



A Study on Visual Outcome after Intraocular Lens Implantation (IOL) in Children with Traumatic Cataract

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Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

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ABSTRACT

Aim: To assess the final visual outcome after Intraocular Lens (IOL) implantation in children with traumatic cataract.

Materials and Methods: Retrospective study, Twenty five children with traumatic cataract age ranging from 2 years to 14 years over the period of two years were selected after fulfilling the inclusion criteria. A thorough systemic and ocular examination was carried out. This included recording of visual acuity, anterior segment examination, slit lamp biomicroscopy, tonometry, posterior segment evaluation with B-scan ultrasonography. IOL power, Keratometry was done with the help of Keratometer (KM- 500, NIDEK) and IOL power was calculated with the help of A-scan (Alcon, Ocuscan) using Sanders Retzlaff Krapp (SRK) –II formula and IOL Master (Carl Zeiss Meditec. AG).

Results: 19 (76%) male and 6 female (24%). 14 patients (56%) were suffered from penetrating injury, of this 10 (71.4%) were male, 4 (28.6%) were female. There were 11 patients (44%) who suffered blunt injury of this 9 (81.8%) were male and 2 (18.18%) were female. Most common mode of penetrating injury was by stick. Preoperative visual acuity was < 1/60 in 20 cases (80 %). The final visual outcome with the best correction was 6/6 in 4 (16 %) cases (3 in blunt, 1 in penetrating), 6/9 in 4 cases (16%) cases. **CONCLUSION-** intraocular lens implantation in children has a role in treating aphakia, resulting in good visual outcome and binocularity.

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1. AIM OF THE STUDY

To assess the final visual outcome after Intraocular Lens (IOL) implantation in children with traumatic cataract.

2. MATERIALS AND METHODS

The retrospective study was conducted at the tertiary eye hospital over a period of two years. Twenty five children with traumatic cataract age ranging from 2 years to 14 years were included in this study.

Different types of ocular trauma causing cataract were tabulated. Posterior chamber lens was implanted as primary or secondary procedure. Detailed anterior segment evaluation was done in all cases. In cases where fundus was not visible ultrasound was done to assess the status of posterior segment. Operations were done under general anaesthesia. Surgical management varied with individual cases.

2.1 Inclusion Criteria

- ❖ Both sexes
- ❖ Children with age less than 14 years
- ❖ All mechanical injuries
- ❖ Vision from perception of light, projection of rays (PLPR) to 4/60

2.2 Exclusion Criteria

- ❖ Non-mechanical injuries
- ❖ Patient who had undergone surgery.

2.3 Pre-operative Assessment

The clinical history in detail, the mechanism and time of injury, vision, associated ocular damage, time gap between the occurrence of trauma and treatment were recorded. History suggestive of systemic diseases and past history of any ocular diseases was also elicited.

2.4 Examination

A thorough systemic and ocular examination was carried out. This included recording of visual acuity, anterior segment examination, slit lamp biomicroscopy, tonometry, posterior segment evaluation with B-scan ultrasonography, blood

pressure, urine routine examination for sugar and albumin, weight and hemoglobin.

2.5 Calculation of IOL Power

To calculate the IOL power, Keratometry was done with help of Keratometer (KM- 500, NIDEK) and IOL power was calculated with the help of A-scan (Alcon, Ocuscan) using Sanders Retzlaff Kraff (SRK) –II formula and IOL Master (Carl Zeiss Meditec.AG). The fellow eye was used for the IOL power calculation when it was impossible to obtain them in the injured eye.

2.6 Operative Procedure

Written informed consent was obtained from each parent. Routine preparation of the eye like trimming of eyelashes, installation of ofloxacin eye drops (antibiotic) was done before surgery. The pupil was fully dilated using tropicamide 1% eye drops.

2.7 Anesthesia

Surgery was performed under general anesthesia. Adequate depth of anesthesia was ensured to keep the intraocular pressure low. The facial and peribulbar block was given prior to surgery.

2.8 Type of Surgeries

- Phaco aspiration.
- Small incision cataract surgery
- Extracapsular cataract extraction.

Phaco aspiration with posterior chamber (PC) IOL implantation was done in 4 cases small incision cataract surgery (SICS) with IOL implantation in 20 cases and extracapsular cataract extraction (ECCE) with PC IOL implantation in 1 case.

