A 5 YEAR RETROSPECTIVE CASE STUDY OF PENETRATING OCULAR TRAUMA AT THE AGA KHAN UNIVERSITY HOSPITAL, KARACHI

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ABSTRACT

Ocular Trauma is an important cause of monocular visual impairment and blindness in younger age groups. We examined the cases of hospitalized ocular trauma from 1st January, 1985 through 30th July, 1990 using hospital medical records. The study comprised 27 patients (28 eyes), 51.8% of whom were under 16. The male-female ratio was 2.8:1. Right eye was more commonly involved (66.6%) and one patient had bilateral ruptured globes. Children at play were most vulnerable (33.3%) followed by road accidents which was the major cause (29.6%) in adults. Sixteen (64.0%) eyes suffered some complications and their mean duration of presentation after injury was 28.4 hours. Traumatic cataract was the most common complication (50.0%) in this group, followed by vitreous haemorrhage (37.5%). Nine (36%) ocular injuries did not develop any complications and presented 14 hours (average) after injury. Most of the patients retained their vision on follow-up examination, but 16.0% lost their vision completely. Another 3 eyes had to be enucleated due to severe trauma and loss of vision (JPMA 41:189, 1991).

INTRODUCTION

Injuries to the eye are an important cause of visual impairment in 8-10% of cases[1] especially in younger age groups that are at low risk for chronic ocular conditions. In United States, trauma is considered to be one of the most conimon cause of monocular blindness[2]. Most of the studies of ocular injuries are however, limited to specific aspects of the subject such as perforating injuries[3,4] or their surgical management, and very few general surveys have been published in ophthalmic literature[5,6]. The objectives of this survey were to examine the association of age, sex and their relationship to ocular trauma, identify the main causes of these ocular injuries, explore risk factors for developing complications, identify the types of complications and assess the disability and visual loss following ocular injuries.

PATIENTS AND METHODS

This study was carried out at Aga Khan University Hospital utilizing the medical records of 27 patients with a principal or secondary discharge diagnosis of ruptured globe or ocular trauma, between January 1985 and July, 1990. ICD-9 system was used to classify discharge diagnosis. The data regarding the causes of injury, examination findings and progress was collected. Minor ocular injuries not requiring surgical procedure were excluded. All our cases were treated surgically under general anaesthesia.
The average age was 18.9 years (13.6 for females, 19.6 for males). The mean age. of cases who had complications after injury was 15.4 years (range 2 - 33 years) and 27.3 (range 4-61 years> for those who did not have any complication. The frequency of ocular injuries decreased upto 50 years and then a slight increase was seen in older age.
The male-female ratio is 2.8:1. Right eye was involved in 66.6%, left in 29.6% while bilateral involve-

ment was seen in 3.7% of cases.
Analysis of circumstances of injury revealed that children at play are most vulnerable. Knives, ball-point pens screw-drivers, stones were other common agents involved, in causing ocular trauma.
All cases except one of road accident and one of gunshot injuries were males. All gunshot injuries and 6 out of 8 street injuries resulted in a severe (< 6/36) impairment of vision. Only one out of 6 home injuries developed complication on follow-up. Broken glass from utensils and furniture items were responsible for half of these accidents. (Table I).

TABLE I. Circumstances of injury.

Circumstance	No. (%) of Cases
Play	9 (33.3)
Road accident	8 (29.6)
Domestic activity	6 (22.2)
Gunshot injury	4 (14 8)

Data was obtained from emergency records, ward notes and examination under anaesthesia. Patients were divided inio those who had complications, (groupA) and those who did not, (group B). Three cases of enucleation were not included in any group. (Table II).

TABLE II. Findings of injured eyes.

Findings	With Complications Group A No. (%)	Without Complications Group B No. (%)
Eyelid laceration	5 (20.0)	4 (16.0)
Hyphaema	6 (24.0)	2 (8.0)
Lens matter in A/C	5 (20.0)	0
Iris prolapse	12 (48.0)	5 (20.0)
Vitreous prolapse	2 (8.0)	0
IOFB	2 (8.0)	0

* % was calculated out of 25 eyes.

