

FREQUENCY AND VISUAL OUTCOME OF TRAUMATIC CATARACT

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ABSTRACT

Objective: To assess the frequency, causative agents, current treatment options, post-operative complications and final visual outcome of trauma related cataract.

Material and Methods: The study was conducted at Khyber Institute of Ophthalmic Medical Sciences, Hayatabad Medical Complex, Peshawar, from November 1999 to November 2001. Detailed history with special reference to age, sex, mode of injury, causes and circumstances of trauma were recorded. Indications for surgery were traumatic cataract with or without open globe injury. All patients had B scans (ultrasonography) to evaluate the posterior segment. All patients were operated under general anaesthesia. The patients were followed up for six months.

Results: Out of 77 patients with traumatic cataract (69 males and 8 females), about half of the patients were between 5-15 years of age. Commonest trauma was sport related in 32 (41.5%) cases. Commonest etiological agent for blunt trauma was stone in 15 (19.48%) cases and for penetrating trauma was thorn in 9 (11.7%) cases. In 71 patients (92.20%) presenting visual acuity was less than 6/60. Fifty three patients (68.83%) had final visual acuity of 6/6-6/12 while only 03 patients (03.89%) had a final visual acuity of <3/60.

Conclusion: Traumatic cataract is common cause of visual loss after trauma. Males are affected more than females. Nearly half of patients affected are children under the age of 16. Taking necessary precautions for sports and work can prevent nearly 54% of cataracts. Most common causative agents are stone and wooden sticks.

Key Words: Ocular trauma, Traumatic cataract, Surgery, Visual outcome.

INTRODUCTION

Ocular trauma is the most common cause of monocular blindness and ocular morbidity almost all over the world particularly in younger age group and it has always been a professional challenge to the ophthalmologist.¹

Approximately 75% of people with trauma induced visual impairment are monocularly blind.² The incidence of ocular injuries varies in different parts of the world. A study from India on ocular trauma by Panda³ revealed an incidence of 20.53% and from Pakistan by Khan MD et al⁴ an incidence of 12.9%.

Cataract may be an early or late manifestation of ocular trauma.⁵ The two basic types of trauma related lens abnormalities are loss of transparency and loss of position.⁶ Traumatic cataract is not uncommon in ocular trauma.⁷

Unilateral traumatic cataract, if left alone,

leads to unilateral vision, leucocoria and a psychological burden on the child and the parents. It has an added risk of developing squint in the affected eye. Early rather than late removal of lens by aspiration, followed by aphakic correction with glasses or contact lenses was usually recommended, but the results are not uniformly good because of poor compliance. Intraocular lens implantation in the young patients with bilateral cataracts is an excellent way of overcoming the above mentioned problem and enhancing their chance of developing binocular single vision.

Stegmann believes that the prognosis for a traumatic cataract can be the same as for a routine senile cataract if handled appropriately, excluding cases in which there is damage to the posterior segment.⁸

The greatest benefit of primary cataract removal is that it allows the surgeon to see the posterior segment, otherwise blocked by the lens

opacity. In general primary cataract removal is recommended if the lens is fragmented, swollen or if there is papillary block.⁹

Majority of the eyes with traumatic cataract can be safely rehabilitated with posterior chamber lens implantation.¹⁰

Aim of the study was to assess the frequency, causative agents, population at risk, current treatment options, post-operative complications and final visual outcome of trauma related cataract

MATERIAL AND METHODS

This prospective study was conducted at Khyber Institute of Ophthalmic Medical Sciences (KIOMS), Hayatabad Medical Complex, Peshawar from November 1999 to November 2001. Seventy seven patients were analysed in this study of two years duration. A comprehensive Performa was designed for the study. After admission to the

CIRCUMSTANCES OF TRAUMA

Activity	No of Cases n=77	Percentage
Sports related	32	41.55%
Accidental	28	36.36%
Occupational	10	12.98%
Fight/assault	07	09.09%

Table 1

ward, detailed history was taken with particular reference to age, sex, and mode of injury, causes and circumstances of the trauma. Detailed examination was performed including visual acuity testing by Snellen chart. Extraocular movements were checked and cover test performed to look for fixation pattern. Slit lamp biomicroscopy was done in all cases. Cornea was examined for any pathology related to trauma. The anterior chamber was examined for hyphema, reaction, lens matter or vitreous. Iris and pupils were examined for any synechiae and reaction to light. Pupils were dilated routinely and morphology of cataract noted. Intraocular pressure was checked by applanation tonometer. When intraocular pressure (IOP) was elevated, gonioscopy was performed to look for angle recession. B scan was performed to exclude any posterior segment co- morbidity. In suspicious cases, X-rays orbit (AP and Lateral views) were performed to detect and localize any foreign body. The average hospital stay was noted.

