time of discharging the patient, on 1st week of follow up, after 1 month, 2 months and 3 months respectively. Thorough examination of the affected eye was carried out during every follow up.

Inclusion Criteria: All patients who presented following ocular trauma at Department Of Ophthalmology (G. T. Sheth Eye Hospital) P. D. U. Govt Medical College, Rajkot.

Exclusion Criteria: None

4. Result and Analysis

In our study, out of 250 cases, 175 were males and mean age was 32.9 years

Table 1: Age and Sex Distribution among Patients

Age Range	Males	Females	Total
0-10 years	32	10	42
11-20 years	34	11	45
*21-30 years	31	7	38
*31-40 years	26	13	39
*41-50 years	24	16	40
*51-60 years	15	11	26
61-70 years	11	3	14
71-80 years	6	3	9
81-90 years	0	1	1
TOTAL	175	75	250

Occupationally active age group was considered between 21-60 years of age which included total 143 patients with 96 males and 47 females.

Days spent in hospital along with days required for special care (minimum one week) in occupationally active group(21-60 years) and in school going children(6 to 18 years) resulting in quality loss of life days/months affecting educational and economical poor outcome. Total **1619 days** were lost from the precious lives of the patients who belonged to age group 21-60 years whereas total **488 days** were lost leaving the educational progress behind of school children belonging to the age group 6-18 years.

Table 2: Loss of Quality Life Following Ocular Trauma in Days

Age Group	Number of Days Lost		
	Males (days)	Females (days)	Total (days)
21-60 YEARS	1053	536	1619
6-18 YEARS	348	140	488

Out of 250 cases, 117 were penetrating trauma cases and 137 were non penetrating trauma cases manifested as keratitis corneal ulcers, foreign body, eschars, hyphaema, iridocyclitis, chemical injury, corneal infiltration and traumatic cataracts.

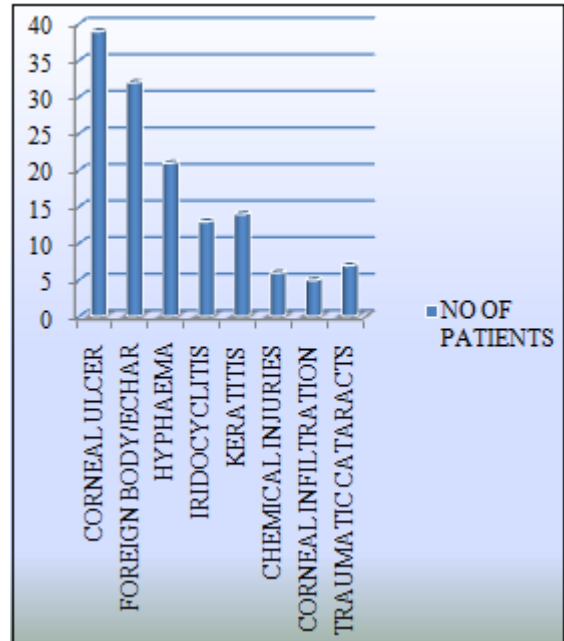


Figure 1: Non Penetrating Eye Injuries

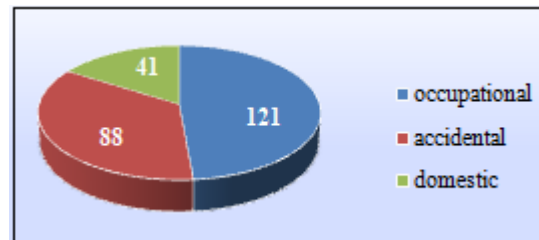


Figure 2: Incidence of Injury

During our study period, including festive occasions, there were multiple incidences which were amenable to cause possible trauma to eye. Out of 250 cases, 121(48.4%) cases had history to exposure to traumatic events at work place such as trauma with a metallic object while working at factory, vegetative trauma while working at farm etc.88 (35.2%) patients had trauma due to road traffic accidents, firecracker injuries, holi colour fall, ball injuries while playing.41(16.4%) patients had domestic injuries occurred while working at home by accident or assault such as chemical fall. Notably, 48 patients had suffered ocular trauma during Diwali festival due to firecracker injuries. most of them, children and adults were **bystanders**. Out of 118 cases of occupational injuries, 40 patients had injury with metallic objects such as baring of machine, iron rod/plate/nail at factory whereas, 78 patients had trauma with vegetative material such as husk, tree branch, thorn or wooden stick.

