



OCULAR TRAUMA – MANIFESTATIONS AND ITS MANAGEMENT”

Ophthalmology

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ABSTRACT

Background : The occurrence of ocular injuries in patients who have major trauma is low, but there is a combination of ocular injuries and fracture of facial bones. Adults have the highest occurrence of ocular injuries. Road traffic accidents are the main reason for ocular injuries. All patients who have major trauma should be checked especially for an ocular injury. **Material and Methods :** The present study was conducted in the Upgraded Department of Ophthalmology at Darbhanga Medical College & Hospital, Laheriasarai, Bihar. The patients attending the Out-patient Department of Ophthalmology and central emergency of DMCH during the period from July 2018 to November 2019 constituted the material for the study. **Results :** 120 cases of ocular trauma who presented in out-patient department and emergency of DMCH, Laheriasarai, Bihar were enrolled in the study. **Conclusion :** The eye has been given various protective mechanisms by nature. In spite of that injuries to the eye are common and may result in blindness. Therefore all ocular injuries must be treated as emergencies and a detailed examination is warranted in even innocuous looking injuries.

KEYWORDS

INTRODUCTION

Eye is our most important organ and it introduces us with our environment. Loss of sight is the most feared of all disabilities especially so if suffered acutely like in the cases of serious eye injuries. Traumatic injuries of eyes are increasingly becoming a common cause of permanent and yet avoidable cause of blindness.

The surgical management of such injuries is directed primarily at the restoration of normal ocular anatomy; the ultimate goal is to prevent secondary complications and maximize the patient's visual prognosis. Ocular injuries carries high risk of ocular morbidity in all age groups. 1 Blindness is a major health problem in developing countries like in India and ocular injuries are the main avoidable cause. Ocular trauma is a major cause of worldwide visual impairment. Despite its public health importance there is less population based data on the magnitude and risk factors for ocular trauma especially from developing countries. Information on minor ocular injuries requires population based study. Most study are based on hospital records, but such data do not accurately indicate the population at risk.

Annually, there are in excess of 2.4 million cases of ocular trauma, with more than 40,000 individuals sustaining significant visual impairment on a permanent basis.² From the international perspective, an estimated 500,000 blinding eye injuries occur annually worldwide, making ocular trauma the principle cause of unilateral blindness in the world today and the second leading cause of blind eyes.³ Today, in industrialized nations, eye injury has become the most frequent reason for admission of ophthalmologic patients. Visual outcomes vary from full recovery to complete blindness, with physical and psychological loss and enormous costs to society.⁴ In the Indian context, injury as a cause of blindness constitutes 1.5% of total cases (NPCB 2002).⁵

The incidence of ocular trauma is extremely high in males. Most of those who are injured are young. The average age is usually less than 30 years.^{1,6,7} People of lower socioeconomic and educational levels are more likely to be injured. Illiteracy and ignorance among the poor and rural folks contribute in a big way to ocular morbidity.^{8,9}

Ocular injuries can and do occur in almost any setting, including recreational and sports related activities, the workplace, the home, rural agricultural settings, motor vehicular accidents and on the battlefield. Impact of ocular trauma is difficult to define but the life of the patient maybe permanently altered following the injury.² It

represents not only a cause of severe visual loss but also a profound emotional trauma to patients and their relatives. Treatment is time consuming and expensive.¹⁰

Ocular injuries caused by sharp or blunt instruments or foreign bodies are all potentially serious and should be treated as an emergency. The gravity of such injuries is due to the immediate damage to the eye, post-traumatic iridocyclitis, introduction of infection, traumatic cataract and sympathetic ophthalmitis.¹¹

Management of ocular injuries on an emergency basis is of crucial importance, which needs a different perception on the part of the patient as well as the treating surgeon. This becomes significantly important in the case of penetrating ocular injuries. Although the prognosis of severe eye injury has improved markedly in the last two decades, the outlook remains guarded.^{7,12} The extent of injury prescribes the management path to be followed. It is accepted in practice to primarily repair the wound and then plan the secondary reconstruction optimally in one or more steps.