2.9 Post-operative Examination

A detailed examination was done on the 1st postoperative day. Subsequent examinations were performed at 2nd, 3rd, 4th weeks and 3 months postoperatively. The parameters assessed include:

- Patient's complaint
- Visual acuity (unaided and with pinhole)

- Tonometry
- Slit lamp biomicroscopy examination with undilated and dilated pupil to look for signs of inflammations, pupillary and iris changes, lens decentration or tilt, posterior capsule status and opacification.
- Fundus examination.
- Refraction
- In cases where posterior capsular opacification present Nd Yag capsulotomy was done

3. RESULTS

This retrospective study was conducted at the department of ophthalmology of tertiary medical centre over the period of two years. Twenty-five patients with traumatic cataract were included in this study.

3.1 Age Group

Age of the patients ranged from 2 years to 14 years (Table 1).

3.2 Sex Distribution and Type of Injury

There were 19 (76%) male and 6 female (24%). 14 patients (56%) were suffered from penetrating injury, of this 10 (71.4%) were male, 4 (28.6%) were female. There were 11 patients (44%) who suffered blunt injury of this 9 (81.8%) were male and 2 (18.18%) were female.

3.3 Modes of Penetrating Injury

Most common mode of penetrating injury was by stick. 5(37%) cases had injury by stick, 2 (14%) cases were by thorn, 1(7%) was by pencil, 1(7%) by glass, 1(7%) by knife, 1 case (7%) by bow and arrow, 1(7%) by stone and 2(14%) were due to unknown cause.

3.4 Modes of Blunt Trauma

Blunt trauma occurred in 11 cases (44%). 5 (46%) cases were due to stick, 3(27%) cases due to cracker, 1(9%) case due to iron rod, 1 (9%) case due to cricket bat and 1 case (9%) was due to pencil.

3.5 Time Interval between Injury and Intervention

1 hour to 7 days in 10 cases, 8 to 15 days in 2 cases, 15 to 1 month in 1 case and 1 to 3 month in 1 case in penetrating injury.

1 hour to 7 days in 4 cases, 15 to 1 month in 1 case, 1 to 3 months in 3 cases, 3 to 6 months in 2 cases and > 6 months in 1 case in blunt injury (Table 2).

3.6 Pre Operative Visual Acuity

Pre operative visual acuity was < 1/60 in 20 cases (80 %), 14 (56 %) cases (8 in penetrating, 6 cases in blunt) injury had visual acuity PLPR, HM in 4 (16 %) cases (3 in penetrating and 1 in blunt), CF to <1/60 in 2 cases (2 Blunt), 1/60 to < 6/60 in 3 (12%) cases (2 in penetrating, 1 in blunt) and 2 (8%) cases (1 in penetrating, 1 in blunt) had visual acuity 6/60 to < 6/36 (Table 3).

3.7 Final Visual Acuity

The final visual outcome with best correction was 6/6 in 4 (16 %) cases (3 in blunt, 1 in penetrating), 6/9 in 4 cases (16%) cases (3 in blunt, 1 in penetrating), 6/12 in 2 (8%) cases (2 in penetrating), 6/18 in 4 (16%) cases (3 in blunt, 1 in penetrating), 6/24 in 3 (12 %) cases (3 in penetrating), 6/36 in 2 (8%) cases (2 in penetrating), 6/60 in 1 (4%) case (1 in penetrating) and <6/60 in 5 (20%) cases (2 in blunt, 3 in penetrating).

14 (56%) cases (9 in blunt, 5 in penetrating) have a best set of visual outcome 6/6 to 6/18.

11 (44%) (2 in blunt, 9 in penetrating) have a poor set of visual outcome 6/24 to < 6/60 (Table 4).

Table 1. Proportions of age distribution in traumatic cataract

Age	No. of cases		Percentage
	Blunt	Penetrating	
0-5 years	1	3	16
6-10 years	4	5	36
11-15 years	6	6	48
TOTAL	11	14	100

10 male and 4 female patients developed traumatic cataract due to penetrating injury while 9 male and 2 female developed traumatic due to sustained blunt trauma.

11 cases developed traumatic cataract due to Blunt injury and 14 cases developed traumatic cataract due to Penetrating injury.

Most common mode of Penetrating Injury was by stick 5 (35.7%).

3.8 Blunt Injury

Injury with stick was the predominant mode of blunt trauma.

