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Original research article

The study of clinical profile and visual outcome of Ocular Trauma

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Abstract

Background- Ocular trauma is the common form of ocular morbidity presenting at eye OPD and emergency.

Aims of the study- Aims of study is to identify the age , sex ,type of injury, object of injury, place of injury, occupation of patients, ocular findings and visual acuity in trauma cases.

Material and Methods- This was an observational study on 148 patients attended at Department of Ophthalmology, Patna Medical College Hospital Patna, from September 2017 to August 2019.

Results - Males (66.22%) carried the higher incidence compared to females (33.78%). Male to female ratio was 4.28:1. 50.68% patients were in 21-40 year age group . Close globe injury was more common (58.78%) than open globe injury (32.43%). Globe rupture (2.70%), penetrating laceration injury (19.59%), perforating injury (19.46%), and retained intraocular foreign body (0.68%) were commonly observed. Anterior segments of eye were commonly involved (93.24%) than posterior segments (6.76%). Injuries at workplace were the commonest (35.14%) followed by injuries at home or surroundings (23.65%), road traffic accidents (18.24%), assault injury (12.16%), and injuries during sports activity (10.81%). Wooden sticks (20.94%), iron particles (6.08%), stones and bricks (10.81%), balls (5.41%),and trauma by hands (5.41%)were common injuries producing agents.

Conclusions-After treatment maximum patients regained good vision - 6/6 to 6/18 in 41.89%, *6/24* to 6/60 in 26.35%.Only few patients had perception of light (12.16%) and absent Perception of light (4.05%) **.** Visual impairment depended upon type, extent, nature and severity of injuries.

Key word-Ocular trauma, closed globe injuries, open globe injuries

Introduction

Ocular trauma is leading cause of blindness. Trauma to eyes involves all age groups including children and adults. Ocular traumas also cause visual morbidity with significant socioeconomic impact. WHO Programme for prevention of blindness reveals that annually 55 million eye injuries restrict activity for more than one day, about 7.5 lakhs require hospitalization and 2 lakhs cases suffer open globe injuries[1].Maximum cases of traumatic blindness can be prevented by using simple measures such as protective eye wear, by following factory rule, and traffic rule. In India significant percentage of injuries happened due to crackers during Diwali.

Aims of study: Aims of study is to identify the demographic data (age and sex) ,type of injury, object of injury, place of injury, occupation of patients, ocular findings and visual acuity in different type of trauma cases.

Material and methods: This study is an observational study of patients attended at emergency and outpatient Department of Ophthalmology, Patna Medical College Patna. Duration of study was from September 2017 to August 2019. A total 148 eyes of 148 cases included in this study.

Inclusion criteria: Trauma cases like lacerated injury, penetrating injury, and perforating injury involving eyelids, ocular surface and globe including open globe injury of all age groups.

Exclusion criteria:

1. That patient who lost for followup.
2. Very old injuries following points were noted in the study- demographic data (age and sex), type of injury, object of injury, and place of injury, occupation of patients, ocular findings, and visual acuity. After taking proper history, clinical examination were performed by diffuse torch light, Slit lamp examinations, IOP examination , fundus examination by direct and indirect ophthalmoscopy . Radiological investigation X-ray orbit, and ultrasound B –Scan were performed. Total blood count, differential blood count, blood sugar were also performed. Patients were treated both on OPD and indoor basis according to need. Patients were examined on next day, 7^{th} day, and at one month in OPD cases, those patients who had admitted and surgically managed ,were examined daily till discharged. After discharge, patients were followed on 7^{th} day, 30^{th} days and at 3 months. Findings observed were classified by using Birmingham Eye Trauma Terminology System[2](BETTS).

Statistical analysis-Patients were examined. Data's obtained were evaluated and presented in form of tables and percentages.

Results:

Sex distributions-Males were 98 and female patients were 50.Male to female ratio was 4.28:1.

Age group: 75 patients(50.68%) were in 21-40 year age group.28 patients(18.91%) were belongs to 6 months to 20 year age group.33 patients(22.30%) were in age group 41-60 years while 12 patients (8.81%) were belonged to more than 60 year age group.

Eye injured – Right eye were involved in 86 patients (58.10%) while left eye in 62 patients (41.89%).

Type of injury: Close globe injury was observed in 87 patients (58.78%) while open globe injury was observed in48 patients (32.43%). Chemical injury was observed in 13 patients (8.79% Among closed globe injury corneal foreign body were observed in 34 cases(22.97%).31 cases(20.95%) had lamellar lacerations while 22 cases(14.86%) had contusion injury. In open globe type injury, globe rupture was noticed in 4 patients, penetrating laceration injury in 29 patients, perforating injury in 14 patients, and retained intraocular foreign body in 1 patient.