The final outcome being dependent on a variety of factors like location, extent and type of injury, visual acuity at presentation, presence of infection, etc.^{11,13}

Therefore prevention of ocular trauma should be given high priority. Ocular injuries are avoidable. 90% of eye injuries are said to be preventable. The adage “prevention is better than cure” applies more aptly in the case of ocular trauma. If there is mass awareness of the inherent dangers of games such as bow and arrow, gillidanda, etc; teachers, parents, elders and children can prevent countless number of ocular injuries. Education regarding the risks and dangers of ocular trauma likewise will go a long way in preventing ocular trauma. Professional associations like the International Society of Ocular Trauma (ISOT), and the United States Eye Injury Registry (USEIR), have been formed to promote research, elaborate epidemiologic investigations, highlighting preventable sources of injury, emerging patterns of trauma, treatment outcomes and disseminate its results. The USEIR is presently working with the ISOT to establish the World Eye Injury Registry (WEIR).

AIMS AND OBJECTIVES

Trauma to the eye is potentially grievous and should be treated as an emergency. Ocular trauma can present in a variety of settings. It poses a

challenge to the Ophthalmologist, in spite of the accepted guidelines. Therefore prevention of ocular trauma should be given high priority.

This study is undertaken with the objective:

- 1) To study the causation and management of different ocular injury
- 2) To evaluate the final visual outcome and the sequelae of different ocular trauma.

MATERIAL AND METHODS

The present study was conducted in the Upgraded Department of Ophthalmology at Darbhanga Medical College & Hospital, Laheriasarai, Bihar.

The patients attending the Out-patient Department of Ophthalmology and central emergency of DMCH during the period from July 2018 to November 2019 constituted the material for the study.

A total of 120 cases, who presented with ocular injury for the first time in out-patient department or emergency were selected for the study. Some patients were admitted and some were either sent back home or to higher Centre after giving appropriate treatment. All the cases, enrolled in the study were followed up frequently for 6 month to notice the final visual outcome and sequelae of ocular injury. The data was categorized into age, sex, causative agents, socioeconomic status of patients or parents, time since injury, mode of injury, visual acuity at presentation and after 4 weeks, final visual outcome, any sequelae or complication and the treatment received.

Patients were explained in detail in their own vernacular language regarding the nature of the disease and also about the importance of timely intervention.

Importance of co-operation from the patients towards frequent visits for follow-up was also emphasized. The risks and benefit of GA and surgery was explained in detail to the patients and the relatives. The patients and the relatives were also explained about the guarded visual prognosis and also about the possibilities of secondary procedures and additional visual rehabilitation. After all the details were clearly explained to the patients and the relatives in their own vernacular language, about the condition of the eye, the treatment and the possible outcomes, an informed consent was taken towards the treatment procedure.

A thorough and detailed history was taken with special emphasis on the nature and the mode of injury, symptoms, time elapsed since injury, vision of the patient before the injury, whether the patient was treated before coming to the hospital, activity at the time of injury, condition of the other eye, any systemic illness, etc.

Inclusion criteria:

All cases of ocular injury attended out-patient department or emergency of DMCH between July 2018 to November 2019 for the first time were selected for the study.

Exclusion criteria :

- Patient refusing admission.
- Patient not coming for regular follow-up.

EXAMINATION:

Careful and detailed examination of both the eyes was conducted along with the general physical examination for any other associated injury over any other part of the body. Vitals were recorded and appropriate intervention done.

Examination of function of eye:

Vision: At the initial examination vision was assessed carefully using Snellen's charts.

In cases where visual acuity was less than 6/60, vision was expressed as counting fingers at a particular distance, expressed in meters. If patient was not able to count fingers, visual acuity was expressed as hand movements close to face, perception of light and projection of rays.

Pupillary reaction: Both direct and indirect pupillary reaction was checked. Pupil was also tested for any afferent pupillary defect which grossly tests optic nerve function and retinal function.

Slit-lamp examination: A thorough examination of the eye was carried

out on slit-lamp.

In some conditions where slit lamp was not available, loupe was used for the examination.

Refraction: Refraction was done for both eyes using cycloplegics.

Fundoscopy: A thorough and careful examination of the fundus was done using direct and indirect ophthalmoscope with special attention towards any opacity in the lens, vitreous, vitreous haemorrhage and retinal detachment. In most cases fundus was not visible due to hazy media, swelling of lid and proptosis.

Intra-ocular pressure: IOP was checked with Schiottz or Goldmann Applanation tonometer only in cases where the wound of entry was sealed and the anterior chamber was well formed. IOP was not checked in the cases of corneoscleral tear with iris prolapse and shallow AC.

