

# Visual Outcome after Surgical Management in Penetrating Ocular Trauma

CH. JAVED IQBAL, KASHIF RAZA KHAN, MUHAMMAD SOHAIL ARSHAD, MUMTAZ HUSSAIN

## ABSTRACT

**Purpose:** To determine the frequency of good visual acuity after primary repair in patients presenting with penetrating ocular trauma involving cornea and sclera.

**Material and method:** 90 patients presenting in emergency, fulfilling the inclusion criteria were included in the study. Informed consent about surgery was taken. Primary repair was done by single surgeon. This was recorded on a Proforma. Follow up visits were done after one month, 3 month and good visual acuity (>6/60) was taken at four months postoperatively, recorded with Snellen's chart.

**Results:** Seventy nine (87.8%) out of total ninety patients were males showing the preponderance of ocular trauma in males, whereas the rest eleven were females (12.2%). In these patients the frequency of good visual acuity was found to be 67.8% after 4 months of surgical management.

**Conclusion:** Visual outcome after penetrating ocular trauma depends upon the structure involved, initial visual acuity and the timely and proper surgical management.

**Key words:** Ocular trauma, visual outcome, cornea & sclera

---

## INTRODUCTION

Ocular trauma by definition is a blunt or penetrating injury of the eyeball. Penetrating eye injury is full thickness wound of eyeball caused by sharp object with no exit wound<sup>1</sup>. It is one of the main reasons for severe visual impairment and as a rule requires treatment in hospital.

Severe ocular trauma may cause multiple injuries to the lids, globe and orbital soft tissue<sup>2</sup>. It is the most common cause of monocular visual impairment and blindness worldwide<sup>3</sup>. Incidence of ocular trauma is 33.5% under the age of 14 years, 31.2% in 15-25 years, 24.7% in 26-40 years and only 10.7% over the age of 40 years.

Ocular trauma is mainly accidental and has an age specific pattern. A marked preponderance is seen in the 6-10 years age group<sup>4</sup>. Males are affected more due to their adventurous and aggressive nature<sup>5,6</sup>. The causes are diverse and tend to vary in different geographical areas and according to socioeconomic status. In the Indian context, wood stick injuries and those due to iron objects are common. Domestic objects like knives, screwdrivers, scissors, glass etc can cause grave ocular injuries<sup>7</sup>. Fire works related ocular injuries are seen during festivals, while bird beak and animal horn injuries are common in rural setting.

Visual outcomes in ocular injuries depend on the type of injury, the extent of damage and the presence or absence of secondary infections with retained

intraocular foreign bodies. Generally, blunt injuries have a somewhat better visual outcome than penetrating or perforating injuries<sup>8</sup>. Non penetrating corneal and ocular surface injuries usually respond to conservative management whereas penetrating injuries require surgical intervention for restoration of structural integrity.

Penetrating ocular trauma is the single laceration of the eye wall in which no exit wound occurs. Though technically the wall of the eye has not one but three coats posterior to limbus but for clinical purpose it is best to restrict the term "eyewall" to the rigid structures of cornea and sclera. Visual outcome after surgical management in penetrating ocular trauma involving cornea sclera was found to be good (>6/60) in 64.5% of patients after four months of surgical management in one particular study<sup>9</sup>.

Worldwide studies are being conducted with increasing development of effective techniques for prevention and treatment of ocular trauma. The purpose of this study is to determine the visual outcome of penetrating ocular trauma after four months of surgical management so that effective recommendations can be suggested for its prevention and treatment.

## MATERIALS & METHODS

This descriptive case series study was carried out on 90 patients presented to the Institute of Ophthalmology, Mayo hospital Lahore from 15-07-2009 to 15-01-2010. Patients of both genders, ranging from 5 to 50 years of age, presenting with penetrating ocular trauma involving the cornea and

---

*Institute of Ophthalmology, King Edward Medical University, Mayo Hospital, Lahore*  
Correspondence to Dr. Ch. Javed Iqbal, Assistant Professor Email: drj4eye@yahoo.com # +923334311146

sclera, detected on slit lamp examination were included in the study. While the patients presented with blunt ocular trauma, ocular infection, previous ocular trauma, surgery or ocular pathology were excluded from the study. Initial visual acuity was taken at the time of admission. Informed consent about surgery was taken. Primary repair was performed. This was recorded on a Proforma. Follow up visits were done after one month, 3 month and 4 months postoperatively. Visual acuity was recorded on each visit with Snellen's chart. The frequency of good visual acuity (>6/60) was then determined at four months interval after the primary surgical management.

