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## A Clinical Study of Evaluation and Management of Paediatric Ocular Trauma

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### ABSTRACT

*Between June 2003 to June 2005 in Regional Eye Hospital, Kurnool, Kurnool Medical College, Kurnool, we taken a sample size 95 paediatric ocular trauma cases of*

*0 – 14 years were selected to identify the causes, demographic clinical profile and evaluation final visual outcome of ocular injuries.*

*In paediatric age 0 – 14 years group the ocular trauma was very common. The trauma to the Eye may be penetrating, blunt, thermal, chemical, IOFB, and others. The causes for these trauma were stick, stone, crackers, ball, needle, toy, thron, fall, chemicals, and glass etc.*

*Due to mention above causes the adenexia and ocular structures may be injured, like lid laceration, conjunctival tear sclero corneal tear, corneal erosions or ablations, Hyphema, secondary glaucoma, vitrious, haemorrhage, retinal detachment, retained IOFB, optic nerve injury, lense dislocation or sub luxation.*

*Among 95 paediatric ocular, patients, some patients were admitted and some patients were treated as OPD cases, for these patients we given medical treatment and medical and surgical treatment where ever necessary.*

*The results and observations were noticed as follows. The commonest type of ocular injury was penetrating injury 55% (n-51), blunt trauma 40% (n-38) and other types noticed. Most of the injuries were occurred at home 43% (n-41), 0-4 year age group affected 71% at home. Male children had ocular trauma 75% (n-71), Female 25%(n-24), 83% (n-73) between the age group 6-14 years.*

*In this study commonest cause were stick 22%, stone 23% fire crackers, 9% and other modes, among 95 paediatric ocular trauma cases were noticed.*

*Laterality concerned 51% (n-41) right eye underwent ocular trauma. Ocular trauma wise in these 95 cases the involvement of conjunctiva 12.23% (n-17), cornea 36% (n-50), sclera 5% (n-7), Hyphema, 7%(n-10), traumatic cataract 13%(n-18), posterior segment damage 5%(n-8), 1%(n-2), orbital injury were affected respectively. The followup period we taken as 3 months for all paediatric Ocular injury cases.*

*Regarding visual outcome in these cases the blunt ocular trauma had better visual outcome than the penetrating trauma 53% cases (n-50) had >6/12 vision, 7%(n-7) blind, 34 cases shown 6/18 to 6/60 vision.*

*The commonest sequelae noted were corneal opacities 45 cases noticed. To conclude home was common place for ocular trauma in paediatric age group 6-14 years, the common cause were stick or stone, penetrating type of injury have been the commonest type, right eye shown predominant involvement good prognosis of vision noticed in blunt ocular trauma.*

*To prevent these ocular injuries awareness, health education, better care of children and avoiding domestic hazards were necessary.*

## **INTRODUCTION**

Eye injuries are an important causes of ocular morbidity in children, being a leading cause of non-congenital unilateral blindness in this age group<sup>1</sup>. One third of eye injuries occur in paediatric age group.

The pattern of ocular injuries has changed significantly in adults with a reduction of both trauma and injuries due to road traffic accidents. There changes have occurred due to a combination of a changing socia-economic climate with education, increased awareness of risk and legislation. Such factors may influence childhood injuries although there is an excess risk of severe trauma among very young.

Identification of any underlying factors in the aetiology of serious injuries helps us to determine the most effective method of reducing the incidence of visually damaging trauma.

This study is carried out to

1 identifies the current causes of severe eye injuries in children (0-14years) in kurnool and surrounding areas.

2 To determine their outcome and to

3 Explore any possible methods of reduction

## **AIM OF STUDY**

The aim of the study is to identify the causes, demographic and clinical profile and evaluate final visual outcome of ocular injuries in children aged between 0 - 14 years presenting to Regional Eye Hospital, Kurnool between june 2003 to june 2005.

