

DEMOGRAPHIC AND CLINICAL PROFILE OF OCULAR TRAUMA.

Ophthalmology

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ABSTRACT

Background: The main objective of this study is to determine the demographic and clinical profile of ocular trauma of patients attending our hospital.

Methods and Material: A retrospective study of 245 patients with ocular trauma seen from August 2013 to July 2015 at our hospital. Statistical analysis used: Retrospective analysis

Results: Ocular trauma accounted for 1.6% of all the patients attending our hospital OPD and emergency. The study included total number of 245 patients of which open-globe injuries accounted for 124 (50.61%), closed-globe injuries 74 (30.29%), adnexal injuries 41 (16.73%), chemical injuries five (2.04%), thermal injuries one (0.40%). Of 245 patients, males include 191 (77.95%), females 54 (22.04%). Majority of patients were between 30-44 years, who accounted for 28.57%. The most frequent types of injury were road traffic accidents 116 (47.34%), work related 77 (31.42%), sports related 26 (10.61%), home related 12 (4.89%), violence related 12 (4.89%), animal bite two (0.81%).

Conclusions: Duration of presentation has significant association with presence of infection and other complications. Delay in presentation was associated with complications. Preventive efforts are important for work related, road traffic accidents and home related injuries.

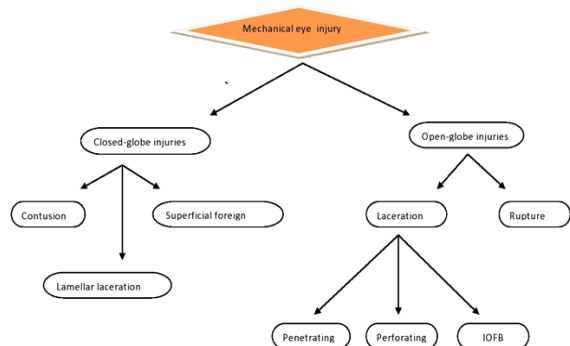
KEYWORDS

Ocular trauma, Open-globe injuries, Closed-globe injuries, Adnexal injuries, Thermal injuries, Chemical injuries.

INTRODUCTION:

Ocular trauma is a common cause of unilateral blindness^[1] and is associated with numerous emergency room^[2] and out-patient visits.^[3] 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.^[4] 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.^[5] Operational definitions were according to World Health Organization (WHO) and Birmingham Eye Trauma Terminology System (BETTS).^[6] (Fig 1)

Fig 1: Classification of Mechanical globe injuries according to BETTS



METHODS:

A two years retrospective study was conducted which included 245 patients of ocular trauma in Department of Ophthalmology, at our hospital from August 2013 to July 2015.

All patients were examined according to standardized protocol and data was recorded in proforma developed for the purpose. Demographic data and details of modes of injury (blunt / penetrating) (Fig 2) and type of injury (open / closed globe) were obtained. The patients initial complaints, the interval between time of injury and time of presentation, relation with work and work place, object causing trauma were recorded. The examination findings of the injured eye, the visual acuity, diagnostic tests, investigations and final diagnosis were obtained and recorded according to the standardized classification of ocular trauma.

During the initial examination, we also evaluated the ocular trauma

score (OTS)^[7] of each and every injured eye using the Ocular Trauma Scoring system, developed by Kuhn et al., since it provides prognostic information regarding the final visual outcome post-eye injury. It is a scoring system that takes into account six variables [Table 1]. Higher OTS scores tend to indicate a better visual prognosis.



Fig - 2 Penetrating corneal injury with full thickness scleral tear with lower lid laceration(OT)

Table1: Ocular Trauma score

Variables	Raw points
Initial vision	
NPL/Enucleation/Evisceration	60
PL/HM	70
1/60-5/60	80
6/60-6/15	90
6/12	100
Rupture	-23
Endophthalmitis	-17
Perforating injury	-14
Retinal detachment	-11
RAPD	-10

NLP : No light perception, LP : Light perception, HM : Hand movement, RAPD : Relative afferent papillary defect. Note : With the final score, each eye evaluated was placed within an OTS category : Category 1 : 0-44 points, Category 2 : 45-65 points, Category 3 : 66-80 points, Category 4 : 81-91 points, Category 5 : 92-100 points.

Open globe injury was repaired at earliest possible time under local / general anaesthesia. Closed globe injuries were initially managed medically and after evaluation necessary treatment was done. Posterior segment injuries were referred for vitreo-retinal opinion and intervention.

All the patients were followed at one week, six weeks and three months intervals. Patients referred for vitreo-retinal intervention were also

followed up .

Based on literature review , the factors likely to predict outcome after open globe injury are mechanism or type of injury, preoperative visual acuity (VA), time lag between injury and surgery, relative afferent papillary defect (RAPD), size and location of the wound . Besides the above listed variables, other parameters that can predict vision outcome are retinal detachment, uveal or retinal tissue prolapsed , vitreous haemorrhage, lens damage, hyphema and number of operative procedures.^[8,9,10,11,12,13]

RESULTS:

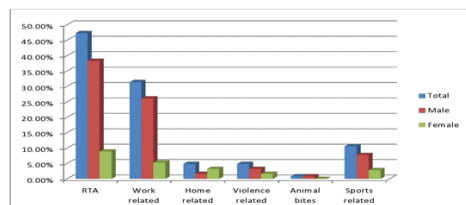
In our study of 245 patients which was conducted between August 2013 to July 2015 , the incidence of ocular trauma was found to be 1.6% .