Table 2. Time interval between injury and intervention

Duration between injury and intervention	No. of cases	
	Penetrating	Blunt
0-7 Days	10	4
8-15 Days	2	-
15 Days – 1 month	1	1
1 month – 3 months	1	3
3 months – 6 months	-	2
Above 6 months	-	1
Total	14	11

Table 3. Pre –operative visual acuity

Vision	No. of cases		Percentage
	Penetrating	Blunt	
PL PR	8	6	56
HM	3	1	16
CF- <1/60	0	2	8
1/60- <6/60	2	1	12
6/60- <6/36	1	1	8
Total	14	11	100

Table 4. Post -operative visual acuity

Visual acuity	Final visual acuity		Percentage
	NO of cases		
	Blunt	Penetrating	
6/6	3	1	16
6/9	3	1	16
6/12	0	2	8
6/18	3	1	16
6/24	0	3	12
6/36	0	2	8
6/60	0	1	4
< 6/60	2	3	20
Total	11	14	100

4. DISCUSSION

Mechanical injuries are the leading cause of unilateral visual loss and traumatic cataract is an important sequelae of both penetrating and concussion injury. Young people are more liable to ocular injuries [1,2,3].

The common cause of traumatic cataract is concussion and penetrating injuries with or without retention of IOFB. 10 cases were between 1-5 years, 13 cases between 5 -10

years and 11 cases between 10-15 years [4,5]. In the present study, it was observed that the patients were more in the age group of 11-15 years (48%).

77.7% traumatic cataract results from penetrating injury and 23.3% after blunt trauma. In this study also penetrating injury (56%) was more common than blunt injury (44%) [6,7].

Role of IOL in traumatic cataract and found that majority of the case had penetrating injury (80.2%) and 15.8% were due to blunt injury. In their study, 73% had visual acuity of 6/12 and 86.3% had visual acuity 6/24 or better.[8] In our study, it was found that 10 cases (40%) had visual acuity of 6/12 and 17 cases (68%) had visual acuity 6/24 or better which is similar to the above study.

In a study of 129 cases, out of which 103 were males and 26 were females.53 out of 129 had traumatic cataract [9]. In another study of 322 eyes of 300 children. Out of which traumatic cataract was seen in boys (68%) twice more than in girls (32%) [10]. In the present study also male patients were more 19(76%) compared to female patients 6(24%) out of the 25 cases. The findings of this study are in agreement with the above studies.

14 cases of traumatic cataract were treated by Das et al. (1989), among which 3 patients had 6/9 vision, 2 of them had 6/12, 6/18 vision in 3 cases, 6/36 in cases in 4 cases and 6/60 in 2 cases. They observed that corneal scar was responsible for poor visual recovery. In our study it was found that 4 patients had 6/6 vision, 4 of them had 6/9, 6/12 in 2 cases, 6/18 in 4 cases, 6/24 in 3 cases, 6/36 in 2 cases, 6/60 in 1 case and < 6/60 in 5 cases. Here also it was noted that corneal opacity and adherent leucoma were predominant (30%) causes for poor visual acuity.

In a study of IOL implantation in cases of traumatic cataract, out of 34 patients, 30 eyes had penetrating trauma and 4 had concussion. Stick and thorn injuries formed the mode of trauma in 61.8% cases [11]. In another study, Muthuram et al. (2001) presented 18 cases of corneal laceration with traumatic cataract. The cause of injury was stick related in 7 eyes, thorn in 6 eyes, iron rod in 2 eyes, knife in 2 eyes and pencil tip in 1eye and 1 patient with intraocular foreign body cilia in AC. In this present study it was observed that injury with stick was the predominant mode 10 eyes (40%),thorn in 2

eyes(8%), pencil in 2 eyes(8%), glass in 1 eye(4%), knife in 1 eye(4%), bow and arrow in 1 eye(4%), stone in 1 eye(4%), cracker in 3 eyes(12%), iron rod in 1 eye(4%), cricket bat in 1 eye(4%). These findings are comparable to those obtained in above study.

The treatment of unilateral traumatic cataract by IOL's implantation offer considerable advantage overcorrection by the contact lens, especially in children. Most eyes with traumatic cataract have corneal scars which preclude fitting of contact lens [12,13]. The difficulty in inserting and removing contact lens, the psychic trauma inflicted on children by repeated insertion and removal and the cost are others limiting factors in contact lens fitting. Contact lens (CL) or spectacles are needed to correct aphakia. Many patients cannot tolerate contact lens. Assaf and coauthors reported that 44% of unilateral aphakia patient did not wear their contact lens [14,15,16]. The contact lens may be associated with infectious keratitis. Spectacles can provoke aniseikonia in unilateral aphakia patients and optical distortions. They may not be tolerated for weight and cosmesis reasons. Intraocular lens implantation allows continuous correction of aphakia without the concerns associated with contact lens or spectacles. Greenwald and Glaser (1998) analyzed binocularity in unilaterally aphakic children. Binocularity was good when aphakia was corrected with IOL implantation [17].

5. CONCLUSION

This study suggests that intraocular lens implantation for unilateral cataract in children has a definite role in correcting aphakia, resulting in good visual outcome and thus helping to maintain binocularity.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the author.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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