## **METHOD AND MATERIAL**

Ninety five children aged fourteen years or less presenting to Reginal Eye Hospital, Kurnool with ocular injury are included. Demographic data, nature and cause of injury, ocular structures involved any associated systemic injuries along with the duration of injury were recorded.

After eliciting history evaluation of visual acuity using snellens chart or E chart, anterior segment with slit lamp, fundus examination with direct and indirect ophthalmoscopy was done. Gonioscopy was done where ever indicated X-ray of the orbit ultrasound and CT was done wherever needed.

All cases of minor eye injuries like small corneal foreign body, injury to the lids, conjunctival tear not requiring sutures and subconjunctival hemorrhage were treated at outpatient. Other cases were prepared for surgery under anaesthesia.

All cases were investigated for hemoglobin, urine examination, X-ray of orbit wherever needed.

Detailed neurological examination was done to rule out and intracranial lesion and opinion of neuro surgeon and ENT surgeon was obtained for deserving cases.

In the operating theatre under strict aseptic precautions, under peribulbar and facial block or general anesthesia reassessment was done and definitive procedures were carried out.

A general plan of management is as follows: Injuries to the lids were managed by suturing in layers with black silk. Conjunctival tears more than 3 mm were sutured with 8-0 black silk. Corneal foreign bodies were removed.

In case with corneal tear with iris prolapse, iris segment was abscised and corneal tear was repaired with 10-0 nylon.

Comeoscleral rupture and scleral rupture were identified and sutured with 8-0 black silk.

Dislocated lens into anterior chamber or incarceration into the pupil was managed by extraction of the lens.

In cases with traumatic cataract, ECCE was done if posterior capsule is found intact, IOL implantation was carried out.

Cases with injury to posterior segment were referred to higher institutes for further management.

Post operatively all patients were given antibiotics (both local and systemic) anti inflammatory drugs and cycloplegics.

Sutures were removed at the end of 6 weeks and during follow up visits, patients were examined or visual acuity, fundus examination and slit lamp examination for assessment of visual outcome.

## RESULTS OF STUDY

### Method:

patients aged between 0 - 14 years presenting with ocular trauma to Reginal Eye Hospital, Kurnool between june 2003 to june 2005 were included in study. All data was collected on demographic characteristics of patients, the cause mechanism and place of injury. The final visual acuity in the injured eye after treatment was documented. All patients were followed up for a minimum of 3 months.

### Results:

A total of 95 patients presented with ocular trauma 75%(n=71) male and 25% (n=24) female. 17%(n=16) of total patients were aged between 0-5 years and 83%(n=79)were between 6-14 years.

### Mechanism of injury:

The commonest type of injury is penetrating injury without retained foreign body 54%(n=51) of total, blunt trauma was next 40% (n=38) with all other types of injury being rare.

**Place of injury:**

Overall injuries occurred most frequently at home 43%(n=41) and in 0-4 age group 71% (n=10) occurred at home.

**Causes of injury**

The cause of injury are many and varied and no one cause can be identified as being predominant, especially in younger age group. Injuries with stick and stone were the commonest cause in 6-14 age group. A total of 9%(n=9) of injuries were caused by fireworks.

**Table -1** Mechanism of Injury

|              | Age Group ( years) |         | Total   |
|--------------|--------------------|---------|---------|
|              | 0-5                | 6-14    |         |
| Penetrating  | 5(36%)             | 46(57%) | 51(54%) |
| Blunt trauma | 8(57%)             | 30(37%) | 38(40%) |
| IOFB         | 0                  | 1(1%)   | 1(1%)   |
| Chemical     | 1(7%)              | 0       | 1(1%)   |
| Thermal      | 0                  | 3(4%)   | 3(3%)   |
| Others       | 0                  | 1(1%)   | 1(1%)   |
| Total        | 14                 | 81      | 95      |