**RESULTS**

The calculated sample size in the study was ninety patients. Out of these ninety patients, seventy nine (87.8%) were male and eleven (12.2%) were female (Table 1)

According to their age, all the patients were divided into five groups. The first group comprised of patients ranging from 5-15 years of age and included 42 patients ( 46.7%). The second group consisted of patients ranging from 16-25 years of age, comprising 21 patients (21.3%), The third group included patients ranging from 26-35 years of age, including 18 patients (20%). The fourth group comprised of patients ranging from 36-45 years of age, and included 3 patients (3.3%). And the final fifth group included 6 patients (6.7%) ranging from 46-50 years of age. So it is clearly evident that most of the sufferers of ocular trauma were of younger age (Table 2).

In our study we calculated the final visual outcome after primary repair of the patients presented with penetrating ocular trauma. Patients were divided according to their final visual outcome as having good visual outcome (>6/60) and with poor visual outcome (<6/60). Good visual acuity was achieved in sixty one (67.8%) patients while the remaining twenty nine patients (32.2%) were ended up with poor visual outcome, so highlighting the role of proper and timely management of the condition (Table 3).

In our study patients were included with penetrating ocular trauma involving the cornea and sclera. The collected data showed that most of the patients presented were having penetrating ocular trauma involving the cornea (Table 4). Total fifty nine (65.6%) patients were included in this group. While the number of patients having penetrating ocular trauma involving the sclera was thirty one (34.4%).

The visual acuity at which patients were presented was noted in all patients and the patients

were divided in six groups according to it. Out of total ninety patients, seventeen patients (18.9%) presented with visual acuity better than 6/60 while rest of them presented with poor visual acuity (Table 5). This preoperative visual acuity at presentation is a very useful clinical prognostic factor regarding the final visual outcome. Data clearly shows that in all the patients presenting with visual acuity Counting Fingers (CF) or better than this, the final visual outcome which was good. While in patients with presenting visual acuity Hand Movement (HM), two patients acquired finally poor visual acuity and patients of presenting visual acuity less than that ended up in poor outcome.

So in our study, data clearly shows that majority of patients were males of relatively younger age. The most frequently involved structure was cornea. Visual acuity at presentation proved to be an effective predictor of final visual outcome.

Table 1: Gender Distribution

Gender	Frequency	%age
Male	79	87.8
Female	11	12.2
Total	90	100.0

Table 2: Age group

Age ( Years)	Frequency	%age
5-15	42	46.7
16-25	21	23.3
26-35	18	20.0
36-45	3	3.3
46-50	6	6.7
Total	90	100.0

Table 3: Good visual acuity

Visual acuity	Frequency	%age
Good	61	67.8
Poor	29	32.2
Total	90	100.0

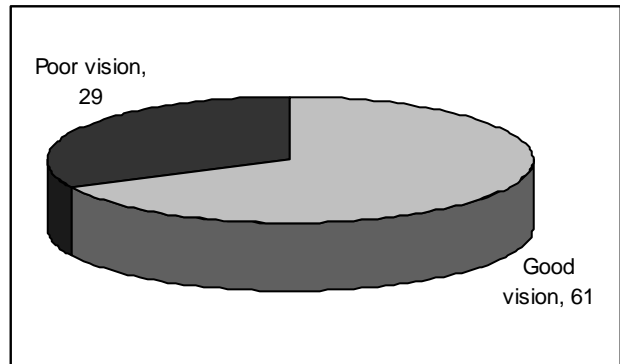


Table 4: Structures involved

Structures involved	Frequency	%age
Cornea	59	65.6
Sclera	31	34.4
Total	90	100.0

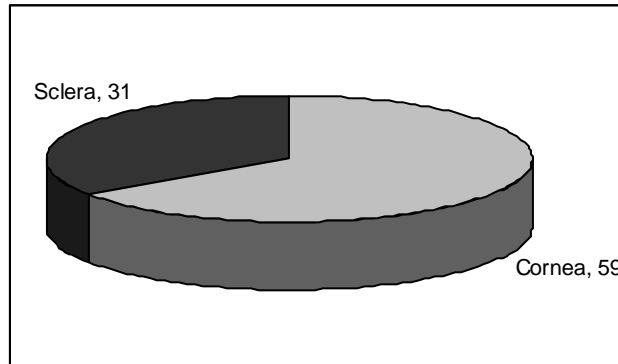
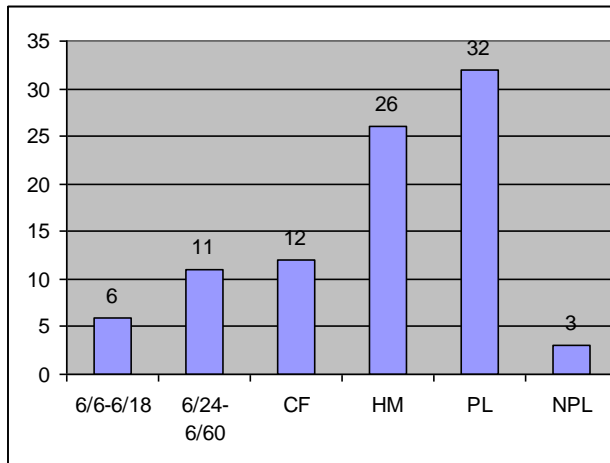