Evaluation by a physician was done in all cases to note the presence of any systemic diseases and for opinion regarding medical fitness for surgery. In cases where GA was used, the patient was examined by the anaesthetist and opinion regarding status of the patient for anesthesia was given.

INVESTIGATIONS:

- Routine urine and blood examinations
- Conjunctival swabs and vitreous tap (in relevant cases)
- X-ray orbit to rule out any fracture and lodged foreign body.
- CT scan (in relevant cases)
- USG B-scan (done in relevant cases)

TREATMENT :

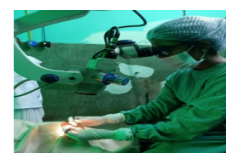
All those patients having serious ocular injury were admitted and treated as an emergency. Informed consent was taken from all patients for evaluation and management. Protective shield and bandaging was done for all patients. All the patients were started on broad spectrum antibiotics. Antibiotic drops and cycloplegic drops were instilled. Further management was planned based on the whether the wound was self-sealing or not. In those cases where the wound of entry was small, the two lips of the wound were well apposed without any prolapse of uveal tissue, and the anterior chamber was well formed. For the large leaking wound primary repair was undertaken. Surgical management included repair of the wound with abscission of the prolapsed uveal tissue, with AC reformation, using either air or saline. In some cases of traumatic cataract, the cataract extraction was done at the same time, and when it was not possible some cases were advised cataract extraction as a secondary procedure. Cases which involved the posterior segment, endophthalmitis and vitreous haemorrhage, were referred to a vitreo-retinal surgeon for further management. The patients were followed up frequently. The patients were followed up weekly in the first month and then monthly upto six month. At every visit, the patients underwent a detailed ocular examination which included slit-lamp examination. Vision was assessed, using Snellen's chart, at each visit and any change were noted.



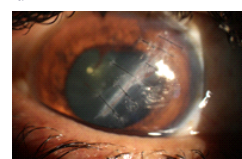
Eye Lid



Sclerocorneal Tear with Iris Prolapse
Sclerocorneal wound



Repairing of



Corneal repair after penetrating ocular trauma

OBSERVATION AND RESULT

120 cases of ocular trauma who presented in out-patient department and emergency of DMCH, Laheriasarai from July 2018 to November 2019 were enrolled in the study.

AGE INCIDENCE:

In the present study, the incidence of ocular trauma is found to be highest in the 1st and 3rd decades of life. The cases in the 1st and 3rd decades of life, contributes to 66.6% of total cases. In the 2nd and 4th decades there were 13.33% of cases each.

SEX INCIDENCE :

In the present study males outnumbered the female in the occurrence of ocular injury. This study shows that ocular injuries in males was 80% (n=96), in comparison to females 20% (n=24).

EYE AFFECTED :

This study shows that in 33.33% right eye was involved in comparison to 66.67% cases with left eye involvement. There were no cases with bilateral ocular injuries.

ZONE OF INJURY :

In the present study most of the injuries involved zone 1 (70%), the zone. The zone 2 injuries were seen in 20% cases and zone 3 injuries in 10% cases.

TIME SINCE INJURY :

This study shows that maximum no. of patients came to hospital within the 1st week of injury. 53.33% patients came to the hospital within first week but after 24 hour of injury. 30% patients came after more than 1 week of injury.

AETIOLOGICAL PATTERN: (activity during injury)

The present study shows that most of the ocular injuries occurred during physical assault, in agricultural set up, factories work and in below 10 year child during play. Motor vehicle accidents, competitive sports and kitchen works accounted for less number of cases. Chopping wood is one important activity leading to ocular injury.

OBJECTS CAUSING INJURY :

The maximum numbers of injury were because of thorn, wood piece, stick, fist and wires. All these together contributes to 92 cases, (76.66%). Stone, glass piece, knife, bow and arrow, compass and other contributes about 23.34% of cases.

STRUCTURE OF EYE INVOLVED :

Table below shows the frequency of the ocular structure involved in ocular injury in the present study. Lens and the structure of anterior segment of eye was involved in most of the cases. Injuries to lid, eyebrow, conjunctiva, cornea, iris, lens account for maximum no of cases. Most of the patients had more than one ocular structure involvement. 24 cases had shallow anterior chamber and 24 cases had vitreous and retinal involvement.

