Review of Penetrating Eye Injury in Paediatric Age Group

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Introduction

Ocular injuries are the most common cause of acquired uniocular blindness in children.[1] It eventually leads to decrease in vision, morbidity due to associated facial injuries, cosmetic blemishes and resultant personality defects.[2] 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.

Material and Methods

Thirty consecutive patients below 12 years who had presented to out patient department of our hospital with penetrating eye injury were included in our study. Detailed history was taken to find out the mode of injury, the injurious agent leading to penetrating trauma, any associated other injury and the interval between the trauma and presentation of patient to the hospital.

Visual assessment was done wherever possible. A careful external examination was performed to evaluate the extent and type of tear, the involvement of visual axis, the scleral involvement, the presence of iris or vitreous in wound, and associated lens injury. Anterior chamber was inspected for the depth, presence of any foreign body, hyphema or ruptured cortex. The injured eye was protected with eye shield to prevent any further inadequate pressure on the eye. X-ray was done to rule out possibility of any intra ocular foreign body. Relevant investigations were done for anaesthesia fitness. Broad spectrum intra venous antibiotics and injection tetanous toxoid were given. Informed consent of the parents were taken. General anaesthesia was preferred for surgical repair.

During surgery, thorough wash was given with balanced salt solution, and the wound was reassessed. The scleral extension was examined by dissecting the conjunctiva. Care was taken at all steps to do minimal tissue handling. In presence of iris prolapse, the decision of repositing the iris depended upon the time interval between the trauma and surgery, the status of wound and iris tissue. If the patient was brought immediately after trauma and iris tissue appeared healthy, then it was reposited back or else it was abscissed. Side port entry was done and anterior chamber was formed with viscoelastic. This was followed by suturing of the tear in an interrupted fashion with 10-0 nylon suture. Knots were buried at the end. For stellate laceration, a purse string suture was required in addition to secure the wound. Anterior chamber wash was given to clear the hyphema or any ruptured cortex, if present. The wound integrity was checked. Post operatively broad spectrum antibiotics, cycloplegics, and lubricants were given. Steroids were added with careful monitoring for infection. In the ward, patients were closely monitored for wound leakage,

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infection, lens changes or any rise in intra ocular tension and second surgical intervention was done wherever indicated. Once the corneal oedema decreased, the indirect ophthalmoscopy for fundus evaluation was done. In case of hazy media, USG B scan was performed to evaluate the retina status. Patients were followed for a period of 12 months and evaluated for visual improvement.

Results

Our study included 30 patients with penetrating eye injury all below 12 years of age. There were 17 males and 13 females. The aetiology of penetrating eye injury was domestic accidents in 15 (49.5%); fire crackers in 7 (25.1%); sports related injury in 6 (19.8%) and road traffic accident related injury in 2 (6.6%) patients. The time of presentation to the hospital was within 24 hours in 26 (85.8%) patients and beyond 24 hours in 4 (13.2%) patients. 16 (52.8%) patients had eye injury by sharp objects, out of which 14 (46.2%) were involving visual axis. The type of the penetrating injury was corneo–scleral tear in 16 (52.8%); corneal tear in 12 (39.6%) and stellate in 2 (6.6%)patients. The size of tear was less than 5 mm in 5 (16.5%); 5-10 mm in 16 (52.8%) and more than 10 mm in 9 (29.7%) patients.

All the tears were surgically repaired with interrupted sutures to achieve water tight closure, however two of them required additional purse string sutures for stellate pattern. In 3 (9.9%) patients, even after tight suturing, the wound apposition was inadequate and required cyanoacrylate glue application with bandage contact lens in

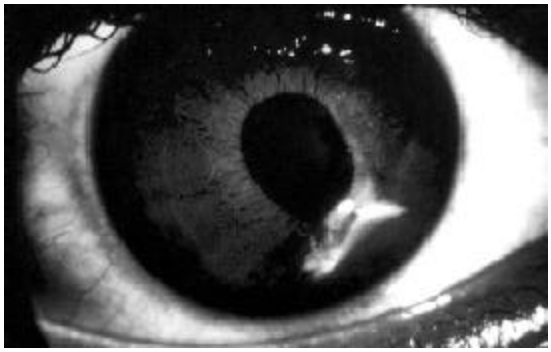

Fig. 1 : Small corneal tear with iris prolapse.

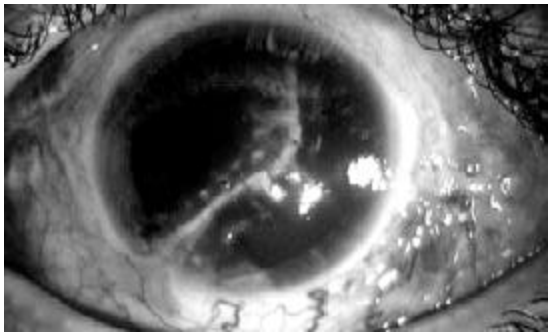

Fig. 2 : Large corneal tear involving visual axis with cortex aspirated.

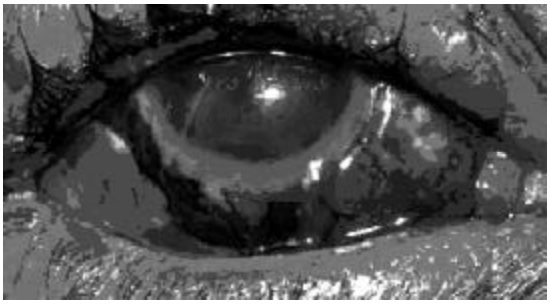

Fig. 3 : Tear with scleral extension and uveal tissue prolapse.