**Table -2** Place of Injury

|                      | Age Group ( years) |         | Total   |
|----------------------|--------------------|---------|---------|
|                      | 0-5                | 6-14    |         |
| Home                 | 10(71%)            | 31(38%) | 41(43%) |
| School               | 1(7%)              | 12(15%) | 13(14%) |
| Sports/Leisure       | 1(7%)              | 26(32%) | 27(28%) |
| RTA (Road & Traffic) | 1(7%)              | 3(4%)   | 4(4%)   |

|            |       |         |         |
|------------|-------|---------|---------|
| accidents) |       |         |         |
| Work       | 0     | 10(12%) | 10(11%) |
| Others     | 1(1%) | 0       | 1(1%)   |
| Total      | 14    | 81      | 95      |

**Table -3** Cause of injury

|                    | Age Group ( years) |         | Total   |
|--------------------|--------------------|---------|---------|
|                    | 0-5                | 6-14    |         |
| Stick              | 1(7%)              | 21(26%) | 22(23%) |
| Stone              | 1(7%)              | 12(15%) | 13(14%) |
| Fire crackers      |                    | 9(16%)  | 9(9%)   |
| Assault            |                    | 4(5%)   | 4(4%)   |
| Ball               | 1(7%)              | 8(10%)  | 9(9%)   |
| Toy                | 1(7%)              | 1(1%)   | 2(2%)   |
| Needle             | 1(7%)              | 1(1%)   | 2(2%)   |
| Thorn              |                    | 3(4%)   | 3(3%)   |
| Fall               |                    | 4(5%)   | 4(4%)   |
| Domestic chemicals | 1(7%)              | 1(1%)   | 2(2%)   |
| Glass              |                    | 1(1%)   | 1(1%)   |
| Others             | 8(57%)             | 16(20%) | 24(25%) |
|                    |                    | 81      | 95      |

**Table -4** Laterality of eye

|           | Age Group ( years) |         | Total   |
|-----------|--------------------|---------|---------|
|           | 0-5                | 6-14    |         |
| Right Eye | 9(64%)             | 41(51%) | 50(52%) |

|          |        |         |         |
|----------|--------|---------|---------|
| Left Eye | 5(36%) | 39(48%) | 44(46%) |
| Both Eye | 0(0%)  | 1(1%)   | 1(1%)   |
| Total    | 14     | 81      | 95      |

|                   |    |     |
|-------------------|----|-----|
| HypHEMA           | 10 | 7%  |
| Lens              | 18 | 13% |
| Posterior segment | 8  | 5%  |
| IOFB              | 1  | 1%  |
| Chemicals         | 1  | 1%  |

**Table -5** Sex Distribution

|        | Age Group ( years) |         | Total   |
|--------|--------------------|---------|---------|
|        | 0-5                | 6-14    |         |
| Male   | 9(64%)             | 62(77%) | 71(75%) |
| Female | 5(36%)             | 19(23%) | 24(25%) |
| Total  | 14                 | 81      | 95      |

**Table -6** Final visual Acutities

| Visual    | Number (%) |
|-----------|------------|
| >6/12     | 50(53%)    |
| 6/18-6/60 | 34(36%)    |
| <6/60     | 7(7%)      |
| Unknown   | 4(4%)      |
| Total     | 95         |

Table -6 Involved Ocular Structures

| Ocular Structures | No. of cases | Percentage |
|-------------------|--------------|------------|
| Orbit             | 02           | 1%         |
| Lids              | 12           |            |
| Conjunctiva       | 17           | 12.23%     |
| Cornea            | 50           | 36%        |
| Sclera            | 7            | 5%         |
| Iris & CB         | 15           |            |

**Table -8** Visual outcome

| No. of cases | Visual Acuity |
|--------------|---------------|
| 50           | >6/12         |
| 34           | 6/18-6/60     |
| 7            | <6/60         |
| 4            | Unknown       |

**Management:**

54% required surgical management 42% were treated medically and 4% (n=4) were observed patients were admitted in the hospital for a mean of 4/2 days.

**Outcome:**

36% had and acuity in the affected eye in the visually impaired range(6/18-6/60) and 7% were blind (<6/60) in the affected eye. One child was bilaterally blinded by injury.

