To Study the Pattern of Ocular Trauma and Predicting the Final Visual Outcome in Paediatric Ocular Trauma Cases in a Tertiary Eye Care Centre of Eastern India

Rahul Prasad¹*, Deepti Tiwari¹, Bibha Kumari¹ and Antabha Bandyopadhyay¹

¹Regional Institute of Ophthalmology, RIMS, Ranchi, Jharkhand, India.

Authors’ contributions

This work was carried out in collaboration among all authors. Author RP designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author DT managed the analyses of the study. Authors BK and AB managed the literature searches. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/OR/2020/v12i330150

Editor(s):
(1) Dr. Ahmad M Mansour, American University of Beirut, Lebanon.
(2) Tatsuya Mimura, Tokyo Women's Medical University, Japan.

Reviewers:
(1) A.K. Gangwar, ANDUAT, India.
(2) Usman Abubakar Bosso, Nigeria.
(3) Partha Chakraborty, BSUH, UK.

Complete Peer review History: http://www.sdiarticle4.com/review-history/57661

ABSTRACT

Aim: The study was done to identify causes, demographic and clinical profile and to evaluate factors influencing visual outcome in paediatric ocular trauma patients (up to 15 years).

Study Design: It was a prospective interventional study

Place and Duration of the Study: The study was done in a tertiary eye care centre of eastern India between January 2019 to February 2020.

Materials and Methods: The study was done from January 2019 to February 2020 on children between 1 year to 15 years of either sex with ocular trauma. Demographic details, cause of injury, presenting visual acuity were noted. Follow up was done till 2 months after carrying out appropriate intervention.

Results: A total 106 eyes of 106 patients were evaluated and it was observed that children who were of 7 yrs and above were more affected (67%) than below (33%). Male children (59%) were

*Corresponding author: E-mail: dr_rahulprasad@yahoo.com;
more affected than female (41%). Injuries to Adnexa were found in 52% eyes, 40% injury cases were due to closed injury while open globe injuries comprised 8% of total cases. Common causes of injury were found to be mainly blunt objects and projectile objects. Maximum correction in visual acuity (VA) of more than 6/18 was achieved in 66% eyes, 6/18-6/60 in 11% eyes, <6/60-counting finger at 1 meter in 10% eyes.

**Conclusion:** Late reporting, poor initial visual acuity, involvement of posterior segment, and no immediate primary intervention at time of injury adversely affect visual outcome. Early intervention and globe salvaging repair should be done in all eyes of trauma.

**Keywords:** Ocular trauma; visual acuity; paediatric age; globe injury.

**1. INTRODUCTION**

Ocular trauma in paediatric age group accounts for approximately 8-14% of the total injuries occurring and so is one of the important cause of morbidity and non-congenital unilateral blindness [1,2,3]. The pattern of ocular injuries, their healing and prognosis in long term are very different in children as compared to adults. Age-specific types of injuries is seen in children. Unilateral eye injury being more common often result in amblyopia among children 7 years of age or younger [4]. Injuries due to sharp objects, stones, toys, pen and pencil, sports, vegetative matter are commonly seen in older children whereas toddlers mostly get injured from fingertips of parents, caretaker or siblings [3,5]. Boys are more affected than girls due to their adventurous and mischievous nature [3]. Ocular injuries can be categorized into: Open globe, closed globe and adnexal injuries. Open globe injuries are emergency situation and require prompt intervention [6,7]. Blindness occurring due to trauma in childhood greatly affects the quality of life. So in order to reduce this burden identification of risk factors and appropriate intervention is needed. This can prevent up to 90% of cases of ocular trauma in children [8]. Educating general public regarding eye injuries and emergency care that can be given by them can contribute to good visual prognosis [7]. This study is done to analyze epidemiology, visual outcome and prognosis in children up to 15 years of age presenting to a tertiary centre in Jharkhand.

**2. MATERIALS AND METHODS**

This was prospective interventional study carried out between January 2019 to February 2020.

All children with age from 1 year to 15 year of either sex attending casualty with ocular trauma were included in the present study while patients over 15 years and those with history of previous eye diseases like congenital anomalies, glaucoma or other non traumatic causes were excluded.

