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Trauma to the eye and its surrounding structure remains a leading cause of visual morbidity and blindness. The objective of the study was to determine the pattern of ocular trauma among patients presenting in department of ophthalmology, Andhra medical college, Visakhapatnam. Two years retrospective review of records of 515 patients with ocular trauma seen from 1st January 2014 to 31st December 2015 was done. Ocular trauma accounted for 515(0.36%) of the 1, 42,806 ocular patients seen at OPD and emergency. Of the 515 cases 274 cases(53.20%) cases were below 35 years of age. M:F ratio was 4:1.370(71.84%) patients presented to hospital within 24 hours of injury. The cause of injury were mainly violence related and road traffic accidents in 187(36.31%) and 164(31.84%) patients respectively. Closed globe injuries accounted for 269(52.3%) cases. Conservative management was done in 326(63.30%) cases with final visual outcome between 6/6 to 6/12 in 309 (60%) cases.

KEYWORDS

ABSTRACT

Ocular trauma, closed globe injury, blindness

INTRODUCTION: Eye is protected anatomically from direct injuries by the lids, eyelashes and projecting margins of the orbit. Still eye can be injured in several ways, by chemicals, heat, radiation and mechanical trauma. Traumatic mechanical damage causes severe morphological and functional damage to eye especially monocular.^{3,4} Mechanical injury to the globe may occur in a variety of ways and produce myriad clinical sequel.^{1,2} 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 blindness⁵. Recognition of the public health importance of ocular trauma in view of it being preventable in many cases with proper counseling is gaining importance.

MATERIALS AND METHODS:

A retrospective study conducted on patients with mechanical injuries from January 1st2014 to December 31st2015 at Department of ophthalmology, Andhra Medical college, Dr.R.S.P.R Govt.Regional Eye Hospital, Visakhapatnam. Out of 1,42,806 patients treated as outpatients and emergencies 515 patients had mechanical injuries. All the patients with injuries underwent thorough anterior segment and posterior segment examination, visual acuity testing with snellen's chart, examination of anterior segment with Slit lamp and posterior segment using Direct / Indirect ophthalmoscopy. Necessary investigations like B scan ultrasonography, CT scan of orbits and brain were done to few cases. Patients were analyzed as per age, sex, cause of injury, time of presentation, vision at presentation, type of ocular injury and final outcome.

Ocular Trauma Terminology guidelines as per Birmingham Eye Trauma Terminology System (BETTS).^{4,5}

Eye Wall: Cornea and Sclera

Closed Globe Injury: No full thickness wound of the eye wall

Contusions: no full thickness wound, direct energy delivery (e.g. choroidal rupture) or due to change in shape of the globe (e.g. angle recession)

Lamellar laceration: partial thickness wound of the eye wall

Open Globe Injury: full thickness wound of the eye wall

Laceration: full thickness wound at the impact site of a sharp object by outside- in mechanism

Penetrating: entrance wound only

Perforating: entrance plus exit wound

Intra- ocular foreign body: technically a penetrating injury, but grouped separately because of different clinical implications

Rupture: Full thickness wound by blunt object by inside out mechanism due to increased intraocular pressure

Adnexal injuries: Eyelid and/or conjunctiva injuries

RESULTS:

Out of 1,42,806 patients treated as outpatients and emergencies 515 patients had mechanical injuries. Trivial injuries like subconjunctival hemorrhage, small abrasions were excluded from the study. It was found that the ocular trauma accounted to 0.36% out of total patients treated at hospital. Out of 515 patients 413 were male and 102 were female. Maximum injuries occurred in 25-44 year age group (table -1).

