



IMPACT OF COVID ON OCULAR TRAUMA

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ABSTRACT

Ocular trauma constitute of important cause of preventable visual morbidity worldwide. Aim was to determine epidemiology, causative factor and treatment outcome. This was a prospective, hospital based, non- randomized & observational study conducted at department of Ophthalmology, Indira Gandhi Institute of Medical Sciences, Patna in duration of 1.5 year. Epidemiology, causative factor, time of presentation since trauma and visual outcome was seen in all patients. Common age group was less than 10 years with wood being most common mode of trauma. Time of presentation after ocular trauma varied in between pre-covid and covid era. Patients were treated accordingly and followed up for 3 months. Visual outcome was noted.

KEYWORDS : ocular trauma, children, visual morbidity, covid-19, visual outcome

INTRODUCTION:

Ocular trauma constitutes of an important cause of preventable visual morbidity worldwide. Despite having major socioeconomic impact, very less data is available on magnitude and risk factor of ocular trauma. There are about 6 million people blind due to eye injuries out of which 2.3 million are affected bilaterally. Pediatric eye injuries account for approximately 8-14% of total injuries and the most common type requiring hospitalization. Few studies from central and southern India are present but no data of ocular injuries are available for Eastern India. Only 1-2 studies have been found in Bihar. Aim was to determine epidemiology, causative factor and treatment outcome.

MATERIALS AND METHODS:

This is a prospective, hospital based, non-randomized, observational study conducted at department of Ophthalmology at Indira Gandhi Institute of Medical Sciences, Patna in duration of 1.5 year (July 2019 to January 2021) approved by institutional ethical committee. Inclusion criteria: All age group with history of ocular trauma with written, informed consent. Exclusion criteria: covid-19 positive patients, patients with severe head trauma (first to manage in emergency), patient not willing to participate the study. Total 250 patients of ocular trauma were included in the study. Detailed history was taken in all cases. Demographic data like age, sex, occupation, address, Duration of trauma since exposure to presentation and traumatic agent was noted in all cases. Mode of trauma was classified into open globe injury and closed globe injury. Detailed ocular examination was done including Visual Acuity on Snellen's Chart, Slit lamp biomicroscopy, indirect ophthalmoscopy for posterior segment evaluation. Ultrasound was done where funduscopy was not possible. X-Ray Orbit was mandatory in all cases. Radiological investigations like CT-scan and MRI was done wherever indicated. In pre-covid era (july2019 to march2020) viral marker was important to take the patient in Operation Theater but in covid era (April2020-january2021) COVID-19 test negative was mandatory in all the patients. All the patients were treated accordingly like lid repair, globe exploration n repair, corneal perforation repair, foreign body removal, Lens Aspiration (in case of ruptured anterior capsule), vitrectomy and retinal detachment surgery. Patients less than 12 years were operated under general anesthesia with help of our Anesthetic team. All patients were followed up for 3 months (1 week, 1 month, 2 months and 3 months)

RESULTS:

250 patients were evaluated in duration of 1.5 year with history

of ocular trauma. All patients were treated accordingly and followed up for 3 months. Chart 1 shows that there was male predominance. Age & sex distribution(Table1) data had shown that the commonest age group presentation was below 10years with29.6% in which male was 31.1% and female was 26.25%.

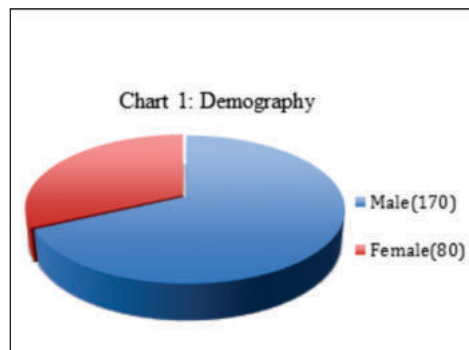


Chart 1: Demographic profile

Table 1: Age & Sex distribution (Male predominance with <10years)