All patients with trauma induced inflammation were treated with topical corticosteroids, antibiotics and mydriatic/cycloplegic eye drops preoperatively.

The selection criteria for surgery was

CAUSATIVE AGENTS OF BLUNT TRAUMA (n=48)

Agent	No of Cases	Percentage
Stone	15	19.48%
Wood	09	11.68%
Stick	06	7.79%
Wire/metal wire	07	9.09%
Catapult	03	3.89%
Toy pistol	02	2.59%
Gulidanda	02	2.59%
Flying object	01	1.29%
Fire cracker	01	1.29%
Fist	01	1.29%
Sugarcane	01	1.29%

Table 2

traumatic cataract with or without straight eyes on cover tests and normal posterior segment on B scan (Ultrasonography). Intraocular lens (IOL) power was determined by a scan and Keratometry readings were obtained by using SRK regression formula. Average IOL power was 21.5 dioptries with a range from 14.50 to 29 dioptries.

All children were assessed by an anaesthesiologist and paediatrician for fitness for surgery under general anaesthesia.

The standard surgical procedure performed was conventional extracapsular cataract surgery incision, anterior capsulotomy, lens matter aspiration and posterior IOL implantation. The standard procedure was combined with other surgical procedures depending upon the need in individual cases. All patients were examined on the first post-operative day. Routine slit lamp examination was carried out and the condition of cornea, anterior chamber reaction, pupillary reflexes, IOP measurement by applanation tonometer, status of IOL and posterior capsule were noted. All patients were given Tobramycin+ Dexamethasone eye drops postoperatively four times a day. The dosage and frequency was adjusted individually depending on postoperative findings of the anterior chamber.

After discharge from the hospital, all patients were examined at regular intervals of 1 week, 4 weeks, 1 month and 6 months. At each visit visual acuity was recorded. Detailed anterior and posterior segment examinations were performed with indirect ophthalmoscope after pupil dilatation.

Final refraction was done on 4th post operative visit i.e. after 3 months. Topical medications were tapered off gradually and

CAUSATIVE AGENTS OF PENETRATING TRAUMA (n=29)

Agent	No of Cases	Percentage
Thorn	09	11.68%
Stone	04	5.19%
Wood	03	3.89%
Stick	03	3.89%
Bomb blast Injury	02	2.59%
Metal wire	03	3.89%
Disposable syringes	02	2.59%
Fire cracker	02	2.59%
Battery explosion	01	1.29%

Table 3

stopped on 3rd postoperative visit. (40 days).

Visual outcome was graded as good (6/6-6/12), fair (6/18-6/24), satisfactory 6/36-6/60) and poor (less than 3/60).

RESULTS

Out of the 77 patients studied, 69 (89.6%) were male patients whereas 8 (10.4%) were female patients i.e. a ratio of 8:1. Thirty nine patients (50.64%) were between 5-15 years of age, followed by 33 patients (42.85) between 16-40 years and 5 patients (6.49%) were in the 41 to 60 years age group. Patients with closed globe injury were 49(63.3%) and open globe injury 28 (33.76%). Circumstances of events causing traumatic cataract are shown in table no 01. Causative agents of blunt and penetrating trauma are given in table no. 02 and 03.

The morphology of traumatic cataract was cortical in 45.5% of the patients, ruptured anterior capsule in 25.97%, posterior subcapsular in 11.68%, partially absorbed cataract in 9.09% and rosette cataract in 7.79% of the cases.

In 71 patients (92.20%) presenting visual acuity was less than 6/60 and only 6 patients (7.8%) had visual acuity of 6/60.

The interval between trauma and surgery was less than a month in 17 cases (22.07%), 1-3 months in 27 cases (35.06%), 4-6 months in 07 cases (9.09%), 7-12 months in 09 cases (11.68%), and more than 12 months in 17 cases (22.07%). Surgery was performed on all 77 patients.

A number of intraoperative and postoperative (early and late) complications were noted. Vitreous was lost in 8 (10.32%) cases. Among these cases, one patient had traumatic posterior capsular hole diagnosed preoperatively and in seven patients vitreous loss occurred while separating the adherent flaps of anterior and

posterior capsules of partially absorbed cataracts. In all these cases vitreous loss was managed by anterior vitrectomy and successful posterior chamber IOL implantation, was done.

In the early post operative period, severe anterior chamber reaction was noted in 20 cases (25.97%), posterior capsule opacity in 7 cases (9.09%), corneal oedema in 3 cases (3.89%) , hyphema in 3 cases (3.89%) and raised intraocular pressure in 2 cases (2.59%) . Endophthalmitis was noted in 1 case (1.29%).

