Ocular Manifestations in Polytrauma Patients in Pediatric Age Group in Tertiary Care Center in Central India

Authors
Dr Minal Vyawahare¹, Dr Piyush A Madan², Dr Swatie Kamble³, Dr Sunil Bhad⁴
¹M.B.B.S, M.S., Assistant Professor, Department of Ophthalmology, Government Medical College, Nagpur, Maharashtra – 440024
²JR3, Department of Ophthalmology, INMC, Sawangi (Meghe), Wardha
³JR 2, Department of Ophthalmology, Government Medical College, Nagpur, Maharashtra
⁴R 3, Department of Ophthalmology, Government Medical College, Nagpur, Maharashtra

Corresponding Author
Dr. Piyush A Madan

Address – 266, Near VMV College, Satnami Nagar, CA Road, Ambedkar Chowk, Nagpur, Maharashtra-440008
Mob No. 8087896559, Email: pmadan01@gmail.com

Abstract
Purpose: In a tertiary center in Central India everyday many pediatric patients present with polytrauma to the emergency department with life threatening injuries. In such scenario ocular injuries remain the one of the cause of the co-morbidity. This study is to know the ocular involvement in pediatric patients with polytrauma in a tertiary care center in Central India.

Method: This was a retrospective cross-sectional study in tertiary care center in central India. All the patients under age 16 reporting to the emergency services from June 2016 to June 2017 were included. Data was collected from records and tabulated. Statistics analysis was done using spss software.

Results: 1483 cases were screened, of them 111(7.4 %) showed ocular manifestations. Males were predominantly involved (71.17%) as compared to females (28.83 %). Most common mode of injury was fall from height (45 cases) and then road traffic accidents (34 cases). Head injury was main association with ocular trauma (56 cases) followed by nasal bleed (32 cases). Periorbital edema is most common presentation (35 cases). Vision was affected in 19 cases (14.84 %) ranges from No PL to 6/6. Most common cause of vision loss was traumatic cataract (9 cases), corneal perforation (7 cases) followed by vitreous hemorrhage (6 cases). Mortality is present in 4 cases.

Conclusion: Ocular involvement is present in many cases of polytrauma though vision threatening involvement is less. But care full assessment can help to prevent co morbidity.

Introduction
Eye injuries are major and under-recognized cause of disability and ocular morbidity that especially affects the young¹. Ocular trauma is a leading cause of acquired monocular visual disability and blindness in pediatric age²,³. Children are particularly subject to ocular trauma because of their predilection towards hazardous play and relative lack of judgment. Eye comprises as little as 0.27% total of body surface area. However, injuries to the eye are found in 10–13% of all combat casualties⁴. Worldwide, 55 million eye injuries restricting activities more than one day occur each year; there are approximately 1.6 million blind people from injuries, an additional 2.3 million people with bilateral low vision from this cause⁵. In a tertiary care center in Central India everyday many pediatric patients present with polytrauma to the emergency department with life threatening injuries. In such scenario ocular
Injuries remain one of the causes of the co-morbidity and treated lastly after patients get stabilized. This study is to know the ocular involvement in pediatric patients with polytrauma in a tertiary care center in Central India.

**Method**
This was a retrospective cross-sectional study in tertiary care centre in central India. All the patients under age 16 reporting to the emergency services from June 2016 to May 2017 (total 1 year) were included. For the demographic and epidemiologic data, information related to patients and trauma circumstances was collected and included: age, gender, rural urban difference, socioeconomic status, nature and cause of injury, systemic association, place of injury, duration between injury and first presentation to the hospital (ophthalmologist) and ocular manifestations were recorded. Complete details of ophthalmic examination including visual acuity, intraocular pressure, lid abrasions and laceration, facial injury, subconjunctival haemorrhage, presence or absence of corneal/scleral perforation, hyphaema, traumatic cataracts, presence or absence of vitreous haemorrhage, retinal detachment, intraocular foreign body, intactness of orbital margins and ocular motility, endophthalmitis and optic nerve dysfunction etc. was noted. X-ray head with orbit was done in case of perforating and penetrating injuries.

**Observation and Results**
Total 1483 pediatric patients which were brought to emergency department at tertiary care center in central India with polytrauma were screened out of which 111 showed ocular involvement.