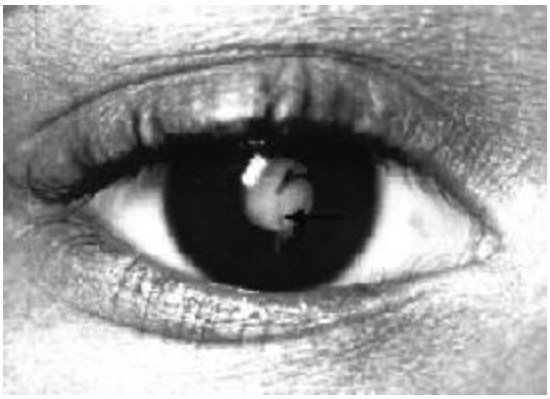

Fig. 4 : Post traumatic cataract.

addition. During primary surgical repair; out of 17 (56.1%) iris prolapses - 6 (19.8%) were reposited back and 11(36.3%) required iris abscission. In 8 (26.4%) patients, cortex aspiration was done for the ruptured cataract in anterior chamber. In 4 (13.2%) patients, where the corneo-scleral wound was beyond 5 mm from the limbus, cryo application was done. Second surgical intervention was required in following cases. 3 (9.9%) patients required resuturing for wound leak, 2 (6.6%) patients who developed endophthalmitis underwent vitrectomy with intra-vitreal antibiotic administration. 6 (19.8%) patients developed post-traumatic cataract for which cataract aspiration with intra-ocular lens implant surgery was performed after three months. Secondary IOL implantation was done in those 8 (26.4%) patients in whom cortex was aspirated during primary repair. Scleral fixated intra-ocular lens implantation technique was used in 3 (9.9 %) patients who had deficient posterior capsule. 2 (6.6%) patients who had uncontrolled IOT underwent trabeculectomy surgery. 4 (13.2%) patients had developed retinal detachment for which vitrectomy surgery was performed. On fundus evaluation, 13 (42. 9%) patients had posterior segment involvement like vitreous haemorrhage, retinal detachment, macular oedema, macular hole, choroidal tear and optic atrophy that resulted in poor visual outcome. All patients were treated for amblyopia by occlusion of the better eye.

In our study, visual outcome could not be assessed in 12 (40%) patients who were in pre verbal age group. In such patients, we had observed for the fixation pattern and the development of squint. We found 7 (57.5%) patients had good fixation and 8 (66.4%) patients did not develop squint, which were indicators of probable visual potential in the affected eye. Of the 18 patients where we could assess the vision; only 3 (16.6 %) patients could achieve vision more then 6/18; while 7(38.8%) patients had visual recovery of 6/60 - 6/24; and 8 (44.4%) patients had vision less than 6/ 60. The causes of poor visual outcome were; involvement of the visual axis, fundus changes like retinal detachment, macular hole, chronic macular oedema, and optic atrophy and amblyopia.

Discussion

Globally, more than half a million blinding eye injuries occur every year. Eye injuries account for approximately 8 – 14% of total injuries in children and are most common type requiring hospitalization. Penetrating eye injuries are a frequent cause of unilateral visual loss.[3,4] Recent research on economic cost of blindness indicates that blindness cause community millions of rupees in lost productivity, caring facilities, rehabilitation and special education. Approximately one third of this cost is incurred by childhood blindness. The most important aspect of paediatric ocular trauma is prevention. Parents, caretakers, teachers, as well as the media have an important role to play in prevention of injuries in children. The irreversible nature of visual loss and immense morbidity associated with it need to be emphasized and publicized. The majority of injuries occur in young children who cannot be fully responsible for their actions; hence, parents and care takers need education and should direct their attention towards the potential dangers of home surroundings. Adequate supervision is required during child play and access to sharp, dangerous household objects or tools should be restricted. Plants with thorns are not suitable for gardens with children. Children playing with pets require supervision and education on how to treat pets. Games involving throwing projectiles should be disallowed and fire crackers if possible should

be discouraged or atleast burnt with adult supervision. Attention should also be directed towards the education of children in the avoidance of potentially dangerous activities. Thus, prevention of ocular trauma by following simple measures is the key factor for reducing morbidity and costs associated with paediatric ocular injuries.

Conclusion

Management of penetrating eye injury is very challenging for an ophthalmologist, but systematic approach of the injury, early surgical intervention and adequate repair can be rewarding. However, involvement of visual axis, lens disruption, vitreous prolapse, posterior location of wound and delayed repair remain the risk factors for poor visual outcome.

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References

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SHOULD PREDNISOLONE BE FIRST-LINE THERAPY FOR ACUTE GOUT?

For gout arthritis, non-steroidal anti-inflammatory drugs (NSAIDs) and colchicine are effective, but they have many cardiovascular and gastrointestinal adverse effects, and patients with gout often have comorbidities that contraindicate these drugs.

Gout patients present most often in primary care with a sudden and very painful arthritis, and expect quick relief. At that moment, doctors might not be aware of the patient's comorbidity status (such as latent heart failure, use of anticoagulants, or renal insufficiency). We propose prednisolone 35 mg once per day, for 5 days.

In reference to the management of acute exacerbations of chronic obstructive pulmonary disease and other similar disorders with systemic corticosteroids, important adverse effects such as diabetes mellitus or hypertension are uncommon even when these drugs are used in high doses (30-100 mg/day) or very high doses (> 100 mg/day) and for as many as 21 days).

HJ Janssens, M Janssen, EH van de Lisdonk, PL van Riel, C van Weel; The Lancet 2008; 372 : 1301-02.