**DISCUSSION**

This study has identified that boys (75%) are more commonly than girls (24%) which is in keeping with other studies 44,45. This probably reflects boys have more adventurous and possibly aggressive behaviour. School are children are more susceptible than younger are group as, although they are slightly immature, there children are slightly more

independent which makes them more vulnerable. This observation is consistent with those reported by saxena R et al 87.7% in are group 6-14 years.

The commonest location for an injury to take place is home 44 (43%). This is almost exclusively the place for pre school children (71%) but was also very common in school children (38%) which reflects both the amount of time children spend at home and the risks around the home. Many of the risks remain unrecognized cp most of younger children are injured by toys or domestic utensils which are found in any home.

The injuries in the older children were the result of a very diffuse number of causes. Most common cause of injury is stick (22%). This variety of ocular trauma is unique to our country. Injury with stick can occur during play when it is used as bow and arrow or as a sword 47. In the study reported by saxena R, et al Bow and Arrow 15.2% House hold applicances 14.3%). Children are not aware of the possible consequence of their action and effective counter measures for this type of injuries is very difficult to devise.

In this study penetrating injuries predominate(54%). Penetrating injuries causing a poorer prognosis are those who suffer from penetrating trauma are more likely to require surgery and suffer from longterm visual impairment. The next common mechanism of injury is blunt trauma(40%) which had better outcome than penetrating. Injuries with IOFB(1%) and chemical (1%) are found to be rare. Injuries caused by IOFB usually produce singnificant intraocular damage and have a dismal prognosis. Chemical injuries required initial intensive treatment be need prolonged. Chemical injuries

required initial intensive treatment and need prolonged topical therapy. The outlook for serious chemical burns is poor.

Though there is a ban on child labour children continue to be employee in various industries and most of injuries with stone occurred at work.

In tip series no case was having damage to lacrimal apparatus. 12 cases of injuries to lids are present. Conjunctiva was involved in 17 (12.23%). The chief structure involved in cornea in 50 (36%) cases with a wide spectrum of involvement including minor and major corneal tears associated with iris prolapse, and corneo scleral tears.

Central corneal tears and corneo scleral tears carry poor prognosis. Simple corneal tear away from pupillary area carries visual prognosis.

7(5%) cases of scleral tear are recorded. Scleral tear carry a poor visual outcome in view of severe damage to intraocular haemostatic mechanism. There are 10 cases (7%) of hyphaema. There injuries need careful evaluation of ocular tension, and if necessary gonioscopy during follow up.

Traumatic cataract occurred in 18 cases (13%) 8 cases (5%) presented with posterior segment damage. 1 case of choroidal rupture. After initial evaluation there patients were subjected to "B" Scan and patients with significant posterior segment involvement were referred to higher institues, for facilities which are mov available in our hospital. There were 2 cases (1%) of injury to orbit with orbital margin involvement and did not require any intervention.

Common complications and sequelae noted in 45 cases central corneal opacity had maximum visual impairment when compared to peripheral. There



have to be tackled early to avoid the risk of amblyopia. Any disturbance in the metabolism and nutrition of the lens leads to traumatic cataract. This is treated by ECCE and IOL implantation in cases with intact capsule. No case of endophthalmitis or panophthalmitis was seen early surgical repair and medical treatment was instituted in all cases.

#### **Outcome:**

Blunt trauma has better outcome than penetrating trauma. The visual outcome depends on severity of injury and vision at presentation 53% had vision >6/12; 7% were blind in injured eye after treatment in this study. This visual outcome is better than that found in previous studies 49, 50. The improved prognosis is due to better surgical techniques and medical treatment. Early treatment of trauma helps in preventing amblyopia. In this study home is the most common location for a pediatric ocular injury. Methods of prevention: Prevention of injury depends firstly on identifying the cause and secondly, targeting this by education and legislation. Injuries due to road traffic accidents and fire cracker have come down because of increased awareness and legislation.

