Original Article

Visual Outcome after Anterior Segment Trauma of the Eye

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Purpose: To find out the final visual outcome (snellen visual acuity) after initial management of ocular trauma and to determine the etiological factors responsible for ocular trauma and extent of injury.

Material and Methods: This study was conducted in the Department of Ophthalmology, Sir Ganga Ram Hospital/Fatima Jinnah Medical College, Lahore from June 2004 to December 2004. All these patients presented in the out patient department of Ophthalmology Sir Ganga Ram Hospital. Detailed history was taken. Complete clinical examination was done to record the findings and all patients were thoroughly investigated to reach the final diagnosis. All patients were treated on the basis of their diagnosis for the underlying cause. Surgical procedures were performed where appropriate. Every patient was followed for 6 months within the study period.

Results: Fifty patients were included in the study. Forty two (84%) were male while 8 (16%) were female patients with male to female ratio 5.25:1. All patients were between 5-30 years of age (mean ± SD 15.94 ± 6.03). Different treatment options were used in the management of trauma.

Conclusion: Complications of anterior segment trauma can be treated safely by medical and surgical methods.

The ocular injury has always been important since early life and had been part of medical landscape in antiquity so much so that eye injuries has been mentioned in historical documents in the Eber's Papyrus which was discovered in 1872 in the Egyptian city of dead, which was written between 1553 and 1550BC[1-3].

The eye injury cases in this region are quite common. The anterior segment trauma is prevalent in poverty and literacy stricken population. Duke Elder has outlined variable and diverse sources of ocular trauma[2]. The ocular trauma pattern differs from one type of industry to other; urban to rural area e.g. chemical trauma is more prevalent in big cities agricultural area ocular trauma is of its own nature. The ocular trauma due to mechanical work is more prevalent in and around factory area such as Lahore, Karachi, Gujranwala and Sialkot. The blunt trauma is often seen in children, violence and sports ocular trauma in players while pressure waves (burnt tyre or bones) ocular trauma is seen in these workers. It has been estimated that 75% of all proceeds in ocular pathology laboratories are related to ocular trauma[4]. The modern trend of management has changed the results towards relatively better visual outcome as compared to last century results. Good results are also due to easily available broad spectrum antibiotics, anti-inflammatory and immunosuppressant drugs. The better outcome is also achieved due to proper tissue rehabilitation and prevention of complications by careful and timely surgical repair and restoration of anatomy[5,6]. The results of trauma has also improved due to proper supervision and follow up along with handling of complications especially after blunt or concussion ocular trauma which may cause maculopathy, macular hole, commotion retina, traumatic choroidal rupture.

The aim of this study is to find out the visual outcome (snellen visual acuity) after initial management of trauma and to determine the etiological factors responsible for ocular trauma and extent of injury.

MATERIAL AND METHODS

This interventional, Quasi experimental study was conducted at the Ophthalmology Department, Sir Ganga Ram Hospital, Lahore from January 2004 to December 2004. Fifty patients were enrolled for the study. No discrimination of gender and age was kept for admission. All patients were included after detailed history, physical examination, and thorough ocular examination. Special attention was given about eye injury, causative agent and the damage caused. Details of anterior segment trauma were recorded. The intraocular pressure was carefully recorded in blunt trauma cases[7]. General physical examination of the patient and laboratory tests for various investigations especially general anaesthesia, total leukocytic count, differential leukocytic count, haemoglobin, complete urine, x-ray chest (PA view) electrocardio-gram, electrolyte balance and kidney functions were done to avoid complications. In certain severely lacerated eyes, permission was sought for enucleation if necessary, to avoid sympathetic opthalmia[8,9]. Patients were examined on the first postoperative day and further visits were scheduled at 1 week and 4 weeks interval. On each visit, visual acuity was recorded.

Data was entered and analyzed using SPSS version 11. The age was analyzed by descriptive with mean ± SD. The variables like age, sex, preoperative visual acuity, treatment, postoperative visual acuity and complications were analyzed as frequency and percentages. Pre and postoperative visual acuity were analyzed and Chi-square test was applied. A p value of less than 0.05 was considered as significant.

RESULTS

Fifty patients were included in this study with age range 5-30 years with mean age was 15-16 years in majority of patients with a mean 15.94±6.03 (Table 1). There was definite male predominance 42 (84%) as compared to female 8 (16%) with male to female ratio 5.25:1 (Table 2).

Different agents were responsible for trauma. In majority of cases trauma occurred in domestic settings (Table 4).

Preoperative visual acuity was recorded before treatment in all patients. NPL in 1 (2%), PR + in 9 (18%) cases, projection was faulty in 4 (8%), 3/60 1 (2%), 4/60 1 (2%), CF 8(16%), HM 4 (8%), 6/60 2 (4%), 6/24 1 (2%), 6/18 3 (6%), 6/12 1 (2%) and 6/6 15 (30%) cases respectively (Table 5).

Table 1: Age distribution of patients (n=50)

Age (years)	Frequency n (%)
5 – 15	24 (48)
16 – 25	21 (42)
> 25	5 (10)

Mean±SD = 15.84±6.03

Table 2: Sex distribution of patients

Sex	Frequency n (%)
Male	42 (84)
Female	8 (16)

Male to female ratio 5.25:1.

