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SOCIO-DEMOGRAPHIC AND CLINICAL PROFILE OF PEDIATRIC OCULAR TRAUMA: A HOSPITAL BASED PROSPECTIVE STUDY.

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Abstract

Objectives: This present study was to evaluate the clinical and socio-demographical study in cases of paediatrics ocular injuries.

Methods: A detail assessment and relevant investigations were performed to all paediatrics OCT. And globe injuries were recorded according to the BETT. Occular injury was examined by using equipment model OCT 2000 by TOPCON at IGIMS, Patna. Treatment was given depending on type and severity of injuries. Patients were followed up on day 1, day 7, 1 month, and at 6 months. Initial best corrected visual acuity was evaluated on first day of follow up. And final best corrected visual acuity (BCVA) was evaluated on last day of follow up after 6 months.

Results: Data was analysed by using simple statistical methods with the help of MS-office software. All data was tabulated and percentage was calculated.

Conclusions: Age group 0-10 years and males were more prone to ocular trauma. Stick, stone RTA and fall were more causative risk for OCT. School, home, Road traffic accident were the common places for ocular trauma. Open globe injury and close globe injury were commonly seen in ocular trauma cases. Close globe injury patients were shows the better BCVA with respect to OGI, lids and lacrimal apparatus injury and non-mechanical injury. Hence, we should aware the parents and family members about the common modes of trauma, the need of supervision of the objects of play. Self-protection should be taught to children to prevent possible ocular injuries. Houses, playgrounds and schools must be made safe and common items of trauma such as sharp objects, household lime, acids must be kept out of reach of children. Intensive campaign may be done before festival seasons about safety measures to increase public awareness. Ocular trauma is a frequent reason for emergency room visits. Evaluation of eye injuries should start with visual acuity and continue with prompt referral to an ophthalmologist as indicated.

Key words: Ocular trauma, clinical profile, open globe injury, close globe injury, BCVA

Introduction

Trauma is one of the leading causes of monocular blindness worldwide there are approximately 1.6 million people blind from eye injuries and 2.3 million bilaterally visually impaired and 19 million with unilateral visual loss; this being a most common cause of unilateral blindness today [1,2].

According to estimates of world health organization (WHO), the global annual incidence of ocular trauma is around 55 million [3,4] and worldwide blindness in 1.6 million people is due to ocular trauma [5, 6]. It may occur at any age in either sex [7, 8], especially among pediatric and elderly population [7]. Both hospital and population based studies indicate a large preponderance of traumas affecting males [8, 5].

Ocular trauma is one of the leading causes of treatable visual morbidity and blindness [9] with children at a greater risk due to careless activities and inability in understanding the nature of dangerous objects [10]. Ocular trauma is associated with a great amount of emotional stress as well as frequent hospital visits and increasing economic burden [11,12]. Ninety percent of eye trauma is preventable by taking care of minor things [13].

Corneal tear, sclera tear and lens damage are the most frequently observed morbidities of ocular trauma [6] followed by lid and canalicular laceration, uveal prolapse, anterior chamber (AC) abnormality, retinal detachment and optic nerve avulsion [6, 14]. Majority of the patients were presented in to eye

health facilities after 24 hours from time of trauma [15]. Patients reported within 24 hours of eye injury showed better visual outcome as compared to later than 24 hours presentation [16].

Most injuries stem from sports, recreation, military, occupational, or automotive. Patient education is highly recommended, as well as prevention by use of protective polycarbonate eyewear. An objective of our study was to evaluate the incidence and clinical profile of ocular trauma in paediatrics.

MATERIALS AND METHODS

This present study was conducted in Department of Ophthalmology, SKMCH, Muzaffarpur, Bihar, with collaboration of VIMS, Pawapuri, Bihar and IGIMS, Patna, Bihar, India during a period from March 2019 to November 2019.