Traumatic cataract developed in all the cases who had lens matter in anterior chamber. The 'cases with intraocular foreign body (Pellets of airgun or shot gun) or with vitreous prolapse lost their vision ultimately and developed pthysis.

The exact length of corneoscieral laceration could be found in 17 patients (GroupA= 12, Group B = 5), these were compared with regard to the length of laceration and to the length of hospital stay and also to duration of presentation after injury.

Patients who had long lacerations, especially those involving the central part of cornea, could not regam their vision completely. Complicated cases presented twice as late on an average than uncomplicated cases. Patients were discharged three to five days on an average after micro-surgical repair and antibiotic prophylaxis. They however received treatment on an out-patient basis post-operatively. (Table III).

TABLE III. Relationship of size of laceration with duration since injury and Hospital stay.

	With Complications Group A (12 cases) Mean (Range)	Without Complications Group B (5 cases) Mean (Range)
Corneoscleral Laceration (mm)	9.73 (4-15)	6.1 (3-8.5)
Duration since Injury (Hrs)	28.4 (2-96)	14 (4-24)
Hospital stay (days)	5.47 (2-17)	3.3 (2-9)

Some cases had more than one complications post trauma. Seven out of 8 cases from group A developed cataract as early as 14 days. Mean age of these 8 cases was 10.4 years. Vitreous hemorrhage was detected late (average = 40 days) and occurred most commonly after road accidents (5 cases). It could not be determined from records whether shattered glass of windscreen was responsible for these penetrating injuries. The sixth case of vitreous hemorrhage was related to Air-gun injury. Pthysis occurred in 4 cases, 3 of these had fire-arm injury. These 4 were the only cases who did not have any perception of light after surgery. Pthysis had become well-established 14-30 days post-operatively. Not included in "Group A" (complicated cases) were 3 badly injured eyes which had lost most of their contents and were enucleated as a primary procedure. Bullet injury in two (assault cases) and road accident was responsible for one of these severe injuries. The mean age of these patients was 32.7 years and they were hospitalized longer (9.7 days) than group A patients.

Retinal detachment was detected as a late sequelae of ocular trauma with a mean interval of 58.2 days following injury. Two of the four cases had an intraocular foreign body (Pellet) which could not be removed at the time of surgery. (Table IV).

TABLE IV. Complications.

Complication	No. % of Complicated Eyes
Traumatic cataract	8 (50.0)
Vitreous haemorrhage	6 (37.5)
Endophthalmitis/Pthysis	4 (25.0)
Retinal detachment	4 (25.0)
Corneal Ulcer/Hypopyon	3 (18.75)
Keratolenticular adhesions	2 (12.5)

The injured eyes were explored under anaesthesia, wound was cleaned with balanced salt solution, excision of non-viable iris was done when necessary. Anterior chamber was reformed using air, Helon or saline. Laceration were sutured with 9-0 or 10-0 nylon sutures. All patients were given antibiotics post-operatively. The visual acuity was checked on 2nd day after surgery. Patient's progress was monitored over the next 100-150 days and final visual acuity was assessed (two or more consistent readings on follow-up visits). The visual acuity is tabulated for Group A (with complications) and group B (without complications) in table V.

TABLE V. Visual acuity in complicated and uncomplicated cases.