Among the causes of injury road traffic accidents accounted for majority of cases, i.e, 116(47.34%), followed by work related 77 (31.42%), sports related 26 (10.61%), home related 12 (04.89%), violence related 12 (04.89%), animal bites two (0.81%) (Fig 3) (Fig 4)



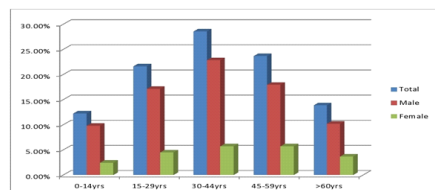
Fig 3: Animal bite (Bear)

Fig 4: Causative agents of the most frequent injury categories by gender



In our study 134 (54.69%) cases presented within 24 hrs , 54 (22.04%) cases presented between 1-2 days , 21 (08.57%) cases presented between 2-7 days , 36 (14.69%) cases presented after one week . Age and sex distribution of cases is shown in Fig 5 .

Fig 5: Pattern of Ocular Trauma in different age groups



Regarding the material of injury the commonest material resulting in injury was stone in 41 (16.73%) patients , followed by metal fragments 26 (10.61%), wooden stick 18 (07.34%), followed by finger nail trauma, playing with ball. Other miscellaneous modes of injury included fire cracker injury, injury with hot oil, blunt trauma, playing with bow and arrow and gullidanda . Clinical findings on presentation are shown in Table 2

Table2: Clinical findings on presentation

Clinical findings	Frequency
Corneal tear(partial and full thickness)	31(12.65%)
Corneo scleral tear	07(02.85%)
Iridodialysis and other iris damage	09(03.67%)
Hyphema	14(05.71%)
Traumatic uveitis	09(03.67%)
Subluxated and dislocated lens	21(08.57%)
Traumatic cataract	09(03.67%)
Glaucoma (angle recession and others)	09(03.67%)
Vitreous haemorrhage	15(06.12%)
Retinal detachment	05(02.04%)
Retained IOFB	14(05.71%)
Endophthalmitis	05(02.04%)
Traumatic optic neuropathy	19(07.75%)
Macular hole	04(01.63%)
Lid and canalicular laceration	49(20%)
Macular edema(Berlins)	03(01.22%)
Orbital fractures	05(02.04%)
Sub conjunctival haemorrhage	12(04.89%)
Orbital cellulitis	02(0.81%)
Third nerve palsy	03(01.22%)
Total	245(100%)

Open globe injuries were found to be more common accounting for 124 (50.61%) patients , followed by closed globe injuries 74 (30.20%), adnexal injuries 41 (16.73%) , chemical injuries 05 (02.04%) , thermal injuries 01 (0.40%) .Type of injuries of patients is shown in Table 3 .

Table 3: Types of Ocular Trauma

Type of trauma	Frequency
1.Open globe injuries	124(50.61%)
Penetrating	105(42.85%)
Perforating	01(0.40)
IOFB	17(06.93%)
Rupture	01(0.40%)
2.Closed globe injuries	74(30.20%)
Contusion	52(21.22%)
Lamellar laceration	22(08.97%)
3.Adnexal injuries	41(16.73%)
4.Chemical injuries	05(02.04%)
5.Thermal injuries	01(0.40%)
Total	245(100%)

Visual acuity at presentation and at final follow up visit is shown in Table 4.

Table 4: A comparison of final visual acuity and presenting visual acuity

Visual acuity	At presentation	At final follow up
NLP	09(3.67%)	11(04.48%)
3/60-PL	98(40%)	64(26.12%)
6/18-3/60	79(32.24%)	99(40.40%)
>6/18	41(16.73%)	61(24.89%)
Others	18(7.34%)	10(04.08%)
Total	245(100%)	245(100%)

Non -surgical and surgical management of ocular trauma cases is shown in Table 5.

Table 5: Non Surgical and Surgical management of Ocular Trauma

Management	Frequency
Non Surgical	92(37.55%)
Surgical	153(62.44%)
Ocular wall repair	44(17.95%)
Lens extraction	30(12.24%)
Posterior vitrectomy	16(06.53%)
Ac wash	14(05.71%)
Sclera buckle	05(02.04%)
Keratoplasty	07(02.85%)
Enucleation	04(01.63%)
Glaucoma surgery	03(01.22%)
Canalicular anastomosis	24(09.79%)
Orbital fracture repair	06(02.44%)
Total	245(100%)

Thirty -five patients needed second surgery after primary repair . The most common second surgical procedure was lens related such as subluxated/ dislocated (Fig 6)/ traumatic cataract with IOL implantation in 30 (12.24%) eyes. Five eyes needed vitrectomy and retinal detachment surgery . Posterior segment involvement including retinal detachment , endophthalmitis , and traumatic optic neuropathy were the main cause of severe visual impairment in 29 eyes . Nine patients developed glaucoma and were on anti- glaucoma medication at last follow up.