Attendants/Entire subjects signed an informed consent approved by institutional ethical committee was sought. Data was collected by random sampling methods with irrespective of sex. A total of 50 cases with age group 0 to 15 years were enrolled in this study. A detail history, clinical examinations and relevant investigations were performed to all cases. Patients who were diagnosed with history and signs of blunt ocular trauma according to Birmingham Eye Trauma Terminology (BETT) were included. Exclusion Criteria of this study had the patients who were difficult for assessment due to severe head injury and with reduced level of consciousness. And history of any past ocular pathology, which impairs best-corrected visual acuity (BCVA).

Methods:

A detail assessment was performed. It included patients' demographics, the patient's initial complaint, interval between the time of trauma and time of presentation, trauma details: date, time, location, type, and mechanism, clinical examination findings of the injured eye, the visual acuity, and globe injury according to the BETT. Ocular injury was examined by using equipment model OCT 2000 by TOPCON at IGIMS, Patna. And visual acuity in preverbal children was evaluated with tests of-fixation and following/central steady maintenance. Ocular trauma score (OTS) was assigned to all patients.

Laboratory Investigations to all patients were performed. It includes routine haematological investigations haemoglobin, CBC, total count, differential count. X-ray orbit AP and Lateral view for PNS- Orbital fractures, intraocular foreign bodies (IOFB) and intraorbital foreign bodies were done. Computed Tomography scan, Ultrasonography were performed when needed.

Procedures: Thorough eyewash were performed for foreign bodies and chemical injuries. Cleaning and dressing of the wounds were done. Applied shield in open globe injuries**.** Tetanus immunization was done. Systemic Analgesics and antibiotics were prescribed. Treatment was given depending on type and severity of injuries. Patients were followed up on day 1, day 7, 1 month, and at 6 months. Initial best corrected visual acuity was evaluated on first day of follow up. And final best corrected visual acuity (BCVA) was evaluated after 6 months (last day of follow up).

STATISTICAL ANALYSIS

Data was analysed by using simple statistical methods with the help of MS-office software. All data was tabulated and percentage was calculated.

OBSERVATIONS

A total of 50 pediatrics cases of ocular trauma with age groups 0 to 15 years was enrolled in this study. Most of the cases 25(50%) of ocular trauma were belonged in age group of 6-10 years. 17(34%) cases were belonged in age group of 0-5 years. Most of the pediatrics 20(40%) had open globe injury. Pediatrics with close globe injury, non-mechanical injury and lid/lacrimal apparatus had 18(36%), 3(6%) and 9(18%) respectively.

Table 1: Age distribution of pediatrics ocular injury.

Age group (Years)	Open Globe Injuries	Closed Globe Injuries	Non Mechanical Injuries	Lid/Lacrimal Apparatus	Total
0-5	6(12%)	5(10%)	1(2%)	5(10%)	17(34%)
6-10	9(18%)	11(22%)	2(4%)	3(6%)	25(50%)
11-15	5(8%)	2(4%)	0	1(2%)	8(16%)
Total	20(40%)	18(36%)	3(6%)	9(18%)	50(100%)

Males 35(70%) were more affected with OCT than female 15(30%). Most of the males 14(28%) had open globe injury.13(26%), 6(12%) males had close globe injury and lids and lacrimal apparatus injury respectively. 6(12%), 5(10%), 3(6%) and 1(2%) females had open globe injury, close globe injury, lids and lacrimal apparatus injury and non-mechanical injury respectively.

Table 2: Sex wise distribution of type of ocular injury of pediatric.

Type of injuries	Male	Female	Total
Open Globe Injury	14(28%)	6(12%)	20(40%)
Closed Globe Injury	13(26%)	5(10%)	18(36%)
Non- Mechanical Injury	2(4%)	1(2%)	3(6%)
Lids and Lacrimal Apparatus injury	6(12%)	3(6%)	9(18%)
Total	35(70%)	15(30%)	50(100%)

5(55.56%) cases of lid and lacrimal apparatus injury, 3(16.67%) cases of close globe injury and 2(10%) cases of open globe injury and 1(33.33%) cases of non-mechanical injury had time interval between trauma to come in hospital less than 6 hours. 8(44.44%) cases of close globe injury, 2(66.67%) cases of non mechanical injury, 3(15%) cases of open globe injury and 1(11.11%) cases of lid and lacrimal apparatus injury had time interval 6-12 hours.