However, there is no legislation regarding the safe keeping of domestic chemicals. However they be identified as dangerous, mainly because they are sometime ingested and parents are aware that they must be stored safely away from children.

The dangers of day to day household items are often not evident until it is too late, and such injuries may prove very difficult to prevent. Raising awareness of dangers in the domestic situation by promoting avoidance and safer practices is the only method available, and although all injuries are, in theory,

preventable this may not be easy in the preschool age group in the home. Perhaps factors such as immature skills, carelessness and uncontrolled emotion which are inherent in young children may be more important in causing injury than most preventable causes.

#### **SUMMARY AND CONCLUSION**

This study has identified that eye injuries in children remain a problem. Ocular trauma is a leading cause of visual loss in children.

Various studies conducted in developed countries have identified blunt trauma to be more common than penetrating trauma. As shown, in this study

1. Penetrating trauma is more common in our country.
2. Boys continue to be more affected than girls and
3. Children between 6-14 years are at increased risk.
4. Most common place for a paediatric eye injury to occur is the home
5. Visual outcome depends on severity of the injury and vision at presentation.

Understanding the fundamentals of eye trauma evaluation and management will help decrease associated morbidity and visual loss. Prevention, as the optimum management of trauma, must however remain a priority in order to reduce existing morbidity and costs.

This study has shown that the most common place for a paediatric eye injury to occur is the home, and it may be more difficult to influence the occurrence of domestic trauma, although by continuing to increase parental awareness, supervision may

improve and exposure of young children to potentially dangerous objects and situation will be reduced.

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#### BIBLIOGRAPHY

1. Pieramics DJ, Sternberg P, Aaberg TM et A system for classifying mechanical injuries of the eye (globe) Am J. Ophthal 1997; 123 : 820-831.
2. Barr CC Prognostic factors in corneoscleral lacerations. Arch Ophthal 1983;101:919-924.
3. Welson FM. Traumatic Hyphaema: Pathogenesis and management Ophthalmology 1991;98:1384-1393.
4. Chandler PA, Naumence AE. A. major cause of hypotony Am J Ophthal 1961, 52:609-618.
5. Spoor TC, Hammer M et al. Traumatic hypaema-failure of steroids to alter its course: a double blind prospective study. Arch ophthal 1980, 98;116-119.
6. Thomson Jr., Parvar LM, Enger CL, Mieler WT, Ligget PE. Infectious endophthalmitis after penetrating injury with retained IOFB. Ophthalmology 1993;100:1468-74.
7. Bitá Esmarch, Susan G Elmar, M.Anthony Schork, Victor M. Elnér. Visual outcome and ocular surgery of after penetrating trauma. A chinico pathological study. Ophthalmology 1995, 102: -401.
8. Meller D, pires Rt, kack PJ et al Amniotic membrane transplant for acute chemical or thermal burns. Ophthalmology 2000; 107:980-989.
9. Caroline J Macewen, paul S Baines, parul Desai Eye injuries in children : The current picture, BJO 1999 Aug;83(2);933-936
10. Vasnaik A. Vasu U, Battu RR, Mechanical eye injuries in children J. Pediatric Ophthalmology Strabismus, 2002 jan - Feb;39(1);5-10.
11. Saxena R, sinhna R, Purohit A, Dada T. Vajpayee RB, Azad R.V. Pattern of pediatric ocular trauma in india. Indian journal pediatrics 2002 Oct ; 69(10)863-7.
12. Smith D, Wrenn K, Stack L.B., The Epidemiology and Diagnosis of penetrating eye injuries. Acad Emerg Med. 2002 Mar 9(3);209-
13. Adeoye AO Eye injuries in the young in Ile -Nigeria Niger J Med. 2002 Jan-Mar, 11(1):26-9.
14. Behbehani AM, Lotfy N, Ezzdean H, Albader S, kamel M, Abdul N. Open eye injuries in the pediatric population Med Princ Pract 2002 Oct - Dec; 11(4);183-9.