

## Original Research Article

# Evaluation of the factors affecting visual prognosis in patients with traumatic cataract

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### ABSTRACT

**Background:** Ocular trauma is a major cause of visual impairment throughout the world, although little is known about the factors that affect the visual outcome in traumatic cataract in developing countries. The objective of the study was to find out the associated ocular injuries and the factors affecting final visual outcome of patients with traumatic cataract.

**Methods:** This prospective-hospital based study was conducted on 50 patients of traumatic cataract in the department of ophthalmology government medical college, Ernakulam, from January 2009 to December 2011. Patients were managed with lens extraction and intraocular lens implantation. Regular follow up of patients was done and best corrected visual acuity (BCVA) and post-operative complications were assessed at the end of six months.

**Results:** Our study showed that majority (64%) of patients were in the age group of <40 years with male preponderance. visual outcome was significantly better in younger age group (<20 years) than the older group (>20 years) ( $p=0.03$ ). There was no significant difference in final visual outcome of traumatic cataracts caused by penetrating or blunt trauma ( $p=0.73$ ). Corneal tear was most common associated ocular damage followed by uveitis, lens matter in anterior chamber.

**Conclusions:** Age of the patient affects final visual outcome after surgical treatment of traumatic cataract but type of trauma (blunt/penetrating) had no significant effect on final visual outcome. Corneal tear was most common associated ocular damage.

**Keywords:** BCVA, Ocular trauma, Traumatic cataract, Visual outcome

### INTRODUCTION

Ocular trauma is a major cause of monocular blindness and visual impairment throughout the world, although little is known about its epidemiology or associated visual outcome in developing countries.<sup>1</sup> Traumatic cataract is a very common sequel of ocular trauma. It may occur when natural lens is damaged either by a blunt or penetrating injury.<sup>2</sup> The methods used to evaluate the visual outcome in eyes managed for traumatic cataracts and senile cataracts are similar, but the damage to other ocular tissues due to trauma may compromise the visual gain in eyes operated on for traumatic cataracts. Postoperative

inflammation and corneal scar are common complication following traumatic cataracts, hampering visual outcome. Other complications leading to decreased post-operative vision are, secondary glaucoma, pupillary capture, posterior capsular opacification and retinal scar.<sup>3</sup> Main causes of traumatic cataract are direct penetrating injury to the lens, concussion or blunt injury. Some rare causes are Electric shock and lightning and ionizing irradiation to ocular tumors.

The objective of this study was to find out the associated ocular injuries and the factors affecting final visual outcome of patients with traumatic cataract.

## METHODS

This prospective study was carried out in the department of ophthalmology government medical college, Ernakulam, from January 2009 to December 2011. A comprehensive proforma was designed for this study. Patients who gave consent and were cooperative and willing for the surgery were included. Personal information of all the patients were recorded. In all cases-cataract surgery was performed after a detailed ocular and systemic evaluation. All patients were treated as inpatients. They were asked to come for follow up at 1 week, 6 weeks, 3 months and 6 months after surgery. The data was analyzed according to age, sex of the patients, etiology of the cataract, time lag between trauma and presentation, treatment adopted and visual outcome of management.

After admission to the hospital, detailed history was taken with particular reference to age, sex, mode of injury, causes and activity at the time of injury. Preoperative assessment included: BCVA by Snellen test-type, extraocular movements, fixation preferences, pupillary reflexes, slit lamp bio-microscopy of the anterior segment, applanation tonometry, dilated refraction, fundus examination with indirect ophthalmoscope. X-ray orbit was done to rule out any intra ocular radio opaque foreign body and B-scan when the optical medium was not clear enough to evaluate the posterior segment. Keratometry (opposite normal eye was used in case of corneal surface irregularities), intraocular lens power calculation and other relevant examinations and routine investigations were also done as well before surgery. All cases were subjected to surgery under local or general anesthesia. The standard surgical procedure performed was small incision cataract surgery (SICS) with posterior chamber intra ocular lens (IOL) implantation, primary lens aspiration at the time of wound repair with primary or secondary IOL implantation. These surgical procedures were combined with other surgical procedures depending upon the need in individual cases. Post-operatively all patients were treated with topical steroids along with topical antibiotics, topical cycloplegics and non-steroidal anti-inflammatory drugs.

Steroids were gradually tapered over next six weeks to 3 months after surgery. Patients were discharged with topical antibiotics, steroids and topical cycloplegics. Patients were called for regular follow up after three days, then once a week for next six weeks, monthly for next three months and thereafter, every three months. On follow up, visual acuity, intra ocular pressure (IOP) recordings, detailed slit lamp bio-microscopy to rule out any uveitis, intraocular lens decentration, synechiae, pupillary capture and posterior capsular opacification were done. Posterior segment evaluation was done with indirect ophthalmoscopy. This study was in accordance with the ethical standards of declaration of Helsinki and was approved by the ethical committee of the institution.

A written informed consent was taken from all the participants. Fifty cases that were admitted in our institution were studied over a period of one and half years.

Data was analyzed by using statistical package for the social sciences (SPSS) 20 version. Appropriate statistical tests were applied. All p values in our study were two tailed and a value of <0.05 was taken as statistically significant.