	Group A Complicated		Group B Uncomplicated	
Visual Acuity	2nd Day after surgery No. (% of total eyes)	Final visual acuity No. (% of all eyes)	2nd Day post-discharge No. (% of total eyes)	Final visual acuity No. (% of all eyes)
6/6 To 6/36	0 (0)	4 (16.0)	6 (24.0)	8 (32.0)
6/6 To CF	2 (8.0)	2 (8.0)	2 (8.0)	0
HM To PL	8 (32.0)	4 (16.0)	1 (4.0)	0
NPL	4 (16.0)	4 (16.0)	0	0
Could not determine	2 (8.0)	2 (8.0)	0	1 (4.0)

CF = Counting fingers, HM = Hand movement, NPL = No perception of light

None of the patients had a visual acuity of 6/6 to 6/36 initially. Four patients who initially had a visual acuity of atleast light perception to 6/60 made good recovery of their vision. Two were found to have vitereons haemorrhagc, one had cataract surgery and in the other cataract absorbed spontaneously. Four patients without any light perception two days postsurgery could never regain their vision and

developed pthysis. Sixteen percent of all eyes lost their vision completely. An accurate account of visual acuity on two small babies was not documented in records.
The follow-up of this group showed that a postoperative vision of 6/6 to 6/36 has good prognostic value and the eye can be expected to maintain good vision. The visual acuity of intermediate degree is also expected to improve eventually.

DISCUSSION

Ocular trauma is one of the six leading causes of blindness (trachoma, cataract, glaucoma, xerophthalmia, onchocercias)[7]. Despite advancement in the management techniques for ocular trauma, majority (66.7% of our cases) still ends up with complications[3]. Apart from the difficulties of impaired vision, ocular trauma also causes psychosocial and economic setbacks for the victim in our culture.
Age is the dominant demographic risk factor for hospitalized ocular trauma patients in this study. Other studies[1,8] on ocular trauma have focused their attention on younger age groups too, but this point shouldt be considered in view of large population size of children in a community. One large study has recently identified a second peak of patients older than 70 years[9].
Sex is also a risk factor for ocular injury. Some reports[10,11] give male-female ratio as 8:1. Epidemiologically, our population has almost an equal percentage of both sexes, and so M:F ratio of 2.8:1 puts males at a definite risk. A possible explanation for this is greater aggressiveness acceptable for boys in almost all societies. As reported by others[6,8] ocular trauma was also more frequent in children in this study therefore adult supervision is extremely important in preventing these accidents[3,12]. As we have studied figures from an urban hospital, road accident made another major portion of cases of accidental injury[6,8,11]. Ocular injuries may necessitate prolonged hospital treatment (average 12 days)[10]. In our study, it was much shorter (average 4.4 days) with the patients coming for regular follow-up post-operatively, as out-patients. Patients, who neglected their ocular injury initially thinking that it will improve, or heal itself, reported late to the hospital. These included children, who were brought to the hospital long after the injury, possibly because of neglect or failure to recognize the injury by parents. All such cases with a mean delay of 28.4 hours after injury got early Or late complications. Most of these victims were children (average age 15.4 years).
Other bad prognostic factors were intra-ocular foreign body (pellets, glass pieces), vitreous prolapse, gunshot injuries and no light perception on 2nd postoperative day. While patients having intermediate visual acuity may develop some complications but they maintain or finally improve their vision. Lens injury was very common and lead to early cataract formation in patients (mostly children under 7 years of age). Children run a risk of amblyopia if monocular optical or surgical correction is not done[3].
Ocular injuries resulted in blindness in 3.8% to 15% of eyes[6,11] and enucleation in 3% to 12% of eyes[5,9,11]. In our study, the visual prognosis was generally good, inspite of complications but complete loss of vision occurred in 16.6% and enucleation was done in 10.7% of eyes.
Prevention of ocular injuries depends on educational and parental supervision of young children. Awareness to the potential danger of sharp-ended objects in reach of a child playing unsupervised and taking measures against it, would decrease the occurrence of injury in the most vulnerable group. Using seat-belts is recommended as a primary preventive measure for adults travelling in motor vehicles. Other studies have stressed the use of eye wear (goggles) where occupational injuries account for majority of cases of ocular trauma[5,10,11,13].
Secondary prevention would include early recognition of injury in a child and reporting to a hospital as soon as possible.
Long term prevention of blindness include early optical correction and preventing the development pf

amblyopia in a child with traumatic cataract. Enucleation of eyes with severe trauma and uveal prolapse reduces risk of sympathetic uveitis later.

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