Place of injury: In 52 patients (35.14%) the most common place of injury were the work place , this was followed by home and surrounding in which 35 patients (23.65%) suffered from injury. Road traffic accident was observed in 27 patients (18.24%).18 patients (12.16%) had assault injury, 16 patients (10.81%) had injury during sports activity.

Occupation:

Industrial workers were most commonly involved (48 patients,32.43%), followed by farmer (28 patients,18.92%), house wives and children less than 6 years(23

patients,15.54%),laborers(21 patients,14.19%),students(11 patients,7.43%) and others(17 patients,11.49%).

Ocular findings: Anterior segment findings: Corneal involvement were the most commonly observed in which the corneal foreign bodies were present in 34 cases(22.97%) and corneal tear in 21 patients(14.19%). Corneal was also injured with other ocular structure like sclera, iris and lens in 30 patients (20.27%). Scleral tear was noticed in15 patients (10.14%), eye lid involvement in19 patients (12.84%), iris prolapsed with hyphema in17 (11.49%), lens damage and dislocation of lens in 12 patients (8.10%).So Cornea was involved in 85 patients (54.43%).

Posterior segment finding: Most common finding were retinal detachments and vitreous haemorrhage.In many cases these findings were associated with anterior segment finding in many cases. Solitary retinal detachment was observed in 3 cases (2.02%) and vitreous hemorrhage was observed in 2 cases (1.05%). Other posterior complications were- traumatic macular hole, optic neuropathy and comotio retinae.Many anterior and posterior segment findings coexisted in same patients.

Object causing injury: Various common objects that people use daily in our day to day work and activity can produce injury to eyes. Wooden sticks were most common object, (20.94%) identified. Other common objects were iron particles (6.08%), stones and bricks (10.81%), balls (5.41%), trauma by hands (5.41%). Chemical injury by acid and lime were observed in 8.78% and Injury due to RTA was observed in 18.24%.

Visual acuity at presentation- 81 patients(54.72%) had visual acuity > 6/60. 47 patients had Finger counting close to face to 6/60. In 14 patients (9.45%) only perception of light was present. In 6 patients (4.04%) light perception was absent.

Final visual outcome after treatment- 62 patients (41.89%) had vision 6/6 to 6/18. 39 patients (26.35%) had 6/24 to 6/60 visions. But 23 patients (15.54%) had vision less than 6/60 to finger counting close to face. Perception of light was present in only 18 patients (12.16%). Perception of light was absent in 6 patients (4.05%)

Table 1: Sex distributions

Sex	Numbers	Percentage
Male	120	81.08
Female	*28*	*18.92*

Table 2: Age group distributions

Age groups	Numbers	Percentage
6 months-20 year	28	18.91
21-40 year	75	50.68
41-60 year	33	22.30
More than 60 year	12	8.81
total	148	100

Table 3: Laterality

Eye involved	numbers	percentage
Right eye	86	58.11
Left eye	62	41.89
Total	148	100

Table 4: Type of injury

Type of injury	numbers	percentage
Closed globe injury	87	58.78%
Open globe injury	48	32.43%
Chemical injury	13	8.79%
Total	148	100

Table 5: Type of injuries with different nature

Type of injury				number	percentage
Mechanical injury	Open globe	Rupture		4	2.70
		Laceration injury	Penetrating	29	19.59
			Retained intraocular foreign body	1	0.68
			Perforating	14	9.45
	Close globe	Corneal foreign body		34	22.97
		Lamellar laceration		31	20.95
		contusion		22	14.86
Chemical injury				13	8.79

Table 6: Place of injury

Place of injury	Numbers	percentage
Work place	52	35.14
Home and surroundings	35	23.65
Road traffic accident	27	18.24
Assault	18	12.16
Sports	16	10.81
Total	148	100

Table 7: Occupations of the patients

Occupation	numbers	percentage
Industrial workers-welders, technicians, black smith, mechanics etc	48	32.43
Farmers/ agriculture workers	28	18.92
Laborers	21	14.19
Housewives and children less than 6 years	23	15.54
students	11	7.43
others	17	11.49
total	148	100

Table 8: Anterior segment finding

Ocular finding	numbers	percentage	
Corneal foreign body	34	22.97	37.16
Corneal tear	21	14.19	
Iris prolapsed +hyphema	17	11.49	
Sclera injury	15	10.14	

Lens damage and displacement	12	8.10
Cornea+ sclera+ iris injury+ hyphema	30	20.27
Lid injury	9	6.08
total	138	93.24