Demographic details of patient like age and sex, date and time of injury, activity and object causing injury, supervision provided or not during injury, time elapsed between injuries and hospital reach were all noted. Visual acuity was noted using snellen’s chart in children 4 years and above. Below 4 years fixation, preferential looking test- Cardiff Acuity cards, paediatric acuity chart were used. Careful and thorough ophthalmological examination was carried out. Anterior segment was evaluated using slit lamp. Fundus examination was done using 90 diopter lens and indirect opthalmoscope. Intraocular pressure (IOP) measured in all cases except open globe injury using Keeler Applanation tonometry. In addition to these Gonioscopy, ultrasound, x ray and CT scan were done wherever required. All patients were treated after assigning them ocular trauma score (OTS) and were followed up on day 1, 7, 30, 60 days. Final best corrected visual acuity (BCVA) was evaluated on 60th day.

Data were presented in percentages and analysed accordingly.

**3. RESULTS**

Total 106 eyes of 106 patients were studied. Majority of injuries occurred in children 7 years and above (67% i.e., 71 patients) than below 7 years (33%). Boys (59%) were affected more than girls (41%). [Table 1] 25% of patients reported to the hospital within 6 hours of injury, 60 % reported between 6 -24 hours of injury, remaining 15% reported after 24 hours [Table 2].

Common causes of injuries were blunt objects (21%), projectile objects (19%), sports (14%), and accidental fall (13%). Other causes were household objects (5%), road traffic accidents
(6%), chemicals (8%), burn trauma (4%), animal bite (7%) and assault (2%) as shown in Table 3.

Most ocular injuries were adnexal found in 48 eyes (51%), closed globe injuries were reported in 39 eyes (41%), open globe injuries found in 7 eyes (8%).

Maximum injuries occurred at home (53%), (21%) at playground, 12% at other places, 9% on street and 5% in school.

On follow up day 60, best corrected visual acuity (VA) of more than 6/18 was achieved in 66% eyes, 6/18-6/60 in 11% eyes, <6/60- finger count at 1 meter in 10% eyes, Projection of light (PL) + perception of rays and no PL in 1% each. In 10% eyes visual acuity could not be evaluated as patient was uncooperative.

4. DISCUSSION

In our present study, the prevalence of ocular injuries in children was found to be more in the age group of 7 years and above (67%), which is different from the study of MacEwen where it was 84% [1,9,10]. Younger age group children mostly stay inside house under the care of their guardian. This may be the reason for lower incidence of ocular injuries in this group. Accidental ocular injuries mostly occur from fall, household items like hot fluid, pen, pencil, chemicals, floor cleaning liquids etc [11]. They are also susceptible to handler related injuries like fingernails of siblings, mother or caretaker [5,9]. On the other hand the school going children are more inclined to outdoor games, have less supervision of elders, spend more time outdoor and so are more vulnerable to get injured by balls, vegetative matter, vehicles, stones etc.

The higher incidence of ocular injuries seen in boys compared to girls can be explained by the fact that boys are more inclined towards outdoor sport games like cricket, football etc while girls in Indian society prefer indoor games. Furthermore, due to gender inequality still present in a larger section of India, it is more likely that the ocular trauma to girls remain unattended and untreated contributing to under-reporting of cases and reflecting as a higher prevalence in males.

Incidence of ocular injuries are found to be more common at home followed by playground which is very much similar to the findings of MacEwen C (51%) and Desai, et al. (45.62%) [3,7].

In our study it was found that blunt objects caused more number of eye injuries followed by projectile objects and sports like injury with cricket ball, bat injuries, gilli danda injuries. In Indian scenario wooden stick injuries contribute to a significant number of cases [3]. Household objects, chemicals, road traffic accidents, burn trauma, animal bite and assault constituted other causes causing ocular trauma. In our study bear bite related ocular injuries were relatively more. Jharkhand has a forest area of 29.61% with sloth bear population in the range of 1200-1500. Bears often enter nearby villages from forest and attack villagers [12].

Our study showed the predilection of more ophthalmic injuries during festive season especially during Diwali and holi. Firecracker injuries were reported during Diwali and chemical injuries by dangerous collar and dyes during holi.

For a good visual prognosis, early treatment plays an important role. In our study it was seen that 25% of patients reported to the hospital within 6 hours of injury, 60% reported between 6-24 hours, remaining 15% reported after 24 hours which is dissimilar with few studies like in Desai et al. where around 70% presented after 24 hours. Malik et al. found 47.50% visit within 24 hours and 30.50% in more than 48 hours [7, 13-15]. The inadequate transport facility in remote areas was one of the major causes of late reporting to hospital. Apart from this ignorance, poverty and carelessness on part of parents were also found to be reasons behind late reporting. The patients who reported within 24 hours showed better visual outcome.