TABLE 1 AGE DISTRIBUTION

| Age group | Male | Female | Total | Percent % |
|-----------|------|--------|-------|-----------|
| < 5 yrs | 10 | 05 | 15 | 2.9 |

| 5-14 | 34 | 4 | 38 | 7.37 |
|-------|-------|-------|-----|------|
| 15-24 | 74 | 12 | 86 | 16.6 |
| 25-34 | 96 | 39 | 135 | 26.2 |
| 35-44 | 104 | 20 | 124 | 24.0 |
| 45-54 | 53 | 8 | 61 | 11.8 |
| 55-64 | 30 | 07 | 37 | 7.1 |
| >65 | 15 | 04 | 19 | 3.6 |
| Total | 413 | 102 | 515 | |
| | 80.1% | 19.8% | | |

Most of the injuries are due to violence related including assault, sports and recreational activities 187(36.31%) and RTA 164(31.84%)(Fig.1) others being domestic accidents or occupation related (table-2). 7 patients below 14 years had lid injuries due to dog bite(Fig.2).

TABLE 2 CAUSE OF INJURY

| Violence related | 187 | 36.31% |
|------------------------|-----|--------|
| Road traffic accidents | 164 | 31.84% |
| Occupation related | 30 | 5.82% |
| Domestic accidents | 127 | 24.66% |
| Dog bites | 7 | 1.355 |
| Total | 515 | 100% |

370(71.84%) patients presented to hospital within 24 hours and 17(3.30%) patients after 1 week.

TABLE 3 DURATION OF PRESENTATION

| <24 hrs | 370 | 71.84% |
|-----------|-----|--------|
| 24-48 hrs | 98 | 19.02% |
| 48hrs-1wk | 30 | 5.82% |
| >1 wk | 17 | 3.30% |
| Total | 515 | |

Right eye was involved in 271(52.62%), left eye was involved in 208(40.38%) and both eyes were involved in 36(6.99%) patients (table-4).

TABLE 4 EYE INVOLVED

| Right eye | 271 | 52.62% |
|-----------|-----|--------|
| Left eye | 208 | 40.38% |
| Both eyes | 36 | 6.99% |
| | 515 | |

299(58.05%) patients presented with visual acuity >6/18 and 216(4.94%) patients were with <6/18 to NO PL (table-5).

TABLE 5 VISUAL ACUITY AT PRESENTATION

| 6/6 -6/18 | 299 | 58.05% |
|------------|-----|--------|
| <6/18-3/60 | 35 | 6.79% |

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| <3/60-PL | 134 | 26.01% |
|------------------------------|-----|--------|
| No PL | 16 | 3.10% |
| Not documented ⫬ cooperative | 31 | 6.01% |
| Total | 515 | |

117(22.71%) patients had adnexal injuries, 269(52.23%) had closed globe injuries and 129(52.23%) had open globe injuries (table-6, &7). The type of injuries varied from corneal, corneoscleral lacerations (Fig.3), hyphema(Fig.4), traumatic mydriasis, subluxated and dislocated lens(Fig.5), vitreous hemorrhage, retinal detachment and traumatic optic neuropathy.

TABLE 6 TYPE OF INJURY

| Injuries of Adnexa | 117 | 22.71% |
|--------------------|-----|--------|
| Closed globe | 269 | 52.3% |
| Open globe | 129 | 25.0% |
| Total | 515 | |

TABLE 7 OPEN GLOBE INJURIES

| Penetrating | 88 |
|-------------|----|
| Perforation | 22 |
| IOFB | 10 |
| Rupture | 9 |

Immediate surgical management was done in 160(31.06%) cases. Wound repair for the lacerated injuries of lids was done in 44 patients. Patients with open globe injuries involving conjunctiva, cornea and sclera were sutured on an emergency basis(Fig.7) (table-8).

TABLE 8 MANAGMENT

| Conservative | 326 | 63.30% |
|---------------------------|-----|--------|
| Surgical | 160 | 31.06% |
| Referral to higher center | 29 | 5.4% |

Penetrating injuries had improvement in vision on immediate surgical management involving the peripheral part of cornea In very badly injured cases the tear has extended across the sclera up to optic nerve where visual prognosis was bad(Fig.6). 36 patients had complications due to delay in presentation or severity of injury.

