

VISUAL OUTCOME OF TRAUMATIC PAEDIATRIC CATARACT AT A TERTIARY EYE CARE CENTRE IN WEST BENGAL

Smiti Rani Srivastava¹, Vaibhav Gupta²

¹Assistant Professor, Department of Ophthalmology, Regional Institute of Ophthalmology, Medical College and Hospital, Kolkata.

²Junior Resident, Department of Ophthalmology, Regional Institute of Ophthalmology, Medical College and Hospital, Kolkata.

ABSTRACT

BACKGROUND

Traumatic cataract is common presentation of penetrating and blunt ocular trauma in children. Ocular trauma is the leading cause of unilateral blindness all over the world. The incidence of ocular trauma varies in different parts of the world. From India, the reported incidence is 20.53%. Traumatic cataract causes significant blindness in paediatric populations particularly in developing countries.

The aim of the study is to evaluate the final visual outcome of the patients with traumatic cataract.

MATERIALS AND METHODS

We conducted a prospective study of 100 children from 4 to 16 years of age presenting in Outpatient Department of Regional Institute of Ophthalmology, Kolkata, with traumatic cataract between April 2015 to March 2017. Detailed history, systemic and local examinations and relevant investigations done followed by medical and surgical intervention and patients were followed up till six months and final visual acuity recorded.

RESULTS

There was a male predilection with a male-to-female ratio 2.85:1.56 (56%) patients sustained penetrating trauma, while 44 (44%) were inflicted with blunt injury. Commonest causative agent was trauma with organic foreign bodies in 20 eyes (20%) followed by stones in 14 eyes (14%). Anterior segment was more involved than posterior segment. Final best corrected visual acuity after six months was better than or equal to 6/18 in 64 eyes (64%). The major early postoperative complications include anterior uveitis in 26 (26%) and corneal oedema in 8 (8%) patients, while late postoperative complication was posterior capsular uveitis in 36% patients.

CONCLUSION

Paediatric traumatic cataract can cause ocular morbidity. Timely and proper medical and surgical intervention can result in good visual outcome. The parents, caretakers and teachers have an important role to play in prevention by recognising hazardous situation and taking preventing measures.

KEYWORDS

Best Corrected Visual Acuity, Penetrating Injury, Blunt Injury, Traumatic Cataract.

HOW TO CITE THIS ARTICLE: Srivastava SR, Gupta V. Visual outcome of traumatic paediatric cataract at a tertiary eye care centre in West Bengal. *J. Evid. Based Med. Healthc.* 2017; 4(89), 5296-5299. DOI: 10.18410/jebmh/2017/1057

BACKGROUND

Ocular trauma is the leading cause of unilateral blindness all over the world.¹ The incidence of ocular trauma varies in different parts of the world. From India, the reported incidence is 20.53%.² Traumatic cataract causes significant blindness in paediatric populations particularly in developing countries.³⁻⁵ Concurrent morbidities such as endophthalmitis, retinal detachment, traumatic optic neuropathy and ruptured globe result in devastating visual loss in children with traumatic cataract. The pathophysiology of traumatic cataract is believed to involve direct capsular

Financial or Other, Competing Interest: None.

Submission 24-10-2017, Peer Review 30-10-2017,

Acceptance 09-11-2017, Published 11-11-2017.

Corresponding Author:

Dr. Smiti Rani Srivastava,

#BH-15, Salt Lake City, Sector 2, Kolkata-700091.