Table 9: Posterior segment finding

Posterior segment findings	numbers	percentage
Retinal detachments	3	2.02
Vitreous hemorrhage	2	1.35
Traumatic macular hole	1	0.68
Optic neuropathy	1	0.68
Commotio retinae	1	0.68
Retinal detachment + vitreous hemorrhage	2	1.35

Table 10: Object causing injury

Objects	numbers	percentage
Wooden sticks	31	20.94
Stone and bricks	16	10.81
Flying Iron particles/nails/iron dusts	9	6.08
feviquick	4	2.70
Fire crackers	4	2.70
Acid and lime injury	13	8.78
Cricket ball, tennis ball,gulli danda,hockey stick,Bow arrow	8	5.41
Pencil/pen	5	3.38
Animal horn/tail injury	4	2.70
Sharp objects knife, needle spring key	5	3.38
Finger nail, hand, fist, elbow	8	5.41
Hot oils	2	1.35
Cactus/plant milk	2	1.35
bullets	4	2.70
Handle of Hand pumps	2	1.35
potato	1	0.68
Fall on ground/on battery or from ladder	3	2.03
Road traffic accident	27	18.24

Table 11: Visual acuity at presentation

Visual acuity	numbers	percentage
More than 6/60	81	54.72%
6/60 to finger counting close to face	47	31.75%
Perception of light present	14	9.45%
No perception of light	6	4.05%
total	148	

Table 12: Final visual outcome

Visual acuity	numbers	percentage
6/6 to 6/18	62	41.89
6/24to 6/60	39	26.35
Less than 6/60 to finger counting close to face	23	15.54

Perception of light present	18	12.16
Perception of light absent	6	4.05
total	148	

Discussions:

Ocular injury is always major cause of visual morbidity worldwide. It produces major disability due to vision loss with significant socioeconomic impact. In developing country like India, it is important preventable cause of unilateral loss of vision.

In present study Males(66.22%) carried the higher incidence of injury compared to females (33.78%) with male to female ratio 4.28:1.Other studies also showed male preponderance there included male: female ratio were 4:1 in Babar et al study[3],3:1 in Jahangir et al study[4] and 5.25 in Arafat et al study[5]

In our study 50.68% injured patients were in 21-40 years age group. 18.91% patients (18.91%) were belonged to 6 months to 20 years age group, 22.30% were in age group 41-60 years while 12 patients (8.81%) were belonged to more than 60 year age group. So our study revealed that most injured occurred at younger age group and this result was in correlation with the study done by P S Mallika, A K Tan and G Intan[6]. They observed 26.2% patients were between 21-30 years. Males and patients between age group 21-40 years were common victims of injury because they were more commonly exposed to outdoor works, so they were more exposed to injury.

Right eye were involved in 58.10% while left eye in 41.89%. Arafat et al[5] also observed right eye was involved in 66% and left eye in 34%.In contrary to our study, Govind singh Tityal, Chandraprakash, Swati Gupta, Vijay Joshi [7]revealed that left eyes (50.9%) were more commonly involved than right eye (43.6%).

In present study, injuries at workplace were the commonest (35.14%) followed by injuries at home or surroundings (23.65%). Road traffic accidents were observed in 18.24%.12.16% had assault injury, 10.81% had injuries during sports activity. P S Mallika, A K Tan and G Intan[6] observed home (34.3%) and industrial premises (31.8%) were common location for eye injury. Govind Singh Tityal, Chandraprakash, Swati Gupta, Vijay Joshi [7] observed that road traffic accidents 32.7% were the most accounted form of injury. Avinash Mishra et al[8] observed that sports and recreational activities were most commonly responsible for injury. In present study, industrial workers were most commonly involved (32.43%); followed by farmer (18.92%), house wives and children less than 6 years (15.54%), laborers (14.19%), students (7.43%) and others (11.49%). Workplace injuries were common in industrial workers like blacksmith, technicians, mechanics and welders.

In our study it was observed that closed globe injuries were more common than open globe injuries. Close globe injuries were observed in 58.78% while open globe injury was observed in 32.43%. Chemical injuries were observed in 8.79%. This study was in concurrence with study done by Karaman et al[9] , who observed closed globe injuries in 67.3% and open globe injuries in 32.7%. In a Korean study by Oum et al [10], the prevalence of closed ocular injury was about six times higher than that of open ocular injury. But in a Pakistani study, Tariq Farooq Barber et al[11] observed open globe injuries were more common (46.18%) than closed globe injuries (42.98%).