Visual outcome was >6/12 in 309(60%) cases HM to NO PL in 12(2.4%) cases. Regarding RTA among 164 cases 25(15.24%) patients had alcohol intake while driving and 109(66.5%) patients did not use any safety precautions.

DISCUSSION:

Ocular trauma accounted to 0.36% which is significantly lower when compared to 6.9% in a study at JUDO, south west Ethiopia⁸ and 1.03% a study done at Department of Ophthalmology Government Medical College, Haldwani, Distt: Nainital, Uttarakhand.⁹

Out of 515 patients 413 were male and 102 female, The ratio is 4:1 which is equal to the world wide typical male female ratio and maximum incidence in 25- 44 age group with mean age of 34.33±9.5 accounting to 66.6% which correlates with epidemiological studies^{3.4}. Violence related injuries, RTA, domestic accidents, occupation related injuries are 36.3%, 31.8%, 24.6% and 5.8% respectively. Younger & male population are at greater risk since men are more indulged in out-

door work and stimulus to aggressiveness more in males may be due to alcoholism leading to violent behavior and road traffic accidents.

In our study 370(71.84%) patients presented within 24 hours, 98(19.02%) patients presented between 24 -48 hours, 57(9.12%) patients presented after 2 days. The cause for the early presentation could be due to the most of the cases being medico legal cases and they were brought by the policemen. There is not much significance between the eye that is injured right eye was involved in 271(52.62%) cases, left eye was involved in 208(40.3%) cases and in 36(6.99%) cases both the eyes were involved which correlates with study of Uttarakhand.

Among the causes of injury violence related injuries accounted to maximum no 187(36.3%), local traffic accidents accounted to 164(31.8%), accidental falls and accidental hits at home accounted for 127 (24.6%) whereas occupation related injuries accounted for 30(5.8%), though dog bite cases are frequent, involvement of the eye is rare accounting to 7(1.35%) cases. In our study commonest weapon used in violent injuries is wooden stick. Other injuries are with fist, hand, Iron rods and stone.

In our study closed globe injuries are more common 269(52.2%), open globe injuries are seen in 129 cases (25.0%) and adnexal injuries are present in 117 cases(22.7%) out of the 129 open globe injuries-penetrating injuries are seen in 88 cases and perforation in 22 cases, IOFB was found in 10 cases and globe rupture in 9 cases.

In our study vision at the time of presentation was NOPL in 16 (3.10%) cases and less than 3/60 to PL in 134(26.0%) cases where visual prognosis is very poor most of these were due to open globe injuries and complications like vitreous hemorrhage, retinal detachment, phthisis. Significant visual improvement is seen in adnexal injuries and closed globe injuries where posterior segment is not involved. Early surgical repair of lid injuries decreased morbidity of ocular surface. Traumatic cataract was seen in 15 cases where cataract extraction with IOL implant was done at a later date with significant visual improvement.

Violence related injuries mostly occurred in people coming from villages and slums with poor literacy and under influence of alcohol, road traffic accidents are the second commonest cause of ocular injuries which correlates with epidemiological studies of ocular trauma. Simple, safety procedures like wearing seat belts and helmet while driving two wheelers, abstinence of alcohol while driving are a few measures that can prevent major cause of blindness.



Fig 1 Lacerations with bone fracture



Fig 2 Lid laceration following dog bite

corneo scleral injury



Fig 3 corneo scleral injury

Blood staining of cornea and hyphema



Fig 4 blood staining of cornea and hyphema

B- scan picture of dropped nucleus



Fig 5 B-scan picture showing dropped nucleus





Scleral rupture with uveal tissue prolapse

Evisceration

Fig 6 scleral injury with iris prolapse followed by evisceration





Fig 7 open globe injury before and after repair

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