E-mail: drsmiti_srivastava@rediffmail.com

DOI: 10.18410/jebmh/2017/1057

rupture or coup, countercoup and equatorial expansion. Coup is the direct injury, whereas countercoup and equatorial expansion result from hydraulic forces within the eye transferring the energy of the trauma to the opposite side of the eye. Either or both of these mechanisms together, capsular rupture or lens epithelium damage lead to progressive or instantaneous lens clouding.⁶ Accompanying the cataract can be both anterior and posterior segment abnormalities depending on the depth of globe penetration. The opaque lens interferes with the visual axis and usually requires removal. If the capsular bag is ruptured, an anaphylactic fibrinous inflammation occurs, which can lead to many devastating complications.^{7,8}

One needs a very strong knowledge of the causes of injury to be able to plan a programme for its prevention, but unfortunately, the causes of ocular trauma in children are so diverse that it is not possible to chalk out a definite and effective preventive strategy.



Traumatic cataract is very common sequel of ocular trauma in children. Traumatic cataract poses a significant medical and surgical challenge to an ophthalmologist. A detailed history, careful examination and a clear management plan can simplify these cases and provide the best possible visual outcome.^{9,10} Traumatic cataract can be treated by primary removal. Secondary removal is better as there is improved visibility and less chance of postoperative complications.¹¹

Surgical options for repair of ocular trauma depend on factors such as level of injury and surgeon's capabilities. Cataract extraction with implantation of a Posterior Chamber Intraocular Lens (PCIOL) is a well-documented and well-established procedure for visual rehabilitation in cases of crystalline lens opacification. The visual outcome is also very much affected by the level of injury.

Aims and Objectives

The aim of this study was to evaluate the final visual outcome of paediatric patients with traumatic cataracts along with their demographic features and modes of trauma in a tertiary eye care centre in West Bengal.

MATERIALS AND METHODS

This study was conducted in Regional Institute of Ophthalmology, Medical College and Hospital, Kolkata. This is a centre of excellence with specialised doctors for all types of ocular morbidities with 24 hours ophthalmic emergency to treat minor as well as major injuries. This is an apex centre and so the referral centre for whole of West Bengal giving plenty of opportunity to obtain comprehensive data on the various characteristics and visual outcomes of patients. The study period was from April 2015 to March 2017 for a period of 24 months. We conducted a single centre, single surgeon and single observer prospective hospital-based study.

Inclusion Criteria

All patients within age group 4 to 16 years presenting to the Outpatient Department of RIO MCH, Kolkata, from April 2015 to March 2017, with history of ocular trauma and diminished vision due to cataract were included in the study.

Exclusion Criteria

- Unsure history of trauma.
- Pre-existing ocular disease such as amblyopia, congenital optic atrophy, glaucoma, etc., which hamper the vision significantly.
- History of ocular surgery.
- Presence of systemic disease such as Down syndrome, cerebral palsy, etc.

The following data was documented and analysed- age; gender; laterality and cause of injury; presenting and final visual acuities; extent of injury; interval between injury and surgical intervention; and possible causes of poor final visual acuity. After establishing the general condition of the patients, we subjected them to detailed local examination,

which included- Best-Corrected Visual Acuity (BCVA), distant and near both, torch light and detailed slit-lamp examination of the anterior segment, tonometry, cycloplegic refraction of both the eyes, fundus examination with the direct and indirect ophthalmoscope (if indicated), keratometry (of both eyes), intraocular lens power calculation and B-scan, x-ray and CT scan (where indicated) orbit to rule out orbital fractures and IOFB. Other relevant examinations were also done and routine investigations were also done before surgery. The slit-lamp examination revealed the details of corneal tear, wound of entry associated iridocyclitis and presence of crystalline lens cortex in the anterior chamber, iridodonesis, iridodialysis, any foreign body and the type of traumatic cataract.

All the patients were operated under general anaesthesia without muscle relaxant. The surgical procedure included adequate mydriasis, which was achieved with tropicamide drops and 2.5% phenylephrine hydrochloride drops 2 hrs. before surgery. Patients with history of inflammation due to trauma were taken under cover of steroids. For a routine uncomplicated traumatic cataract (traumatic cataract with no zonular dehiscence, intact posterior capsule and normal lens position) phacoemulsification with PCIOL implantation was done as a primary procedure.

