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Original Research Article

The Etiology of Penetrating Ocular Injuries in Children in India & Their Visual Outcome

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Abstract: The objective of this study is to evaluate the etiology of penetrating ocular injuries in children in India and their visual outcome. All cases of penetrating ocular injuries in children (<16 years age) presenting to a tertiary level centre in India, between 01.01.2012 to 31.12.2014 were identified and included in this study. A total 131 cases of penetrating ocular injuries were identified. The age of patient having injuries was 11 months to 15 yrs of age. Injuries were more frequent in 3-6 years of age group (32%) followed by 6-9 yrs age group (28%). The commonest causes of injury were trauma with wooden stick (33%) followed by stone injury (21%). The most common place of injury was playground (47%) followed by home (43%). The overall outcome showed the final visual acuity achieved was better or equal to 6/12 was only 19% and less than 6/60 in 49%. The etiology of penetrating ocular injury in children in India is different from that of developed countries. Poor visual outcome results from less awareness of the parents and poor primary level care. Prevention is the utmost important to reduce this ocular morbidity.
Keywords: Penetrating injury; Paediatric ocular injury.

INTRODUCTION:

Ocular trauma is a leading cause of monocular blindness, second only to cataract. Penetrating eye injuries are a common cause of unilateral visual loss and a major health problem. Children account for between 20% and 50% of all ocular injuries [1-3]. Open globe injury has more visual morbidity than closed globe injury [4]. It is seen that most of the ocular injuries are preventable [5].

If the causes of injuries are known then appropriate strategies for prevention can be easily taken. The etiology of penetrating ocular injuries is different from the adults. The etiology in the children also different in developing countries from developed countries. So it needs further evaluation. Most penetrating eye injuries occurred in children aged 0-15 years. The principles of management of penetrating ocular injury are same for children and adults. But the management is more difficult in cases of children due to improper history, less co-operation pre and post operatively. The condition in developing countries is more complicated. It includes delayed diagnosis, poor primary health care, delayed referral and discontinuation of treatment. The possibility of amblyopia in young children further complicates treatment. It also affects the social and psychological development of the child. Thus, it has a major impact on the development of the affected child. Children are the most precious resource of families and they represent the families' future and their hopes. But, a visually disabled child can be a tragedy to their families. Various studies are available documenting the etiology of penetrating ocular injuries in children in developed world, but there are very few studies are available documenting the etiology and visual outcome of penetrating ocular injuries in children in developing countries.

The purpose of this study is to evaluate the etiology of perforating ocular injuries in children in India and to evaluate their visual outcome.

MATERIALS AND METHODS:

All cases of penetrating ocular injuries in children (age<16years) presenting to a tertiary level centre between 01.01.2012 to 31.12.2014 were identified from medical records search. Two years were retrospectively studied and one year prospectively studied. Patients who were initially repaired at other

hospitals were excluded from the study. Partial thickness ocular lacerations were also excluded. Patient records were reviewed to determine age, sex, day and time of injury, place of injury, cause, site and nature of injury, operation performed complications and final visual outcome. Emergency x-ray was done to exclude any radio opaque foreign body inside the globe and to rule out any orbital wall fracture. Ultrasound B- Scan was not done, as the globes were open. Visual acuity was measured with the help of Snellen's chart, if possible. Open globe injury was repaired under general anesthesia as early as possible. Corneal tear was repaired with 10-0 silk and scleral tear was repaired with 8-0 silk suture. Patients were divided into five age group with 3 years spacing, 0-3yr, 3-6yr, 6-9yr, 9-12yr, 12-15yr.

RESULTS:

For statistical analysis, 95% confidence intervals were calculated to indicate precision around percentages and to estimate statistical significance from expected frequencies. A total 131 cases of penetrating ocular injuries were identified (<16 yrs age).

The age of occurrence of injuries was 11 months to 15 yrs of age. Injuries were more frequent in 3-6 yrs of age group (32%) followed by 6-9 yrs age group (28%). Mechanisms of injury were categorized into groups where two or more similar causes were identified. The commonest causes of injury were trauma with wooden stick (33%) followed by stone injury (21%). [Table-1] Males were involved in 88 cases where as females were involved in 43 cases.

The place of occurrence of injury is shown in Table-2. The most common place of injury was playground (47%) followed by home (43%). Insufficient data was available to determine the location of injury in 5% cases. The right eye was most commonly involved (52%). This is not statistically significant.