VISUAL ACUITY AT PRESENTATION :

Visual acuity in the injured eye, at the time of presentation to the hospital was of prime importance in the management of ocular trauma patients. The devastation that ocular trauma brings into the patient life particularly those with penetrating, lacerated eye wound and rupture of globe is undefinable. Loss of sight is the worst disability any one can have. Table below shows the visual acuity at the time of presentation to hospital.

Management of ocular trauma cases :

The cases who presented with sub-conjunctival hemorrhage was managed conservatively with assurance that it will self resolve in 4-6 week time. Those cases who presented with lid laceration, lid repair was done. Those having superficial laceration parallel to lid margin without gaping was sutured with 6'0' black silk and was removed after 5 days. Those with invariable gap at lid margin was sutured carefully with perfect alignment to prevent notching.

The cases who were presented with mild corneal abrasion were treated medically with lubricants and antibiotic topically. Those with lacerated cornea, iris prolapse and flattened anterior chamber who came within 24 hour of injury, iris was repositioned, anterior chamber

was reformed with balanced salt solution and cornea was repaired by using nylon 10-0 suture. Both the cut margin of cornea was aligned and entry and exit of needle was kept at equidistant from the cut margin of cornea. The cases who came after 24 hour with iris prolapse, the prolapse part of iris was abscised and after repositioning of remaining iris AC and cornea was managed in the same manner.

The cases with hyphaema were first medically treated with anti-glaucoma drugs and topical steroids for few days to reduce the inflammation and secondary hemorrhage. Mydriatics was also used. The cases who had total hyphaema, surgical evacuation was done to prevent corneal staining or to avoid persistent elevation of IOP. Those who presented with cataractous lens after trauma was extracted by SICS or ECCE in second setting with IOL implantation. Those having dislocated lens in anterior chamber were treated surgically by ICCE with IOL implantation and peripheral iridectomy.

Those having vitreous hemorrhage and retinal detachment were sent to vitreoretinal surgeon and followed up closely. After OPD based treatment or discharge from ward, cases were followed up weekly for 1st month and then monthly for another 6 month. Visual outcome and sequelae was noted in every cases.

VISUAL ACUITY AT FOUR WEEKS :

After four weeks of management of the ocular trauma the present study shows that 50% of cases (n=60) had vision in the injured eye better than 6/12. Another 40 cases (33.3%) had vision between 6/12-6/18. The leading cause of visual impairment was cataract and corneal opacity.

COMPLICATIONS AND SEQUALAE :

The table below shows the complications and sequelae following ocular injury as seen in this study. About 33.33% of cases (n=40) developed post traumatic cataract. About 30 cases developed post traumatic iridocyclitis that resolved after treatment. 16 cases developed corneal opacity, 8 developed secondary glaucoma and 3 cases developed endophthalmitis. 6 cases developed vitreous hemorrhage and 5 retinal detachment. 6 cases developed ectropion and entropion following lid surgery.

Eyes with injury involving zone 1 with iris prolapse had satisfactory vision following treatment. Patients with traumatic cataract implanted with IOL also had a good visual prognosis. Eyes with infection had poor visual outcome.

CONCLUSION

Ocular injury accounts for most of the cases of unocular visual loss. In addition, ocular trauma tends to affect young males. Different studies done over the last two decades have improved our understanding of the patho-physiology and various complications arising secondary to different ocular trauma. Together with better microsurgical techniques and the availability of sophisticated diagnostic tools such as USG and CT-scan, has improved the management of different types of ocular trauma to the eye.

Even then the prognosis remains guarded. In this study, 80% of the patients were males and more than 80% of the patients were less than 30 years of age. Childhood play, Agricultural activities and physical assault were the most common setting where ocular trauma occurred. Most of the injuries were due to thorn prick injuries, again emphasizing the fact that most patients in this study were rural folks engaged in farming and young kid engaged in dangerous childhood play.

Lid, conjunctiva and cornea due to its anterior placement was the most common structure involved. Although lens outnumbered other ocular structure being involved and the main reason was development of post traumatic cataract. In this study it was observed that most patients presented within the first week following injury. The visual acuity was poor in most cases but following treatment most patients had satisfactory vision except those with serious and posterior segment involvement. Poor visual recovery was seen in cases which were complicated by infection. The most common complication following penetrating ocular injury is cataract. The visual prognosis following IOL implantation is good as observed in this study. This study has limitations like small sample size and a short follow-up period.

A larger sample size along with a longer follow-up period is required to observe the long-term visual outcome and also to study the delayed complication.

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