Certain patients presented with a corneal or corneoscleral tear with shallow anterior chamber and traumatic cataract. These patients were initially taken up for emergency suturing. Postoperatively, antibiotics and steroids were given. After 12 weeks, the patients were taken up for cataract surgery. Intraocular lens implantation was performed only in patients with adequate capsular support. Patients without any capsular support were kept aphakic. Anterior vitrectomy was performed in children with posterior capsular tear and vitreous prolapse. Patients were examined every day for first 4 days and every week for 6 weeks. Spectacles correction was given at the end of 6 weeks for the residual refractive error if required to prevent amblyopia. The final visual outcome was seen by cycloplegic refraction after 6 months of cataract surgery and in some cases where posterior capsular opacity developed after doing YAG laser capsulotomy.

RESULTS

A total of 100 patients were included in the study. 56 (56%) patients sustained penetrating trauma, while 44 (44%) were inflicted with blunt injury. Out of 100 patients, 74 (74%) were males and 26 (26%) were females giving a male-to-female ratio of 2.85:1. Penetrating trauma was more common in males and blunt trauma was marginally more common in females. The paediatric age group was studied below and equal to 16 years of age and the majority of the patients (82%) were below 12 years of age. Traumatic cataract was more common in RE (62%) compared to LE.

Eye injuries resulting from organic foreign bodies were the most common (20 eyes, 20%), followed by stone (14 eyes, 14%), stationary items (12 eyes, 12%) and play items (10 eyes, 10%).

The visual acuity before cataract surgery was inaccurate projection of rays in 6 (6%) children less than 3/60 to accurate projection of rays in 80 (80%) cases, 3/60 to less than 6/60 in 10 (10%) patients and better or equal to 6/36 in only 4 (4%) patients. 6 (6%) patients had retinal detachment and 4 (4%) had vitreous haemorrhage after the trauma, which was diagnosed by B scan ultrasonography.

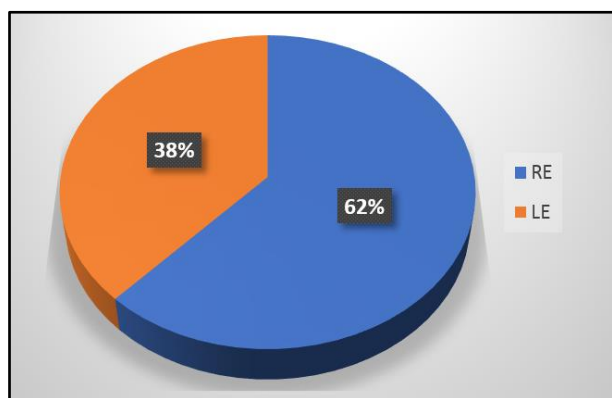
Final best corrected visual acuity after 6 months was better than or equal to 6/18 in 64 (64%) children, less than 6/18 to 6/60 in 22 (22%) cases, <6/60 - 3/60 in 4 (4%), less than 3/60 to accurate projection of rays in 4 (4%) and inaccurate projection of rays in 6 (6%).

The major early postoperative complications include anterior uveitis in 26 (26%) and corneal oedema in 8 (8%) of the patients. The significant late complications include posterior capsular opacity, which affected about 36 (36%) patients. In the cases of posterior capsular opacity, YAG laser capsulotomy was done after 6 months and vision improved to better than 6/18 where other causes were not affecting the vision.

The important causes of decreased final visual acuity were corneal opacity in 36 cases, chronic macular oedema in 10 cases, amblyopia in 6 cases and 6 cases had retinal detachment, which had inaccurate projection of rays after the cataract surgery.