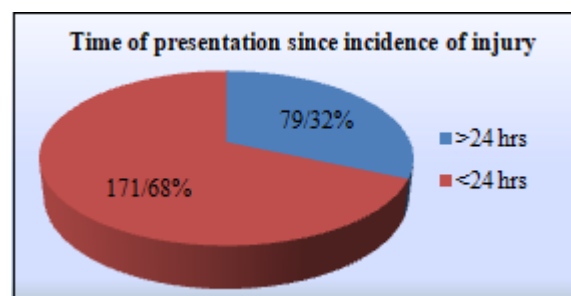


Figure 3: Time of Presentation Since Incidence of Injury

Total 171 patients could manage to come within 24 hours and 79 patients were late enough to receive treatment after 24 hours as they presented after 24 hours of event of ocular trauma. It was evident that those who managed to come earlier had better visual outcome and only 15% cases had poor visual outcome whereas, 31% cases had to suffer poor visual outcome amongst those who presented after 24 hours of incidence of ocular trauma.

Final Visual Outcome: Though it seems complicated at first sight, if interpreted correctly, the data in the below mentioned table is the key to our study which precisely represents the quality of vision gained and/or lost since the

time of presentation of ocular trauma to the final visual outcome recorded after 3 months follow ups. For ease of understanding, we have categorised the vision parameters from 1 to 6 in terms of no perception of light to $\geq 6/12$ Snellen's visual acuity chart respectively. The interpretation of the data in the table can be done as follows. For example, total 82 patients had vision of some perception of light or only hand movements appreciable at the time of ocular trauma when presented to my department. After 3 months of treatment and follow up examinations, out of those 82 patients, 3 patients lost their sight forever (no perception of light), whereas 13 patients could not improve their vision, which remained the same.

Table 3: Final Visual Outcome

Vision At Presentation			Final Visual Outcome						
	V _N RANGE	No. of Patients	NO PL	PL/HM	1/60-5/60	6/60-6/18	$\geq 6/12$	Un coop	TOTAL
Vision at Presentation	Category 1	0	0	0	0	0	0	0	0
	Category 2	82	3	13	18	29	19	0	82
	Category 3	71	1	1	24	11	33	0	71
	Category 4	36	0	0	0	0	36	0	36
	Category 5	11	0	0	1	0	10	0	11
	Category 6	50	0	3	7	11	21	9	50
Total		250	4	17	50	51	119	9	250

To summarize, out of 250 cases, the visual outcome improved in 207 cases after treatment at the end of 3 months, vision at 3 months after treatment remained same in 7 cases whereas, 27 patients had to suffer from poor vision compared to the vision they had at time of ocular trauma.

5. Discussion

Vision is one of the most valued and powerful of all senses. Binocular vision plays an important role in development, and in improving the quality of life.[7]

Ocular trauma is one of the most frequently presented and managed entity in ophthalmic department. Timely presentation from patient side as well as immediate and appropriate management can result in better salvage and also better visual outcome. My study covers wide range of presentation of ocular injuries by means of various modality.

In our study, total 48 patients suffered from firecracker injuries, manifestations being a small eschar on cornea to globe perforation. Surprisingly, majority of them were bystanders as they are relatively unaware whereas active players tend to run far away after before firecracker gets burst. Our study also included 39 cases of corneal ulcers most commonly following vegetative trauma or trauma with metallic object or foreign body fall like sand particle fall or any other material like cloth clip. The major group of patients were factory or farm workers and labourers owing to which, out of 250 patients, total 121 patients suffered ocular injuries due to occupational hazards and lack of protective measures during work. Out of 250 cases, 143 cases belonged to The major occupationally active age group of 21-60 years and school going children were 52 who suffered economical as well as educational loss of quality days of total 2107 days. There were 78 cases which required secondary line of treatment for better outcome out of 250 cases. Keratoplasty following corneal ulcer or leucomatous

corneal opacity and scarring was required. Vitreoretinal surgery was required for management of retinal detachment, vitreous hemorrhage, choroidal detachment and endophthalmitis. Cataract surgery was required for traumatic cataract in both penetrating and blunt trauma. In case of penetrating trauma, some of the cases were simultaneously operated for corneal perforation repair and cataract extraction and secondary intraocular lens implantation could be done later on e.g. after 3 months of follow up. In some of cases, Cataract extraction and intraocular lens implantation could be done after primary repair of cornea and/or sclera. Total 20 cases ended up with complicated and vision threatening entities like endophthalmitis and among them, 4 patient permanently lost their sight in the affected eye.

6. Conclusion

The patients who managed to come earlier after incidence of trauma (in less than 24 hours) gained significantly better visual outcome.

The occupationally active age group (21-60 years) and school going children (6-18 years) had to suffer the most in terms of quality loss of days, thus increasing economical and educational burden over the society.

Four patients (total 4.4%) permanently lost their one eye due to trauma and could be eligible for getting visual disability certificate and for getting licence.

Safety measures while working in factory, farms and other occupationally vulnerable sites are key to the prevention of such trauma.

Bystanders, by watching firecrackers only and not actively participating at festivals, themselves become more vulnerable for the possible ocular trauma. Hence, they need to pay more attention while watching firecrackers and

should acquire necessary protection (like protective glasses) not to become the unfortunate ones.

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