Table 4: Agent of trauma

Agent of trauma	Frequency n (%)
Metalic particle	6 (12)
Pencil	6 (12)
Stick	6 (12)
Stone	5
Glass piece	5 (10)
Nail	4 (8)
Ball	3 (6)
Fire arm injury	3 (6)
Wood piece	2 (4)
Bottle cap	1 (2)
Cloth hanger	1 (2)
Kite	1 (2)
Knife	1 (2)
Pipe	1 (2)
Plastic bullet	1 (2)
RSA	1 (2)
Scissor	1 (2)
Toy	1 (2)
Wiper	1 (2)

Table 3: Laterality of the eye

Sight	Frequency n (%)
Left	17 (34)
Right	33 (66)

Table 5: Preoperative visual acuity

Visual acuity	Frequency n (%)
NPL	1 (2)
PR faulty	4 (8)
PR+	9 (18)
HM	4 (8)
CF	8 (16)
3/60	1 (2)
4/60	1 (2)
6/60	2 (4)
6/24	1 (2)
6/18	3 (6)
6/12	1 (2)
6/6	15 (30)

Table 6: Treatment of patients

Treatment	Frequency n (%)
Conservative	11 (22)
Corneal tear repair	13 (26)
Corneal tear repair and I/A	4 (8)
Corneoscleral tear repair	3 (10)
Corneoscleral tear repair and iris reposition	2 (4)
ECCE + PCL	1 (2)
FB removal	3 (6)
I/A	3 (6)
I/A + PCL	8 (16)
ICCE	1 (2)
Scleral tear repair	1 (2)

Different treatment options were used in management of trauma. In 13 (26%) cases were treated as corneal tear repair was done, 11 (22%) cases were treated as conservatively. In 3 (6%) treated as corneoscleral tear repair, 4 (8%) were treated as corneal tear repair and I/A, 2 (4%) cases corneoscleral tear repair with iris reposition. In 1 (2%) ECCE + PCL, FB removal in 3 (6%), I/A in 3 (6%) cases, I/A + PCL in 8 (16%), in 1 (2%) case ICCE and scleral tear repair was 1 (2%) (Table 6).

Post-treatment visual was noted in NPL 1 (2%), PR 16 (32%), projection faulty was in 4 (8%), 3/60 1 (2%), 4/60 1 (2%), CF 12 (24%), HM 5 (10%), 6/60 2 (4%), 6/24 3 (6%), 6/18 3 (6%), 6/12 1 (2%), 6/6 2 (4%) cases respectively (Table 7). In comparison pre and postoperative visual acuity was not statistically significant. Different complications were recorded, corneal opacity 12 (24%), corneal opacity and hyphema 1 (2%) corneal opacity and traumatic cataract 14 (28%) glaucoma 1 (2%) hyphema 11 (22%) retinal detachment, 3 (6%) and traumatic cataract 4 (8%) (Table 8).

Table 7: Postoperative visual acuity

Visual acuity	Frequency n (%)
NPL	1 (2)
PR faulty	4 (8)
PR+	16 (32)
HM	5 (10)
CF	12 (24)
3/60	1 (2)
4/60	1 (2)
6/60	2 (4)
6/24	3 (6)
6/18	3 (6)
6/12	1 (2)
6/6	2 (40

DISCUSSION

Importance of ocular trauma as a major cause of blindness worldwide has recently been documented[10,11] though reliable population-based data are difficult to obtain, especially in the developing countries. In this

study higher prevalence of ocular trauma in young male was 42 (84%) and female 8 (16%) with male to female ratio 5.25:1. In other studies this may be attributed to higher exposure of younger male to outdoor environment[12,13]. The frequency of trauma was high in right eye 33 (66%) as compared to left eye 17 (34%) (Table 3). The major causative agent of trauma were metallic particle 6 (12%), pencil trauma 6 (12%), stick trauma 6 (12%) stone and glass trauma 5 (10%) respectively. Penetrating trauma was the leading cause in the list of ocular emergencies in this study. Majunatha reported that ocular injury is the third common cause of blindness following assault or accidents both occupational or sports in his study conducted in Jamaica.

Table 8: Complications of patients

Complications	Frequency n (%)
Corneal opacity & traumatic cataract	14 (28)
Corneal opacity	12 (24)
Hyphema	11 (22)
Traumatic cataract	4 (8)
RD	3 (6)
Corneal opacity & hyphema	1 (2)
Glaucoma	1 (2)

In majority of cases post treatment visual acuity was 6/6 to 6/60 in 37 (74%) 4/60 in 1 (2%) CF in 13 (26%) HM in 2 (4%), PR faulty in 4 (8%) and projection was positive in 2 (4%).

Complications were recorded as corneal opacity in 12 (24%) corneal opacity and hyphema in 1 (2%) corneal opacity and traumatic cataract 14 (28%). Glaucoma in 1 (2%) hypema in 11 (22%), retinal detachment in 3 (6%) traumatic cataract in 4 (8%) and in 4 (8%) cases no complication was recorded. High incidence of traumatic emergencies seems to be related to lack of proper safety measures in sports, in the work place, poor implementation of traffic rules and regulations.

To reduce the morbidity, expense, workload of health professionals and institutions, ultimate visual impairment and cosmetic disfigurement due to ocular emergencies, we have to achieve three goals:

i. To prevent occupational and sports related ocular trauma.
ii. Proper and timely management of traumatic emergencies.
iii. Early detection and management of eye disease or conditions that can present later as ocular emergencies. These targets would be achievable if the community is made aware of the hazards and poor outcome related to ocular trauma. It would then be possible to take proper safety measures at the work place, in domestic environment and sports facilities. It remains the responsibility of the Government to provide affordable and accessible health facilities to the community. In conclusion we find that ocular emergencies contribute heavily to the workload of the eye health care professionals.

CONCLUSION

In this study 84% patients were male and 16% were female. This may be attributed to be higher exposure of young male to outdoor environment and young adults of working age group are more actively involved in sports and more likely to be working without proper safety measures. Parents should remain vigilant as many injuries occurred in domestic settings. Preventive measures and safety devices at work place would reduce the high percentage of occupational injuries. Early and meticulous repair gave good visual results. Therefore early referral is emphasized.

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