Variables	Type of Trauma		Total
	Penetrating	Blunt	
Sex	n (%)	n (%)	
Males	44 (59.46)	30 (40.54)	74
Females	12 (46.15)	14 (53.85)	26
Total	56 (56%)	44 (44%)	100

Table 1. Distribution of Cases According to Gender and Type of Injury



Distribution of Patients According to Eye Affected

Cause	Patients	Percentage
Stone	14	14
Organic foreign bodies	20	20
School item	12	12
Play item	10	10
Needle	6	6
Finger nail	6	6
Iron nail/particle	6	6
Fall on floor	4	4
Fork	4	4
RTA	4	4

Cracker	4	4
Others	10	10
Total	100	100

Table 2. Distribution of the Patients According to the Cause

Variables	Type of Trauma		Total
	Penetrating	Blunt	
BCVA	n (%)	n (%)	
Inaccurate projection of rays	2 (3.6%)	4 (9%)	6
<3/60 to accurate projection of rays	4 (7%)	0	4
<6/60 to 3/60	4 (7%)	0	4
<6/18 to 6/60	14 (25%)	8 (18.18%)	22
>=6/18	32 (57.14%)	32 (72.27%)	64
Total	56	44	100

Table 3. Final Best Corrected Visual Acuity After 6 Months

Causes of Decreased Vision	Patients
Corneal opacity	36
Chronic macular oedema	10
Amblyopia	6
Retinal detachment	6

Table 4. Causes of Decreased Final Visual Acuity

DISCUSSION

In developing countries like India, ocular trauma in paediatric age group is a cause of significant morbidity in addition to an economic burden. Traumatic cataract is one of the most common outcomes of ocular injuries. There is a 1 to 15% incidence of traumatic cataract in ocular injuries.¹² Trauma is the leading cause of 90% of acquired paediatric cataracts.¹³

This study includes 100 cases of traumatic cataract treated in RIO MCH, Kolkata.

Male predominance was found maybe due to their more involvement in outdoor activities.¹³⁻¹⁶

In our study, most of the patients were below 12 (82%) years of age, lack of awareness and care of children in rural population might be the cause.

In our study, most common cause for penetrating trauma was organic matter, which includes bamboo sticks, thorn indicating that most of the patients come from village area. Stone was the most common cause of blunt trauma. Singh S et al also reported stick (organic matter) to be the most common cause of traumatic cataract.¹⁷

Corneal involvement was the most common associated ocular damage mainly in penetrating trauma.

Time between first presentation and surgery was about 3 months in most of the penetrating injury cases. In blunt trauma, patients were operated early.

The visual acuity before cataract surgery was less than 6/60 in 96 (96%) of the patients of which 3 patients had inaccurate projection of rays due to retinal detachment.

The best corrected final visual acuity in majority (64 patients, 64%) of patients was better than or equal to 6/18. Visual acuity was better than 6/18 in 57.14% of penetrating

trauma and 72.27% of blunt trauma. Only 14 (14%) patients had final vision less than 6/60.

The most common early postoperative complication was anterior uveitis (26 patients, 26%) and late complication was posterior capsular opacity (36 patients, 36%). The results were consistent with the study of Singh S et al.¹⁷

The most common cause of decreased final visual acuity was corneal opacity in 36 patients and chronic macular oedema in 10 patients. Adlina AR et al also found corneal opacity to be the most common cause of decreased vision after surgery for traumatic cataract.¹⁸

CONCLUSION

Traumatic cataract resulting from ocular trauma is a common cause of ocular morbidity. Males were predominantly affected by traumatic cataract. Penetrating injuries being more frequent than the blunt injuries. Traumatic cataract caused due to blunt trauma and had a better prognosis than penetrating injuries. Corneal opacity and chronic macular oedema were major causes for decreased final visual acuity.

The best possible visual outcome of traumatic cataract depends upon nature of anterior and posterior segment involvement, timely and proper medical and surgical management of these cases, close follow up and management of postsurgical complications.