<table>
<thead>
<tr>
<th>Age group</th>
<th>Male</th>
<th>Female</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 year to 7 years</td>
<td>21</td>
<td>14</td>
<td>35 (33%)</td>
</tr>
<tr>
<td>&gt;7-15 years</td>
<td>42</td>
<td>29</td>
<td>71 (67%)</td>
</tr>
<tr>
<td>Total</td>
<td>63</td>
<td>43</td>
<td>106</td>
</tr>
</tbody>
</table>
Table 2. Time to visit casualty

<table>
<thead>
<tr>
<th>Time</th>
<th>Number of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;6 hours</td>
<td>27</td>
<td>25%</td>
</tr>
<tr>
<td>6-24 hours</td>
<td>64</td>
<td>60%</td>
</tr>
<tr>
<td>&gt;24 hours</td>
<td>15</td>
<td>15%</td>
</tr>
</tbody>
</table>

Table 3. Types of objects causing ocular injuries [11]

<table>
<thead>
<tr>
<th>Nature of injury</th>
<th>Objects</th>
<th>No of eyes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemicals</td>
<td>Holi colour</td>
<td>06</td>
</tr>
<tr>
<td></td>
<td>Lime</td>
<td>02</td>
</tr>
<tr>
<td>Blunt objects</td>
<td>Wooden stick/ tree branches</td>
<td>07</td>
</tr>
<tr>
<td></td>
<td>Stones</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Iron rod</td>
<td>01</td>
</tr>
<tr>
<td></td>
<td>Hands</td>
<td>04</td>
</tr>
<tr>
<td>Household objects</td>
<td>Metal wire</td>
<td>01</td>
</tr>
<tr>
<td></td>
<td>Pencil and pen</td>
<td>04</td>
</tr>
<tr>
<td></td>
<td>Toys</td>
<td>02</td>
</tr>
<tr>
<td>Projectile objects</td>
<td>Blast injury</td>
<td>02</td>
</tr>
<tr>
<td></td>
<td>Foreign bodies</td>
<td>08</td>
</tr>
<tr>
<td></td>
<td>Fire cracker injury</td>
<td>10</td>
</tr>
<tr>
<td>Sports</td>
<td>Cricket ball/bat injury</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Football</td>
<td>03</td>
</tr>
<tr>
<td></td>
<td>Gulli-danda</td>
<td>02</td>
</tr>
<tr>
<td>Road traffic accidents (RTA)</td>
<td>RTA</td>
<td>06</td>
</tr>
<tr>
<td>Animal bites</td>
<td>Animal bites</td>
<td>07</td>
</tr>
<tr>
<td>Accidental fall</td>
<td>Unknown cause</td>
<td>14</td>
</tr>
<tr>
<td>Assault</td>
<td>Assault</td>
<td>02</td>
</tr>
<tr>
<td>Burn trauma</td>
<td>Burn</td>
<td>04</td>
</tr>
</tbody>
</table>

All patients were thoroughly examined, investigated and appropriate treatment was done. Out of total cases, 24 patients needed hospitalization for inpatient treatment. 5 eyes with traumatic cataract were surgically treated by lens extraction and posterior chamber intraocular lens implantation (PCIOL) implantation. No intraoperative and postoperative complications like endophthalmitis, posterior capsular opacification were noted. 12 cases with partial and full thickness corneal-scleral tear with or without iris prolapse where repaired by suturing. Out of 12 cases, 4 cases developed significant corneal opacity. 1 globe perforation patient which could not be saved by repair was eviscerated and orbital implantation done and 1 case of ocular injury with retinal detachment was operated.

5. CONCLUSION

As per our study, it was noted that 7 years and above were the age group in which most ophthalmic injuries occurred and most of them were unsupervised. Most of them could have been easily prevented by a little care and knowledge of some basic eye care steps taken by parents instantly at time of injury. Due to severe trauma in some cases and owing to late visit in few, children lost their vision of one eye permanently which affects their quality of life. In our study a significant number of cases reported within a day which led to their good visual outcome supporting the importance of early intervention. Boys were affected more than girls. Blunt objects, projectile objects and household objects were common causes. Home and playground were found to be the commonest place of injuries.

CONSENT AND ETHICAL APPROVAL

The study was carried out after approval from Institutional Ethics Committee and was conducted in accordance to the tenets of Declaration of Helsinki. Informed and written consent was taken from parents before data collection.

COMPETING INTERESTS

Authors have declared that no competing interests exist.
REFERENCES


© 2020 Prasad et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sdiarticle4.com/review-history/57661