Age group (years)	Number of cases (MALE)	Percent age% (MALE)	Number of cases (FEMALE)	Percentage of cases (FEMALE)	Total number of cases	Percentage % total cases
0-10	53	31.1%	21	26.25%	74	29.6%
11-20	30	17.6%	16	20.0%	46	18.4%
21-30	21	12.35%	12	15.0%	33	13.2%
31-40	16	9.4%	11	13.75%	27	10.8%
41-50	15	8.8%	11	13.75%	26	10.4%
51-60	14	8.2%	07	8.75%	21	8.4%
61-70	11	6.4%	06	7.50%	17	6.8%
>71	09	5.2%	06	7.50%	15	6.0%
total	170		80		250	

On dividing total patients on the basis of geographic distribution there was high ration of rural population presentation to our Centre as shown in table 3 with 68.9%

Table 2:Geographic distribution

Geographic Distribution	%Percentage
Rural Population	68.9% (173 patients)
Urban Population	31.1% (77 patients)

On illustrating causative factors, there were number of agents

involved in the ocular trauma like metallic, non-metallic, alkali, road traffic accidents, fire-crackers, assault, bungee rod, bird peak, blouse-hook n miscellaneous, out of which non metallic agents were the commonest in which wood was the most common agent as shown in Table 3. There were numerous places where ocular trauma incident occurred, as shown in Table 4. The place unrelated to work was common finding like children playing outside home leaving unattended (38%) or infants or pre-school children (29%) followed with festive related like fire-cracker injury (23%). Ocular trauma was divided into open globe injury and closed globe injury as described in table 5. Open globe injury (78%) was further divided into penetrating, rupture and perforation in which penetrating (60%) was commonest. Closed globe injury (22%) was classified into blunt, chemical and lid laceration, which was less commonly presented.

Table3: Causative Agents (wood commonest)

Causative Agents		Number of patients	%Percentage of patients
Metallic Iron rod, Iron nail, Welding machine		20	8.0%
Non Metallic	Wood	37	14.8%
	Stone	18	7.2%
	Glass	11	4.4%
Fire Crackers		21	8.4%
Alkali burn		13	5.2%
Finger Nail, Fist		16	6.4%
Assault		17	6.8%
Road Traffic Accident		19	7.6%
Bungee Rod		12	4.8%
Bird peak		11	4.4%
Blouse hook		18	7.2%
Bow and Arrow		19	7.6%
Miscellaneous (Bee sting, tongue cleaner, cow horn)		15	6.0%

Table4: Place of Injury (common in children during play)

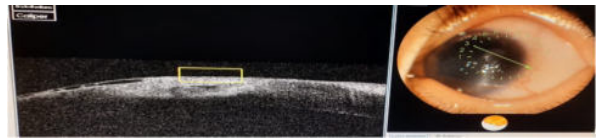
Place Of Injury	Number of patients affected	% percentage
Home	19	7.6%
Domestic Worker	18	7.2%
Iron-Smith	18	7.2%
Factory Worker	16	6.4%
Farmer	20	8.0%
Electrician	16	6.4%
Driver	13	5.2%
Labourer	19	7.6%
UNRELATED TO WORK		
Children (playing)	38	15.2%
Infants & pre-school	29	11.6%
Festive Related	23	9.2%
Old Age	18	7.2%
Total	250	



1)Alkali burn 2)Cow Horn 3)Road Traffic Accident



4)tongue cleaner 5)wood with foreign body 6)wood



7)Honey Bee sting



8)Iron(welding)

Figure 1: trauma caused by various agents

Table 5: Type of Injury and Presentation

Type of Injury	Number of patients	%Percentage of patients
Open Globe Injury		
Penetrating	150	60%
Rupture	42	17%
Perforation	1	1%
Closed Globe Injury		
Blunt	45	18%
Chemical	05	02%
Lid laceration	05	02%

Table 6: Time of presentation since Injury

Time Since Presentation	Number of cases	% Percentage
Within 24 hours	13	5.2%
24-48 hours	69	27.6%
2-7 days	78	31.2%
8-15 days	57	22.8%
16-30 days	21	8.4%
> 1 month	12	4.8%
	250	

Presentation of patients with history of ocular trauma to our institution in pre-covid time was within 48hours, in which 24-48hours presentation was maximum. In starting of COVID-19 pandemic (April-2020 to January 2021 first lockdown) patients presented to our institution within 2-7 days after ocular trauma. For comparison, t-test was applied and p value <0.05 was taken as statistically significant. SPSS 2.0 software was used for analysis, on comparing in pre-covid and covid-era , presentation of patients was common within 48 hours in pre-covid time and during covid era 2-7 days was common duration of presentation. This was because of transport unavailability due to total shut down during pandemic.