Ocular trauma and traumatic cataract can be avoided by employing some basic precautions. There is a clear need for better education of parents, family members, school teachers to recognise the risk certain environment pose for children and to act to modify these environments to minimise the risk. Emphasis needs to be laid on supervision of children activities and provision of child friendly play material. If I have to bundle the entire preventive strategy for children in one phrase, I would say, 'care and extra care' on the part of the mother and educating parents and children about safety and use of eye protection. This will go a long way to bring down the incidence of ocular trauma in children.

REFERENCES

- [1] Khattry SK, Lewis AE, Schein OD, et al. The epidemiology of ocular trauma in rural Nepal. *Br J Ophthalmol* 2004;88(4):456-460.
- [2] Thakker MM, Ray S. Vision-limiting complications in open-globe injuries. *Can J Ophthalmol* 2006;41(1):86-92.
- [3] Maida JM, Mathers K, Alley CL. Pediatric ophthalmology in the developing world. *Curr Opin Ophthalmol* 2008;19(5):403-408.
- [4] Gilbert C, Foster A. Childhood blindness in the context of VISION 2020--the right to sight. *Bull World Health Organ* 2001;79(3):227-232.

- [5] Gilbert C, Muhit M. Eye conditions and blindness in children: priorities for research, programs, and policy with a focus on childhood cataract. *Indian J Ophthalmol* 2012;60(5):451-455.
- [6] Zia S, Khan QA, Iqbal Y, et al. Visual outcome of cataract surgery in cases of penetrating ocular trauma. *Gomal J Med Sci* 2014;12(2):56-59.
- [7] Greven CM, Collins A, Slusher MM, et al. Visual results, prognostic indicators, and posterior segment findings following surgery for cataract/lens subluxation-dislocation secondary to ocular contusion injuries. *Retina* 2002;22(5):575-580.
- [8] Ganesh A, Al-Zuhaibi S, Mitra S, et al. Visual rehabilitation by scleral fixation of posterior chamber intraocular lenses in Omani children with aphakia. *Ophthalmic Surg Lasers Imaging* 2009;40(4):354-360.
- [9] Sarikkola AU, Sen HN, Uusitalo RJ, et al. Traumatic cataract and other adverse events with the implantable contact lens. *J Cataract Refract Surg* 2005;31(3):511-524.
- [10] Kanski JJ. *Clinical ophthalmology: a systematic approach*. Butterworth 1989:257-258.
- [11] Mester V, Kuhn F. *Lens In: Kuhn F, Pieramici DJ, eds. Ocular trauma: principles and practice*. New York (NY): Thieme 2002:180-204.
- [12] Cohen A, Hersh PS, Fleishman JA. Management of trauma-induced cataracts. *Optm Clin North Am* 1995;8:633-646.
- [13] Perucho-Martínez S, De-la-Cruz-Bertolo J, Tejada-Palacios P. Paediatric cataracts: epidemiology and diagnosis. Retrospective review of 79 cases. *Arch Soc Esp Ophthalmol* 2007;82(1):37-42.
- [14] Eckstien M, Vijayalakshmi P, Killedar M, et al. Aetiology of childhood cataract in South India. *Br J Ophthalmol* 1996;80(7):628-632.
- [15] Zaman M, Sofia I, Muhammad DK. Frequency and visual outcome of traumatic cataract. *J Postgrad Med Inst* 2006;20:330-334.
- [16] Reddy AK, Ray R, Yen KG. Surgical intervention for traumatic cataracts in children: epidemiology, complications and outcomes. *J AAPOS* 2009;13(2):170-174.
- [17] Singh S, Sah H, Keyal A. Visual outcome of unilateral paediatric traumatic cataract at R. M. Kedia eye hospital, Birganj, Nepal. *JCMS Nepal* 2016;12(2):40-43.
- [18] Adlina AR, Chong YJ, Shatriah I. Clinical profile and visual outcome of traumatic paediatric cataract in suburban Malaysia: a ten-year experience. *Singapore Med J* 2014;55(5):253-256.