Table 5: Visual acuity at presentation

Vision	Frequency	%age
6/6 - 6/18	6	6.7
6/24 - 6/60	11	12.2
CF	12	13.3
HM	26	28.9
PL	32	35.6
NPL	3	3.3
Total	90	100.0



## DISCUSSION

Ocular injuries are a common and largely a preventable cause of monocular visual impairment and blindness. Penetrating type of ocular trauma is one of the most common eye injuries leading to admission in hospitals. Visual outcome after the primary surgical repair is one of the most important issues in such patients.

Although it affects all age groups, previous reports have indicated that ocular trauma victims are predominantly males and young, with the majority

under 30 years of age. Young males are affected more due to the great physical contact, more adventurous or aggressive behavior, mostly in their leisure activities. The school age group was more susceptible than other groups. It is believed that children in this age group are more independent than the younger but more immature than the older, what may make them more vulnerable.

Work-related injuries are described as the commonest cause of ocular trauma among adults. On the other hand, the most common cause of paediatric injuries was accidental blows and falls.

A delay in diagnosis will lead to poorer outcome of management. Children may not recognize or describe their injury. Particularly open globe injuries if left un-sutured increase the chances of endophthalmitis, one of the bad prognostic factors. A delay in seeking treatment will make prognosis worse and this scenario is more likely to be common in country like ours. A significant number of injuries result from play with ordinary household items. These causes of injury are potentially preventable.

In our study, the males were found to be involved much more than the females. 87.8% of the patients included in the study were males while only 12.2% of them were found to be females. This result is very much closer to the results obtained in the study conducted by Singh D.V, Sharma Y R in which 88.5% patients were males while the 11.5% were females. The same high male to female ratio was found in the study conducted by Malla B.K in which 72% of the patients were males while the 28% were females.

Our study included the patients of ocular trauma in which either cornea or the sclera was involved. Results in our study showed that out of ninety patients, fifty nine (65.6%) patients were having corneal rupture and thirty one patients (34.4%) had sclera involvement, showing almost double the percentage of cornea involvement.

## CONCLUSION

The frequency of ocular trauma is very high in developing countries like Pakistan. As it is one of the most preventable causes of blindness so proper attention should be given in this direction and specific measures should be taken to prevent it. Good useful vision can be saved by timely and proper surgical management in most of the cases.

## REFERENCES

1. Kuhn F, Morris F, Witherspoon CD, Mester V. The Birmingham Eye Trauma Terminology system (BETT). J Fr Ophthalmol 2004; 27: 206-210.

2. Kunimoto DY, Kanitkar KD, Makar MS. Trauma. In: The Wills Eye Manual. 4<sup>th</sup> ed. Philadelphia: Lippincott Williams & Wilkins 2004; 14-38.
3. Yaya G, Bobossi Serengbe G, Gaudeuille A. Ocular Injuries in children aged 0-15 years: epidemiological and clinical aspects at the Bangui National Teaching Hospital. *Ophthalmol* 2005; 28: 708-712.
4. Kaur A, Agrawal A. Paediatric ocular trauma. *Current Science* [online] 2005 [cited 2006 Nov 20]; Vol 89, No.1. Available from: <http://www.ias.ac.in/currsci/jul 10 2005/43.pdf>
5. Robson J, Behrman AJ, Abbuhi S. Globe Rupture [serial online] 2007 February 16 [cited 2007 April 18]. Available from: <http://www.emedicine.com/emerg/topic218.htm>.
6. Arunagiri G. Laceration, Corneoscleral [serial online] 2006 July 14 [cited 2007 April 18]. Available from: <http://www.emedicine.com/oph/topic108.htm>.
7. Butt NH. Management of ocular trauma in children. *Pak. J Ophthalmol* 2002 Oct; 17 (4): 115-8.
8. Mansori MR, Mohammadi SF, Hafez E, Rahbari H, Khezanehdari MS, Zandi P, et al. The Persian Wednesday Eve Festival "Charshanbe-Soori" fireworks eye injuries: a case series. *Ophthalmic Epidemiol* 2007; 14(1):17-24.
9. Shoja M R, Manaviat M, Baradaranfar M H. Outcome of corneal sclera laceration in Yazd. *MJIH* 2004; 6: 2: 45-8.