Table 7: Comparison of presentation of patients between pre covid and covid era

	PRE-COVID (Number of patient)	COVID-ERA (Number of patients)	P VALUE
WITHIN 24 HOURS	13	02	<0.001
24-48 HOURS	69	05	<0.001
2-7 DAYS	12	61	<0.001
8-15 DAYS	06	49	<0.001
16-30 DAYS	05	16	0.89
> 1 month	03	09	0.96

Table 8: Prognosticators

Lid	Tear	09
	Laceration	15
Cornea	Perforation	190
	Laceration	04
Subconjunctival Hemorrhage		45
Anterior Chamber	Hypopyon	39
	Hyphema	16
Pupil	Mydriasis	46
	RAPD	06
	Not visible	198

Lens	Subluxated/Dislocated	06
	Cataractous	25
Posterior Segment	Vitreous Hemorrhage	42
	Retinal Detachment	12
	Foreign Body	02
	Endophthalmitis	13

Patients with ocular trauma presented with lid tear or laceration, corneal perforation, sub-conjunctival hemorrhage, corneal perforation, hypopyon, hyphema, subluxated or dislocated lens, vitreous hemorrhage, retinal detachment, foreign body, endophthalmitis. Most of the patients presented with corneal perforation as described in table 8. These were the prognosticators on which visual rehabilitation of the patients was depended. All patients underwent surgery under general anesthesia or local anesthesia depending on age and condition. The patients were discharged after treatment with regular follow up. Visual Acuity on interval of 1 week, 1 month, 2 months and 3 months was taken and finally visual rehabilitation was assessed after 3 months of post-operative Period.

Table 9: Visual Acuity after 3 months post treatment

Visual Acuity after 3 months of treatment	% Percentage of patient pre-covid (108 patients)	% Percentage of patients during covid era (142 patients)
>20/40(Grade A)	08%	02%
20/50 -20/100(Grade B)	16%	11%
19/100- 5/200(Grade C)	36%	22%
4/200 to Perception of Light (Grade D)	20%	41%
No Perception of Light (Grade E)	16%	19%

Visual Acuity Assessment was done after 3 months of post-treatment, 36% of patients were categorized as group D followed with 20% in group C. (Table 9).

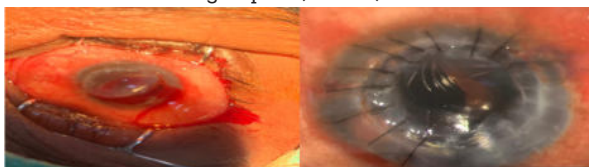


Fig 2: pre-operative and post-operative in post –penetrating keratoplasty patients



Figure 3: pre-operative and post-operative road traffic accident

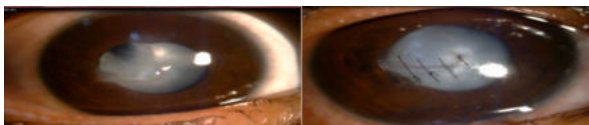


Figure 4: pre-operative and post-operative corneal perforation

DISCUSSION:

The National Society for the prevention of blindness estimates that up to 90% of all eye injuries are preventable, especially in the pediatric age group. Ocular trauma constitutes an important cause of preventable 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 the present study, there is male predominance of 68% and male: female ratio was 3.09:1, which has been found in almost all

studied^{1,2,3}. This may be due to involvement of male in outdoor activities and study covers rural and urban both populations. Ocular trauma commonly involves children if they are left unattended.

Age group commonly involved was 0-10 years with 29.6% in which male was 31.1% and female was 26.25% followed with 11-20 years with 18.4% and least commonly involved is older age group of more 71 years with 6%. Mac Ewen *et al.* reported that one out of five patients of ocular trauma admitted to hospital were children <15 years of age⁴. Majority of the authors have been found highest incidence of ocular trauma in pediatric and adolescent age group^{5,6,7}. Young children are more susceptible to ocular trauma because of their physical vulnerability, lack of coordination, and curiosity/desire to explore, which may lead to serious hazards. People belonging to rural background with lower education level and low-socioeconomic status are more affected by ocular trauma due to delay in seeking medical care. Presentation of the patient in this study was commonly from rural population of 68.9% and then from urban population of 31.1%. Centre of the study was tertiary care center; therefore involvement of rural population was more.