Injuries involving cornea were only in (65%) cases or corneo scleral in (28%) cases. Wounds involving the sclera were only in (7%) cases. The lens was involved in (52%) cases. There was uveal tissue prolapse in 60% cases. The wound was less than 5mm in length in 42% cases, 5-10 mm in 35% and more than 10 mm in 23% cases. Most commonly injuries were occur between 3-6pm. The overall outcome showed the final visual acuity achieved was better or equal to 6/12 was only 19% and less than 6/60 in 49%. Twelve wounds were self-sealing. In 4 cases primary lens removal was performed and in 28 cases secondary lens removal was performed. Retinal detachments were found in11 (8%) cases. Evisceration was performed in 18 cases (14%). Endophthalmitis were occurring in 7 (5%) cases, which were treated with intravitreal antibiotics. Panophthalmitis occurred in 2 (1.5%) cases. There was no case of sympathetic ophthalmitis.

Table 1: Showing causes of ocular injury.

CAUSE OF INJURY	NUMBER OF CASES
Injury with wooden stick	44
Stone injury	28
Sharp object pocked in own eye	17
Hit with sharp object	16
Injury with cow's horn	04
Blast injury	03
Fall on a sharp object	02
Motor vehicle accident	02
Bicycle injury	02
Miscellaneous	13
TOTAL	131

Table 2: Showing the place of occurrence of injury

PLACE OF INJURY	NUMBER OF CASES
Playground	62
Home	56
School	04
Road	02
Shop	01
Unknown	06
Total	131

DISCUSSION:

Penetrating ocular injuries represent a significant cause of visual loss in children. There are few recent studies of the aetiology of penetrating ocular injuries in children, Soylu *et al.;* 242 cases [5], Moreira *et al.;* 146 cases [3], Thompson *et al.;* 72 cases [6], S Narang *et al.;* 72 cases [7], SG Jaison *et al.;* 80 cases [8], Rudd *et al.;* 46 cases [9], Alfaro *et al.;* 30 cases [10]. The male preponderance of injuries in this study of exactly two to one is similar to study done by Thompson *et al.;* but less than the findings of other previous studies [6, 11]. The male predominance of injuries may be a result of males and females being engaged in different activities with different degree of risk of ocular injury.

The commonest causes of injury were trauma with wooden stick (33%) followed by stone injury (21%). Trauma with wooden stick includes sharp wooden objects like bow and arrow, gillidunda etc. This finding is similar with studies from India [7, 8]. But the finding is different form the studies done in developed countries [12-17]. In Australian study done by Thompson *et al.;* [6], in American study done by Rostomian *et al.;* [18] showed sharp object was the most common cause of injury. Soylu *et al.;* [5] described knives, scissors, and metallic sticks were the most common cause. Motor vehicle accidents are less than other study. Because in countries like India children are less exposed to motor vehicle than the other developed countries.

The most common cause of these injuries also dissimilar than the other studies done in developing country, because the countries like India children are mostly played with varies types of wooden particles in playground and they are less exposed to modern instruments like other studies which occur in different countries.

The high incidence of accidents occur in playground (47%) is clearly of concern. It is similar with studies from India [7, 8]. But studies from developed countries like Thompson *et al.;* [6] Rostomian *et al.;* [18], Mac Ewan *et al.;* [15] showed household injury was the most common place of injury. In developed countries children used to play mostly in specific playground. In developing countries like India children are not properly cared during playing and there is also lack of sports ground. Many times they are playing in the field. This also increases the risk of injury. 43% injuries occur at home. It also signifies that children are not cared at home suitably. Only 3% accidents occur in school. This signifies more attention is required during playing and at home.

There is slight predominance of right eye injury, although it is not statistically significant. In this study only 19% of the children achieved 6/12 or better visual acuity. Other paediatric studies reported achieving 6/12 or better in 36%, Thompson *et al.;* [6], 43% Alfaro *et al.;* [10], 46% Moreira *et al.;* [3], and 51% Elder *et al.;* [19]. This is because most of the time they present late to the tertiary level hospital and lack of proper primary level care. In a study from India by Saxena R *et al.;* [20] showed only 24% of pediatric ocular injury presented within 6 hours of injury while 34.3% cases presented after 24 hours of injury. Lack of awareness of the parents also complicates the figure.

CONCLUSION:

Prevention is the utmost important to reduce this ocular morbidity. Children may play in the ground under supervision of a senior person. They must be educated about the danger points of the games and precautions to avoid the injury. Many times they quarrel with each other and injuries occur at that time. It can be prevented. Sometimes in developing countries both parents are engaged in various types of work in farming. For this reason children are not properly taking cared at home. It may be prevented if they are left under supervision of any senior family member. There may be legislation about protective eyewear during playing, which can reduce the incidence of perforating eye injury. Last of all primary level care should be improved and health care provider should be educated for early referral of these cases.

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