Among closed globe injury corneal foreign body was observed in 22.97%.20.95% patients had lamellar lacerations while 14.86% patients had contusion injury. In open globe type injury, globe rupture was noticed in 2.70%, penetrating laceration injury in 19.59%, perforating injury in 19.46%), and retained intraocular foreign body in 0.68% of patients.

In present study anterior segment of eye was more commonly involved (93.24%) than posterior segments (6.76%).In anterior segment involvement, corneal involvement were the

most commonly observed in which the corneal foreign bodies were present in 22.97% and corneal tear in 14.19% patients. Cornea was also injured with other ocular structure like sclera, iris and lens in 20.27% of patients. So Cornea was involved in 54.43% patients. Scleral tear was noticed in 10.14 %, eye lid involvement in 12.84%, iris prolapsed with hyphema in 11.49%, lens damage and dislocation of lens in 8.10% patients. Most common posterior segment finding were retinal detachments and vitreous hemorrhage. In many cases these findings were associated with anterior segment finding. Solitary retinal detachment was observed in 2.02% and vitreous hemorrhage was observed in 1.05%. Other posterior complications were traumatic macular hole, optic neuropathy and commotio retinae 0.68% each.

Object causing injury-Various common objects that people use daily in our day to day work and activity can produce injury to eyes. Wooden sticks were most common object (20.94%). Other common objects were iron particles (6.08%), stones and bricks (10.81%), balls (5.41%), trauma by hands (5.41%). Chemical injury by acid and lime were observed in 8.78% and Injuries due to RTA were observed in 18.24%.Thus in our study blunt injury predominates. These findings were consistent with study of MacEwen et al[12], but contrary to study of Jahangir et al [4]in which most common source of injury was sharp objects.

Visual acuity at presentation- 54.72% patients had visual acuity > 6/60. 31.76% patients had Finger counting close to face to 6/60. In 9.45% patients only perception of light was present. In 4.04% light perception was absent. Visual impairment depends upon type,extent, nature and severity of injuries, Penetrating and perforating type of injuries carried poorer prognosis than closed globe injuries.

Final visual outcome after treatment- 41.89% had vision 6/6 to 6/18. 26.35% had 6/24 to 6/60 visions. But 15.54% patients had vision less than 6/60 to finger counting close to face. Perception of light was present in only 12.16%. Perception of light was absent in 4.05% patients. In our study most of the patients had good visual outcome. Only 12.16% had vision limited to perception of light and 4.05% had lost their vision due to injuries. This result was also matched with study done of Avinash mishra et al[8], they observed 76.8% of patients achieved a vision of 6/12 or better.

Conclusions:

The following conclusions were derived from " The study of clinical profile and visual outcome of Ocular Trauma " which was held at Department of Ophthalmology, Patna Medical College Hospital, Patna", from September 2017 to August 2019 on 148 eyes of 148 patients.

1. Males carried the higher incidence of injury compared to females with male to female ratio 4.28:1. 21-40 years age group was more prone to injury. Thus males and patients between age group 21-40 years were common victims of injury because they were more commonly exposed to outdoor works, so they were more exposed to ocular injury.
2. Right eyes were more commonly involved compared to Left eyes.
3. Work place and home and its surrounding were common place of injuries, in which ocular injuries happened during work and day today activities. Road traffic accidents were also common cause of injuries.
4. Closed globe injuries were more common than open globe injuries. Among closed globe injuries corneal foreign body, lamellar lacerations and contusion injury were very common. In open globe injuries globe rupture, penetrating laceration injury and perforating injury were commonly observed.
5. Corneal injuries were the most commonly observed, which presented either in form of corneal foreign bodies or with corneal tear. Cornea was also injured with other ocular structure like sclera, iris and lens. Scleral tear, eye lid involvement, prolapsed iris with or

without hyphema, lens damage and dislocation of lens were also commonly observed .The common posterior segment finding were retinal detachments and vitreous hemorrhage. In many cases these findings were associated with anterior segment finding. Other posterior complications were traumatic macular hole, optic neuropathy and commotio retinae.

6. Wooden sticks were most common object for causing ocular injury. Other objects responsible for ocular injuries were iron particles, stones and bricks, balls, and trauma by hands. Chemical injury by acid and lime were also observed. Injuries due to RTA were also commonly observed. In our study blunt injury predominates.

7. Visual impairment depends upon type, extent, nature and severity of injuries, Penetrating and perforating type of injuries carried poorer prognosis than closed globe injuries.

8. Most of the patients had good visual recovery on treatment. At 3rd month's followup, only few of the patients had vision limited to perception of light .Posterior segment complication like retinal detachment and vitreous hemorrhage were common cause for poor visual outcome.

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