Place of injury was unrelated to workplace, commonly on playing children of 15.2% followed with infants and pre-school children of 11.6% followed with festive related of 9.2% followed with farmer, laborer, factory worker, home place and many others. L.B. Nelson *et al* study also reveal that ocular trauma is more common in children during playing or home if left unattended.^{10,12} Open globe injury was more common with incidence rate of 78% followed with closed globe injury with 22%. Incident rate of penetrating injury was more common in open globe injury with 60% followed with ruptured and closed globe injury in which blunt trauma was more common with 18%. Presentation of open globe injury was probably because of rural population involvement.¹³ Batur M *et al* study also shows that open globe injury was more common in pediatric age group of 3-5 years and playground was the place of injury¹³

AlDahash F *et al* shows more predilections of open globe injury with 74.4%.¹⁴ Sharp object like wood was the common agent involved in the ocular trauma with 14.8% same as Singh S *et al.*¹⁵ Present study shows that the corneal perforation was present in majority of the patients with open globe injury. Lee CH, Lee L *et al* study also shows corneal injury to be the commonest.¹⁵

In pre-covid era that is before first wave and lockdown due to covid-19 outbreak, patients with ocular trauma normally presented to our hospital within 24-48 hours. Visual outcome of ocular trauma patients depends on time of presentation along with prognosticators as shown by Xue C, Yang LC, Agrawal R, Ho SW *et al.*^{16, 17}. World Health organization declared Novel Coronavirus Disease (COVID-19) outbreak as pandemic and reiterated the call for countries to take immediate actions and scale up response to treat, detect and reduce transmissions of save people's lives. So, lockdown was announced on 25th march, 2020, which stopped the transport facility then and there. In the phase of first lock down, life was difficult in view of transport facility. Therefore presentation of patients to the hospital was delayed, now presentation was within 2-7 days followed with 8-15 days, which in view of normal course of time was within 24 hours. For comparison t-test was applied and p value was <0.001, which was statistically significant. Since our institute was tertiary care centre, all the emergency management was functional in covid-era also. This was a sad part but practically very true that patients with medical emergency had faced lots of trouble to reach the hospital for treatment. If in any manageable circumstances they reach to the hospital, due to non-covid hospital in first phase of

lockdown, there was certain protocol which was needed to follow prior surgery by everyone. Patients had to first undergo covid-19 test under this institute and after confirmation of negative report surgery was planned. Due to all these procedure after coming to the hospital also, treatment was delayed 24-48 hours depending on availability of report. For regaining of vision hours are counted after trauma, which are need to be repaired. In all helpless situation ,we tried our best to give outmost result.

Assessment of data of visual acuity after 3 months of primary treatment of traumatic eye shows that the patients treated in pre-covid time, maximum falls into Group C with 36% and patients treated in covid-19 outbreak falls into Group D with 41%. This may be due to unawareness of rural population towards ocular trauma or difficulty in reaching to hospital. Visual outcome were hampered due to severe ocular injuries, delay in seeking medical help, and poor compliance of patient. Post-treatment development of corneal opacity and disturbance in normal anatomical structure with poor visual acuity affects quality of life, in form of disfigurement, amblyopia, and use of low visual aids.

CONCLUSION:

In summary, most of the eye injuries in hospitalized children from rural areas were penetrating injuries and occurred between the ages of 0 and 10 years. The main cause of injury was a sharp object, especially wood. Males are more prone to ocular trauma than the females. Open globe injury and late presentation are probably the worst prognostic factors for the visual outcome. COVID-19 outbreak has affected people life in every aspect and ocular trauma was ignored because of time running for life. Pediatric ocular traumas do not affect only the child's visual function and development, but also the physical and mental health, thus imposing a heavy burden on families and society. Coronavirus had lead people loose their vision because of the delay to receive primary treatment and decrease the mental development of the growing children.

Limitations: It is a hospital-based study with short-term follow-up period

No Conflict of interest/ No financial interest

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