11(55.55%) cases of open globe injury and 3(33.33%) cases of lid and lacrimal apparatus injury had time interval between 12-24 hours. 7(38.88%) cases of close globe injury and 4(20%) cases of open globe injury had time interval between trauma to come in hospital greater than 24 hours.

Table 3: Interval wise distributions of cases of ocular injury.

Interval	Open Globe injury (N=20)	Closed Globe Injury (N=18)	Non Mechanical Injury(N=3)	Lid and Lacrimal Apparatus(N=9)
<6 hours.	2(10%)	3(16.67%)	1(33.33%)	5(55.56%)
6-12 hrs	3(15%)	8(44.44%)	2(66.67%)	1(11.11%)
12-24 hrs.	11(55)%	0%	0%	3(33.33%)
>24 hrs.	4(20%)	7(38.88%)	0%	0%

In this present study, stick 8(40%) injury was the most common cause of open globe injury. Others 4(20%) stone hit, 3(15%) metal strike, 2(10%) glass material collides, 2(10%) bone arrow strike and 1(5%) RTA was the cause of open globe injury. Hit by sticks 10(55.56%) was also the most cause of close globe injury. Others 2(11.11%) stone, 2(11.11%) cricket ball, 1(5.55%) bone arrow, 1(5.55%) RTA and 1(5.55%) fall were the cause of close globe injury. Fall 4(44.44%) and RTA 3(33.33%) were the most common cause of lids and lacrimal apparatus injury. Others metal 1(11.11%) and blouse hook 1(11.11%) were the cause of close globe injury.

Table 4: Material causing non mechanical injury in ocular trauma.

Causative agent	Open Globe Injuries	Closed Globe Injuries	Lids and Lacrimal Apparatus	Total
Stick	8(40%)	10(55.56%)		18(36%)
Metal	3(15%)		1(11.11%)	4(8%)
Stone	4(20%)	2(11.11%)		6(12%)
Glass material	2(10%)			2(4%)
Bone arrow	2(10%)	1(5.55%)		3(6%)
RTA	1(5%)	1(5.55%)	3(33.33%)	5(10%)
Cricket ball		2(11.11%)		2(4%)
Gulli danda		1(5.55%)		1(2%)
Fall		1(5.55%)	4(44.44%)	5(10%)
Blouse hook			1(11.11%)	1(2%)

Incandescent stick 1(33.33%), hot water 1(33.33%) and lime stone 1(33.33%) were the cause of non-mechanical injury.

Table 5: Materials causing non mechanical injuries in cases of ocular trauma.

Thermal		Chemical	
Incandescent stick	1(33.33%	Limestone	1(33.33%)
Hot water	1(33.33%)		

Table 6: Place of injuries

Place	Open Globe Injury	Closed Globe Injury	Non- Mechanical Injury	Lids and Lacrimal Apparatus	Total
School	5(25%)	8(44.44%)	0%	0%	13(26%)
PG/ Outdoor	3(15%)	4(22.22%)	1(33.33%)	1(11.11%)	9(18%)
Home	10(50%)	3(16.67%)	2(66.67%)	2(22.22%)	17(34%)
RTA	2(10%)	5(27.77%)	0%	6(66.67%)	13(26%)

Home 10(50%) and school 5(25%) were the most common place for open globe injury. School 8(44.44%), RTA 5(27.77%) and PG outdoor were the most common places for close globe injury. RTA 6(66.67%) was the most common causes for lids and lacrimal apparatus injury. 2(22.22) cases of lids and lacrimal apparatus injury were occurred in home.

Table 7: 0cular trauma score

Category	Open Globe Injury	Closed Globe Injury
1	0	0
2	3(15%)	0
3	16(80%)	0
4	0	17(94.44%)
5	1(5%)	1(5.56%)

Most of the cases 16(80%) of open globe injury were belonged in category 3 in ocular trauma score. 3(15%) cases were belonged in category 2. Most of the cases 17(94.44%) of close globe injury were belonged in category 4.

Table 8: Initial visual acuity on first day of follow up.