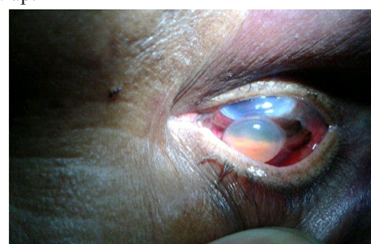


Fig 6: Dislocated Crystalline lens into the sub conjunctival space

DISCUSSION :

Eyes are highly developed and delicate end organ and an otherwise trivial injury can lead to severe damage and loss of function . The epidemiological data of ocular trauma varies world wide . The pattern of ocular injuries varies from region to region depending upon geographical terrain , occupational preferences and socio- economic status . The incidence of ocular injuries is more in developing countries than in developed countries . It is 12.6 per one lakh in Singapore and 15.2 per one lakh in USA .^[14,15] In India the reported incidence of ocular

trauma varies from 1 to 5%.^[16] Incidence in our study was found to be 1.6% among the patients attending to our hospital OPD and emergency.

Ocular trauma is an important cause of preventable visual morbidity among the younger age groups, and more prevalent before 40 yrs of age in males due to their frequent social activity. Review of studies conducted in the Ireland, United states and elsewhere, has revealed that ocular trauma developed predominantly in young males, with a majority under 30 yrs of age.^[15,17,18] In developed countries ocular trauma also often shows bimodal peak with second peak in old age.^[19,20] This increased incidence at old age could be due to poor vision because of cataract, age related macular degeneration, glaucoma etc. In the current series ocular injuries were common in the age group of 15-44 yrs, which constituted for about 50.10%. The bimodal peak of increasing incidence in older age was not seen in current study.

In our study males were found to be at a greater risk of ocular injury, with a male to female ratio of 3.53:1. The greater tendency for men to sustain eye injury is multi factorial. These are aggressive behaviour, work related, sports related, assault related, alcohol and drug abuse and reluctance to use protective devices at work. In the current study men were injured more in road traffic accidents and work place.

Our study data shows most of the injuries were due to Road traffic accidents 47.34%, followed by work related injuries 31.42%, sports related 10.61%. Epidemiological study conducted in the Chaoshan region of china showed most frequent type of injury was work related 46.50%, as the study was conducted in the largest industrial base of play toys in china.^[21]

In the current study ocular trauma was divided into open-globe and closed-globe injury. Various epidemiological studies have shown a higher incidence of closed globe injuries as compared to open globe injury. In a korean study by Oum et al., the prevalence of closed ocular injury was about six times higher than that of open ocular injury.^[22] Karaman et al in their retrospective analysis of 383 patients found 67.30% of ocular injuries were closed globe and 32.70% were open globe injuries.^[23] In a study in Malaysia closed globe injuries were 61.10% and open globe injuries were 34.80%.^[24] In the current study 50.61% of open globe injuries and 30.20% of closed globe injuries were seen, which are consistent with Epidemiological study conducted in the Chaosan region of china by Cao H et al (open globe injuries 55.10%, closed globe injuries 43.40%).

In the current study anterior segment was most frequently involved and corneal and scleral repair was the most frequently performed procedure (17.95%). Complex ocular trauma needs more than one surgery. In the current study 14.28% eyes needed more than one surgery. Similar results were seen in studies done by Cillino et al and Oum et al.^[25,22]

Visual impairment due to ocular injury depends on the extent of damage and the type of injury. Penetrating injuries carry a poorer prognosis than closed globe injuries.^[22,25,26] Patients with better visual acuity at presentation had better visual outcome. Patients with posterior segment involvement in the study group had poorer visual outcome. In the current study 13.06% patients had poorer vision because of retinal and optic nerve involvement.

In addition to visual impairment ocular injuries cause psychological stress and economic burden. Work related injuries cause a huge amount of economic burden estimated at 1 to 3 billion dollars annually.^[27] Factors predicting final visual outcome after open globe trauma include mechanism or type of injury, preoperative visual acuity, time lag between trauma

and surgery, relative afferent papillary defect, size and location of the wound, hyphema, lens rupture, vitreous loss, vitreous haemorrhage, retinal detachment, intraocular foreign body.^[28,29,30,31]

The current study is the hospital based study and therefore has its limitations and bias. There is need for multi-centric study to assess the risk factors and extent of impact of ocular trauma in this region.

CONCLUSIONS:

Ocular injuries were common in young males. Most of the ocular injuries occurred in road traffic accidents, industries and among

labourers. Consumption of alcohol and no use of protective eye gear were identified as risk factors for ocular injury. There is a need for strict reinforcement of traffic rules and industrial safety protocols. Individuals at risk need to be educated regarding use of protective gear and their use be emphasised. The preventive strategies should also be more focused on these areas to reduce the incidence of ocular injuries. Public education and awareness programmes regarding health seeking behaviour for ocular injuries need to be conducted for improved outcome of ocular injuries.

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