The late postoperative complications included posterior capsule opacity in 18 cases (23.37%), posterior synechae in 6 cases (7.79%) and decentered IOL in 3 cases (3.85%). In patients with significant posterior capsule opacification, the visual acuity improved to 6/6-6/12 after YAG laser capsulotomy. The average interval between laser capsulotomy and surgery was six months. Thirty five (45.45%) patients had postoperative refractive error of +/-2.0 dioptres and 7 patients (9.09%) had postoperative refractive error of more than +/-3.0 dioptres. Results of final corrected visual acuity are shown in table no. 04.

DISCUSSION

In this study, patients with traumatic cataract belonged to two distinct groups. Thirty seven patients (48.05%) belonged to rural areas and forty patients (51.94%) patients were from urban areas. The cases due to open globe injury were 36.36% (28 patients) whereas those due to closed globe injury were 63.63% (49 patients). Other studies support our finding that closed globe injuries are more common than open globe injuries.¹¹

Males were affected more than females with a ratio of 8:1. The higher incidence among males is reported in many other studies.¹²⁻¹⁴

The age distribution ranged from 5-15 years in 39 patients (50.64%), 16-40 years in 33 patients (42.85%) and 41-60 years in 3 patients (6.49%). Jan S in his study reported that 60.75% of ocular trauma occurred in below 20 years of age.¹⁵ Sports related injuries were more common i.e. 41.55% (32 patients), followed by injuries

RESULTS OF FINAL CORRECTED VISUAL ACUITY (n=77)

Visual Acuity	No. of patients	% age	Remarks
6/6-6/12	53	68.83%	Good
6/18-6/24	11	14.28%	Fair
6/36-6/60	10	12.98%	Satisfactory
Less than 6/60	03	03.89%	Poor

Table 4

related to accidents 36.36% (28 patients). Children were the main victims as they are engaged in different kinds of high risk sports activities without the supervision of adults with complete disregard for any protective mechanism.

Thompson CJ in his study reported that most of the ocular trauma occurred in children in home setting especially in unsupervised children.¹⁶

The next major group of injuries i.e.22% (17 patients) were related to occupational work and fights. This is again due to lack of awareness about risk factors and not employing any protection while at work. The objects responsible for ocular injuries were stones, wood, thorns, metallic wires, toy pistols, used syringes and fire crackers. The more common causes of injury were stone (24.67%), wood (15.57%) and stick (11.68%). In a study conducted by Gradin D¹⁷, the most common causes of injury were stick (36.3%) and thorn (10.7%). Morphologically most of the traumatic cataracts were cortical (45.45%), followed by ruptured anterior capsule (25.97%) and posterior sub-capsular cataracts (11.68%). In the study by TY Wong,¹⁸ the morphology of traumatic cataract was cortical in 41% of the cases and posterior sub-capsular cataract in 16 % of the cases.

All patients were fitted with intraocular lenses; the type of intraocular lens used was Polycast polymethylmethacrylate (PMMA). Trivedi in his study used both PMMA and Acrylic and found better results with the later.¹⁹

Chuang reported significant improvement after prompt surgical intervention and intraocular lens implantation.²⁰

The visual prognosis, after management, remains satisfactory in our study. Assessment of final visual acuity was 6/6 to 6/12 in 68.72% (53 patients), 6/18 to 6/36 in 23.37% (18 patients) and 6/60 to CF in 7.78% (6 patients). The post operative visual acuity recorded by Akhter and Waheed²¹ was 6/12 or better in 30% of the eyes, 6/24 to 6/12 in 33% of cases, 6/60 to 6/24 in 15% and less than 6/60 in 22% of the cases.

The most common post-operative complications were posterior capsular opacification (32.46%) and severe reaction/exudative membrane (25.97%). In the study by Cheema R A,²² the most common post-operative complication was fibrinous uveitis (25%). In the study by Eckstein M,²³ Posterior Capsule Opacity was almost universal i.e. 92%.

With the availability of new microsurgical techniques, fine sutures, viscoelastics, IOLs and effective antibiotics, the visual outcome of these

eyes have improved considerably.²⁴ Factors adversely affecting visual outcome are complex trauma, delay in referral, inadequate post operative correction of aphakia with contact lenses or implants and inadequate management of amblyopia.

Ocular trauma is also responsible for major economic losses. In USA, the annual economic toll for the management of ocular trauma is reported as 1.3 billion US Dollars.²⁵ In our society, the cost is going to be even higher.

Blindness from injury can at best be prevented by removing the cause of injury but once the injury has occurred, the prevention of blindness depends upon early and efficient management techniques.

CONCLUSION

Traumatic cataract resulting from ocular trauma is a common cause of ocular morbidity, especially in young population. Most of the cases occur in playgrounds (41.55%), while occupational trauma accounts for another 12.98% cases. Serious efforts are required to prevent trauma at home, playground and at work place by creating awareness through public health education, laws enforcement and development of trauma centres with full expertise and technological back up.