**Table: 1 Gender wise distribution**

| Gender  | No. of patients | Percentage |
|---------|----------------|------------|
| Male    | 79             | 71.17%     |
| Females | 32             | 28.83%     |
| Total   | 111            | 100%       |

We had 79 males and 32 females with male to female ratio of 2.46:1.

| Age in years | No.of patients | Percentage |
|--------------|----------------|------------|
| <7 years     | 41             | 36.94%     |
| 7-<12 years  | 55             | 49.55%     |
| 12-16 years  | 15             | 13.51%     |
| Total        | 111            | 100%       |

We divided patients into three categories according to age with <7 years, 7 to<12 years and 12 to 16 years. Children between age group 7 to <12 are most commonly involved with total of 55 (49.55%) patients.

| Place of injury | No.of patients | Percentage |
|-----------------|----------------|------------|
| Outdoor         | 70             | 61.26%     |
| Indoor          | 41             | 38.74%     |
| Total           | 111            | 100%       |

In our study we found that majority of patients 70 (61.26%) had injury when they were outdoors (street). In street, we have taken roads, playgrounds and schools.

**Table: 4 Rural-Urban difference**

| Rural / Urban | Number of patients | Percentage |
|---------------|--------------------|------------|
| Rural         | 72                 | 64.86%     |
| Urban         | 39                 | 35.14%     |
| Total         | 111                | 100%       |

We also noted that among 72 patients 39 patients were belonging to villages/ rural area and only 39 patients were belongs to place bigger than the village i.e. urban area.

**Table: 5 Socio-economic status wise difference**

| S-E Status | No.of patients | Percentage |
|------------|----------------|------------|
| BPL        | 75             | 67.57%     |
| APL        | 36             | 32.43%     |
| Total      | 111            | 100%       |

S-E-Socio-economic, BPL-Below poverty line, APL- Above poverty line.

We also noted during our study that there is socioeconomic wise difference among the numbers of the patients. There were 75 patients who belong to below poverty line and only 36 patients who belong to above poverty line.
Table: 6 Mode of injury

| Mode of injury     | No. of patients | Percentage |
|-------------------|-----------------|------------|
| Fall from height  | 45              | 40.54%     |
| RTA               | 36              | 32.44%     |
| Animal bite       | 08              | 7.20%      |
| Blast injury      | 02              | 1.80%      |
| Others            | 20              | 18.02%     |
| Total             | 111             | 100%       |

In our study we found that most common mode of injury is fall from height accounting upto 45 cases (40.54%) followed by RTA, 36 cases (32.43%).

Table: 7 Systemic associations

| Systemic association | No. of patients | Percentage |
|----------------------|-----------------|------------|
| Head injury          | 56              | 50.45%     |
| Nasal bleed          | 32              | 28.82%     |
| Others               | 23              | 20.73%     |
| Total                | 111             | 100%       |

Most common systemic association was head injury accounting upto 56 cases (50.45%).

Table: 8 Level of consciousness

| Level of consciousness | No. of patients | Percentage |
|------------------------|-----------------|------------|
| Conscious              | 102             | 91.89%     |
| Unconscious            | 09              | 8.11%      |
| Total                  | 111             | 100%       |

Table: 9 Ocular manifestations

| Ocular manifestations       | No. of patients | Percentage |
|-----------------------------|-----------------|------------|
| Periorbital edema +/-       | 35              | 31.53%     |
| Subconjunctival hemorrhage  |                 |            |
| Lacerated wound lid         | 21              | 18.92%     |
| Abrasions of lid            | 09              | 8.10%      |
| Foreign body                | 08              | 7.20%      |
| Perforation                 | 07              | 2.70%      |
| Traumatic cataract          | 09              | 8.10%      |
| Hyphema                     | 05              | 4.50%      |
| Vitreous hemorrhage         | 06              | 5.40%      |
| Retinal detachment          | 00              |            |
| Endophthalmitis             | 01              | 0.90%      |
| Restriction of ocular motility | 04          | 3.60%      |
| Orbital fractures           | 05              | 4.50%      |
| Optic nerve dysfunction     | 01              | 0.90%      |
| Total                       | 111             | 100%       |

Most common manifestation was periorbital edema constitute 35 cases (31.53%), followed by lacerated wound with 21 cases (18.92%).
We divided ocular manifestations according to type of injury vis. a vis. blunt trauma, perforating injury and penetrating injury. Maximum no. of cases occurs due to blunt trauma followed by perforating injury and penetrating injury.

### Discussion

Ocular trauma can be a devastating injury in children and may cause lifelong disability. More than one third of serious eye injuries occur in pediatric age group. Children are more susceptible to eye injuries because of their immature motor skill and their tendency to imitate adult behavior without evaluating risk (Thordarson U Ragnasson AT et al). In the present study, boys outnumbered girls in the injury by a ratio of 2.46:1. Our results were consistent with Strahlman E et al., Cascairo MA et al, Khatry SK et al and Vasnaik A et al. Most eye injuries occurred among boys, which could be attributed to their more active behavior and their tendency to spend more time outdoors compared to the girls.