	Open Globe Injury	Closed Globe Injury	Non Mechanical Injury	Lids and Lacrimal Apparatus	Total
NPH	0%	0%	0%	0%	0%
LP/HM	13(65%)	0%	0%	0%	13(65%)
1/200-19/200	4(20%)	3(16.66%)	0%	0%	7(14%)
20/200-20/50	2(10%)	14(77.78%)	0	0	16(32%)
> 20/50	1(5%)	1(5.56%)	1(33.33%)	7(77.78%)	10(20%)

Initial preoperative best corrected visual acuity (BCVA) in first day follow up of most of the open globe injury cases 13(65%) had LP/HM. 4(20%) cases of open globe injury had BCVA 1/200-19/200. And 2(10%) cases of open globe injury had BCVA 20/200-20/50. Similarly, most of the cases 14(77.78%) of close globe injury had BCVA 20/200-20/50. 3(16.66%) cases of close globe injury had BCVA 1/200-19/200. 1(33,33%) cases of non-mechanical injury had BCVA >20/50. Most of the cases 7(77.78%) of lids and lacrimal apparatus injury had BCVA >20/50.

Table 9: Final visual acuity on last day of follow up.

Visual acuity	Open Globe Injury	Closed Globe Injury	Non-Mechanical Injury	Lids and Lacrimal Apparatus	Total
NPL	0%	0%	0%	0%	0%
LP/HM	15(75%)	2(11.11%)	O%	0%	17(34%)
1/200-19/200	1(5%)	2(11.11%)	1(33.33%)	1(11.11%)	5(10%)
20/200-20/50	4(20%)	5(27.77%)	1(33.33%)	2(22.22%)	12(24%)
> 20/50	0%	9(50%)	1(33.33%)	6(66.67%)	16(32%)

After 6 weeks of follow up, most of the cases 15(75%) of open globe injury had BCVA LP/HM. 4(20%) cases had 20/200-20/50. Most of the close globe injury 9(50%) had BCVA >20/50. 5(27.77%) cases of close globe injury had 20/200-20/50. Most of the cases 6(66.67%) of lids and lacrimal apparatus injury had BCVA >20/50.

DISCUSSIONS

Ocular injury is very common, more so in the under privileged and developing countries. Ocular trauma constitutes 5% of all cases admitted in developed countries and about 12.9% in developing under privileged and developing countries [17]. In our study, it was found that the most common age group involved was 6-10years. And open globe injury 20(40%) was more common than close globe injury 18(36%), lids and lacrimal apparatus injury 9(18%) and non mechanical injury 3(6%).

A review, undertaken for planning purposes in the WHO Programme for the Prevention of Blindness, suggests that around 55 million eye injuries responsible for restricting activities for more than one day, occur annually; they account for 750,000 hospitalized cases each year. These include approximately 200,000 open-globe injuries; with around 1.6 million people blind from such injuries, 2.3 million people with bilateral low vision from this cause, and almost 19 million people with unilateral blindness or low vision [18]. In our study, males 35(70%) were found to be at a greater risk of ocular injury, with a male to female ratio of 7:3. This is consistent with local studies carried out in Lahore [19,20] and Karachi [21], and internationally as well in India [22]. Australia [23], Nepal [24], UK [25] and Egypt [26].

The definitions and classifications of ocular trauma in the study were modified from the Ocular Trauma Classification Group guidelines and Birmingham Eye Trauma Terminology [27]. Three more categories (orbital injuries, burns and superficial foreign bodies) were included in our classifications. Open globe injuries (OGI) was classified as rupture, penetrating injury, intraocular foreign body (IOFB) or perforating injury. Superficial foreign bodies of conjunctiva and cornea were recorded separately. Follow-up records of the patients till 6 months were analysed [29].

In this present study, stick 18(36%), stone 6(12%), fall 5(10%), RTA 5(10%) and metal 4(8%) were more common risk factors of ocular trauma. Among the cases of open globe injury and close globe injury, major risk factors was stick. And for lid and lacrimal apparatus injury major risk factors was fall. which were consistent with other studies [28]. The main contributing factor for the higher proportion of work-related injury is the local work tasks including grinding, welding, hammering, drilling, metal cutting, and nailing, which commonly involve high-powered tools that generate metal fragments at high velocities. When the objects shoot people, the effective action area is small. But with the hard body, the energy it delivered is very large and often has devastating effects on the eyes. Home 17(34%), school, 13(26%) road traffic accident 13(26%) were the common places for ocular trauma. Most of the cases of ocular trauma were belonged in category 3 and category 4 of severity.