REFERENCES

1. Tielsch JM, Parver L, Shanker B, Time trends in the incidence of hospitalized ocular trauma. *Arch Ophthalmol*, 1989; 107 :519-23.
2. Esmaeli B, Elnor SG, Schork MA, Elnor VM. Visual outcome and survival after penetrating trauma. A clinicopathological study. *Ophthalmology*.1995; 102 :393-400.
3. Bhattia IM, Panda A, Dayal Y. Role of ultrasonography in ocular trauma. *Indian J Ophthalmol*.1983; 31: 495-8.
4. Khan MD, Kundi N, Mohammed Z, Nazeer AF. A 6.5 years survey of intraocular and intraorbital foreign bodies in the North West Frontier Province, Pakistan. *Br J Ophthalmol* 1987; 71:716-9.
5. Adala IIS. Ocular injuries in Africa. *Soc Sci Med*. 1983;17: 1729-35.
6. Espallat A, Janigian R Jr. Cataracts, bilateral macular holes and Rhegmatogenous Retinal detachment induced by lightning. *Am J Ophtalmol* 1999; 127: 216-7.
7. Cohen KL. Inaccuracy of intraocular lens power calculation after traumatic corneal ulceration and cataract. *J Cataract Refract Surg*

- 2001; 27:1519-22.
8. Grieshaber MC, Stegmann R. Penetrating eye injuries in South African children: Aetiology and visual outcome. *Eye*. 2006; 20: 789-95.
 9. Mester V, Kuhn F, Lens In, Kuhn Pieramici DJ, editors. *Ocular trauma. Principles and practice*. New York(NY): Thieme: 2002.p.180-204.
 10. Gain P, Thuret G, Maigeryl J. Management of traumatic cataract . *J Fr Ophthalmol* 2003; 26:512-20.
 11. Panda A, Mohan M, Sharma P. Management of perforating injuries of the anterior Segment. *Indian J Ophthalmol* 1984;32:295-8.
 12. Brady KM, Atkinson CS, Kilty LA, Hiles DA. Cataract Surgeries and Intraocular lens Implantation in Children. *Am J Ophthalmol* 1995;120:1-9.
 13. Cavallaro BE, Madigan WP, O Hara MA, Kramer KK, Bauman WC. Posterior chamber intraocular lens use in children. *J Pediatr Ophthalmol Strabismus*. 1998; 35:254-63.
 14. Singh DV, Sharma VR, Azad RV. Visual outcome after fire-work injuries. *J Trauma* 2005; 59 : 109-11.
 15. Jan S, Khan S, Khan MN, Iqbal A, Mohammed S. Ocular emergencies. *J Coll Physicians Surg Pak*. 2004; 14: 333-6 .
 16. Thompson CG, Kumar N, Billson FA, Martin F. The aetiology of perforating ocular injuries in children. *Br J Ophthalmol* 2002; 86: 920-2.
 17. Gradin D, Yorston D. Intraocular lens implantation for traumatic cataract in children in East Africa. *J Cataract Refract Surg*. 2001; 27 : 2017-25.
 18. Wong TY, Klein BE, Klein R , Tomany SC. Relation of ocular trauma to cortical, nuclear, and Posterior subcapsular cataract. The Beaver Dam Eye Study. *Br J Ophthalmol* 2002; 86:152-5.
 19. Trivedi RH, Wilson ME Jr. Single piece acrylic IOL implantation in children. *J Cataract Refract Surg*. 2003; 29:1738-43.
 20. Chuang LH, Lai CC. Secondary intraocular lens implantation of traumatic cataract in open globe injury. *Can J Ophthalmol* 2005; 40: 454-9.
 21. Akhter MS, Waheed A. Intraocular lens implantation in children. Complication and their management. *Pak J Ophthalmol* 1998;14 (3):132-9.
 22. Cheema RA, Lukran AD. Visual recovery in unilateral traumatic paediatric cataracts related with posterior chamber intraocular lens and anterior vitrectomy in Pakistan. *Int Ophthalmol* 1999; 23: 85-9.
 23. Eckstein M, Vijaya Lakshmi P, Kelladar M, Gilbert C, Foster A. Use of Intraocular lens in children with traumatic cataract in South India. *Br J Ophthalmol* 1998; 82: 911-5.
 24. Forbes BJ, Guos S. Update on the surgical management of pediatric cataracts. *J Pediatr Ophthalmol Strabismus* 2006; 43: 143-51.
 25. Zigelbaum BM, Tostanoski , Kerner DJ, Hersh PS. Urban eye trauma. A one year prospective study. *Ophthalmology* 1993;100:851-6.

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