In our study we have found that almost 49.55% occurred in children more than 7 years of age. Higher incidence of ocular trauma in this age group consistent with the studies done by Gorden YJ et al and Niramen M et al in Finland. This is the age group when children try to do things on their own but they do not have adequate maturity to make right decisions on their own and are also influenced by their peer groups to do the adventurous activities. Our study also showed a predominance of injuries occurring in the toddler to school-age population similar to previous studies. At these ages, toddlers are discovering their world and exploring their surroundings. A higher incidence of trauma in school-aged children was present since they spent most of their time in school where they were more exposed to the environment and were more physically active and lack of supervision. There was also less parental guidance in schools or recreational centers.

In our study most of the ocular injuries 73 (67.32%) occurred when children were outside their home (on street, road, playground etc.) This is consistent with the studies done by Dalia M Sebaity et al and Kaimbo et al.

In our study we found that most common mode of injury is fall from height while playing accounting for almost 45 cases(40.54%) followed by RTA accounting for 34 cases(30.54%) and these observations are consistent with most of the previous studies done by Niramen et al, Rapaport et al, Moreira et al.
In our study we found that most common systemic association was head injury, accounting for almost 56 cases and 50.45% which was followed by nasal bleed with 32 cases (28.82%). Most of patients had stable general condition and about 91.89% were conscious at the time of presentation, only 8.11% patient presents with loss of consciousness.

In our study we found that lid is the most commonly injured part with periorbital edema+/− subconjuctival haemorrhage is the most common presentation accounting for 35 cases(31.53%) followed by Lacerated wound 21 cases(18.92%), Abrasions 9 cases(8.10%), Traumatic cataracts 9 cases (8.10%), foreign body 8 cases(7.20%), Hyphema 5 cases(4.50%),Perforation 7 cases (6.30%), Vitreous hemorrhage 6 cases (5.4%), Retinal detachment 0 case, Endophthalmitis 1 case (0.9%), Restriction of ocular motility 4 cases (3.60%), Orbital fractures 5 cases (4.50%), Optic nerve dysfunction 1 case (0.9%).

Conclusion

Ocular trauma is extremely common and especially so in the developing countries. A wide spectrum of injuries in terms of cause and mechanism exists. In such cases, though the vision threatening involvement is less, but care full assessment can help to prevent co morbidity. Emergency department physicians and health personnel must be made aware of the basic treatments in case of ocular emergencies and about prompt referral to ophthalmologists when needed. Public education, general awareness and aggressive primary management may be indicated to optimize visual outcome.

References

1. American Academy of Ophthalmology. Important facts about eye injuries [online]. [cited 2009 Oct.]. Available from:URL: http://www.medem.com/medlb/arttcle.deta illb.cfm/article ID.

2. Stewart C. Blast Injuries: Preparing for the Inevitable. Emergency Medicine Practice. EB Practice, GA, USA, 8 (2006).

3. Bailey A, Murray SG. The chemistry and physics of explosions. In: Explosives, Propellants, and Pyrotechnics. (2nd Edition). Bailey A, Murray SG (Eds). Land Warfare, London, UK, 1–19 (1898).

4. DOS Times - Vol. 14, No.2, August 2008

5. Negral AD, Thylefors B. The global impact of eye injuries. Ophthalmic Epidemiol. 1998; 5: 143-69.

6. Mac Even CJ. Ocular injuries. J R CollSurg MD Edinb 1999; 44: 317-323.

7. Stralman L, Elman M, Daub L, Baker S. Cause of pediatric eye injuries: a population based study arch Ophthalmol 1990; 108: 603-606.

8. Cascairo MA, Mazow ML, Prager TC. In paediatricocular trauma. A retrospective survey J pediatr Ophthalmol Strabismus 1994; 31: 312-317.

9. Gorden YJ, Moketee M. pediatric ocular injuries in leso-tho. Doc Ophthalmol 1982; 53: 283-289.

10. SG Jaison, SE Silas, SK Chopra. A review of childhood admission with perforating ocular injuries ina hospital in northwest India. IJO 1994; 421(4): 199-201

11. Kaimbo WK, Spileers W, Missotten L. Ocular emergencies in kinhasa (Democrat

12. SG Jaison, SE Silas, SK Chopra. A review of childhood admission with perforating ocular injuries in hospital in northwest India. IJO 1994; 421(4): 199-201.

13. Rapaport I, Romem M, Kinek M et al. Eye injuries in children in Israel; a nationwide collaborative study. Arch Ophthalmol 1990; 108: 376-9.