In a study of Chakraborti C et al. [29] At presentation, 403 patients had VA between 20/20 and 20/100 (category 1), 168 had VA between 20/200 to PL positive (category 2), while 34 patients had no PL (category 3). Final VA of 34 patients was between 20/400 to light perception. None of the category 3 patients showed any improvement in 3 months follow-up. Majority of category 2 and 3 were found to have OGI. These 68 patients ended up with monocular blindness of the injured eye.

In our present study, Initial preoperative best corrected visual acuity (BCVA) in most of the pediatrics cases 16(32%) had 20/200-20/50. 13(26%) cases had LP/HM. BCVA in 10(20%) cases had >20/50. 7(14%) cases had 1/200-19/200.

Among open globe injury, 13(65%) had LP/HM. Similarly, among 14(77.78%) cases of close globe injury had BCVA 20/200-20/50. 1(33,33%) cases of non-mechanical injury had BCVA >20/50. And among 7(77.78%) cases of lids and lacrimal apparatus injury had BCVA >20/50. After 6 weeks of follow up, BCVA in most of the pediatric cases 17(34%) of ocular trauma had LP/HM. 16(32%) cases had >20/50. BCVA in 12(24%) cases had 20/200-20/50. 5(10%) cases had 1/200-19/200. Among open globe injury, BCVA in most of the cases 15(75%) had LP/HM. Among close globe injury, BCVA in most of the cases 9(50%) had >20/50. Similarly, among BCVA in most of the cases 6(66.67%) of lids and lacrimal apparatus injury had BCVA >20/50.

A study conducted by Puodžiuvienė et al. [30] According to their study, the final VA was in only 48.5% (130/268) of all patients' record. Among them,

65.4% (85 eyes) regained a visual acuity of 0.5 or better. In 8 eyes (6.2%) final VA was 0.2–0.4, in 15 eyes (11.5%) 0.03–0.1, in 2 eyes (1.5%) - LP (HM), and in 7 eyes (5.4%)- NLP. Good visual outcome was significantly related with CGI, while VA of 0.03–0.1 and severe visual impairment (NLP) – with OGI. 65.63% of all children regained good vision (VA ≥ 0.5), and 18.4% suffered severe visual impairment (VA ≤ 0.1).

In our study, out of total ocular trauma cases, 16(32%) cases were regained visual acuity. Good visual acuity was regained in cases of close globe injury, among them 9(50%) cases were regained vision. Thus, Ocular trauma is extremely common and especially so in the developing countries. Of all the admissions in developed countries 5% cases [31] result from ocular trauma while in developing world this figure is much higher (12.9%) [32]. Children of 5-10 years age group were found to be most prone to ocular injury in our study as supported by others. [33] The lower occurrence of ocular trauma under 2-year-old children can be explained by the parents' greater protection, the children's less independence and risk situations [34].

CONCLUSIONS

This present study concluded that the age group 0-10 years and males were more prone to ocular trauma. Stick, stone RTA and fall were more causative risk for OCT. School, home, Road traffic accident were the common places for ocular trauma. Open globe injury and close globe injury were commonly seen in ocular trauma cases. Close globe injury patients were shows the better BCVA with respect to OGI, lids and lacrimal apparatus injury and non-mechanical injury. Hence, we should aware the parents and family members about the common modes of trauma, the need of supervision of the objects of play. Self-protection should be taught to children to prevent possible ocular injuries. Houses, playgrounds and schools must be made safe and common items of trauma such as sharp objects, household lime, acids must be kept out of reach of children. Intensive campaign may be done before festival seasons about safety measures to increase public awareness. Ocular trauma is a frequent reason for emergency room visits. Evaluation of eye injuries should start with visual acuity and continue with prompt referral to an ophthalmologist as indicated.

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