## RESULTS

In the present study of 50 cases of traumatic cataract, demographic, etiological factors, type of trauma, morphology, associated ocular injuries, pre-operative visual acuity, type of surgery and their role in post-operative BCVA and complications were assessed and analyzed. The age group ranged from 5 to 80 years. 34% cases were found in the age group of 5-20 years followed by 30% in age group 21-40 years and 36% in the age group >40 years (Table 1). In the present study, out of 50 cases, 30 (60%) were males and 20 (40%) were females. The male female ratio was 3:1. Thirty cases (60%) had traumatic cataract due to penetrating trauma and 20 (40%) patients had traumatic cataract due to blunt trauma. Out of 50 cases of traumatic cataract, 30 cases (60%) had injury by wooden particles like stick, thorn and bow arrow. Metallic agents like iron rod, wire compass was responsible in 5 cases (10%). Penetrating injury by stone was seen in 1 case (5%) and with glass piece in 5 (10%) cases, rest by fire cracker, cricket ball and burst carbonated bottle. Maximum numbers of injuries were found to be related to agricultural and domestic activities like cutting of wood followed by thorn and iron wire {20 cases (50%)}. Industrial related activities were seen in 4 (10%) cases. Iron was the most common etiological factor. Sports related activities like cricket ball, bow arrow and fire cracker were type of activity in 11(27.5%) cases and school related in 3 (7.5%) cases. Maximum number of cases (60%) was operated within the first three months following trauma. Only 10% cases presented more than 18th months after trauma. Table 2 showing BCVA at the time of presentation.

Associated ocular injuries at the time of presentation is shown in (Table 3). Traumatic cataract was associated with injuries to the other ocular structures as well like corneal tear in 25 cases, uveitis in 11 cases. Lens matter in anterior chamber was seen in 9 cases. Almost all cases underwent cataract extraction by SICS with primary or secondary IOL implantation but 3 cases remained aphakic. Intraoperatively vitreous loss was seen in 3 cases and hyphema in 2 cases. Traumatic cataract extraction behaves differently as compared to otherwise normal cataract extraction and was associated with postoperative complications like uveitis in 11 cases, posterior capsular opacification (PCO) in 12, corneal edema in 4, macular edema 3, increased IOP in 3 cases, pupillary capture in 2 and hyphema in 2 cases.

Procedures like Nd-YAG laser capsulotomy was employed in the management of PCO.

Final BCVA assessed at the end of six months is shown in Table 4. Out of 50 cases, BCVA of 6/18-6/6 was seen in 28 cases, BCVA of 6/36-6/24 in 12 cases, 6/36-6/60 in 6 and 8% cases had BCVA equal to or less than 6/60.

**Table 1: Age distribution.**

Age (in year)	Number	Percentage (%)
<10	5	10
11-20	12	24
21-30	5	10
31-40	10	20
41-50	12	24
51-60	3	6
61-70	1	2
71-80	2	4
<b>Total</b>	<b>50</b>	<b>100</b>

**Table 2: BCVA at the time of presentation.**

Initial VA	No. of cases (n)
>6/60	1
1/60-6/60	20
CF-1/2 m	2
HM	4
PL/PR	23
<b>Total</b>	<b>50</b>

**Table 3: Associated ocular injuries.**

Associated ocular damage	No. of patients (n)
Corneal tear	25
Increased IOP	6
Uveitis	11
Lens matter in AC	9
Hyphema	3
PC rent	3
Vitreous loss	3

**Table 4: Final BCVA at 6 months.**

Final BCVA	No. of patients (n)
<6/60	4
6/36-6/60	6
6/36-6/24	12
6/18-6/12	21
6/9-6/6	7
<b>Total</b>	<b>50 (100)</b>

Effect of age on final visual outcome -visual acuity more than 6/18 was taken as good vision, between 6/24-6/60 as fair, less than 6/60 as poor. In our study 34% of cases were below the age of 20 years, 76.5% of these had achieved good final visual outcome of >6/18 followed by cases in the age group of 21-40, 60% of which had achieved good final visual outcome followed by cases

older than 40 years, 33.3% had achieved good final visual outcome Table 5. Statistical analysis has shown that visual outcome was significantly better in younger age group (<20 years) than the older group (>20 years) ( $\chi^2=4.29$ ,  $p=0.03$ ). Effect of type of trauma on final visual outcome: In our study 52% cases had penetrating and 48% had blunt trauma. 53.8% of cases of traumatic cataract due to penetrating trauma had achieved good final visual outcome (>6/18) followed by 58.3% of cases of traumatic cataract due to blunt trauma had achieved good visual outcome (>6/18) (Table 6). There was no significant difference in final visual outcome between penetrating and blunt trauma (Fischer's exact  $p=0.73$ ).

**Table 5: Effect of age group on final visual outcome.**

Age (Year)	Final visual acuity (BCVA)			Total
	6/6 to 6/18 (n)	6/24 to 6/60 (n)	<6/60 (n)	
0-10	3	2	0	5
11-20	10	2	0	12
21-30	4	1	0	5
31-40	5	5	0	10
41-50	5	3	4	12
>50	1	5	0	6
<b>Total</b>	<b>28</b>	<b>18</b>	<b>4</b>	<b>50</b>

**Table 6: Effect of type of trauma on final visual outcome.**

Type of injury	Final BCVA			Total
	6/6 to 6/18 (n)	6/24 to 6/60 (n)	<6/60 (n)	
Penetrating trauma	14	11	1	26
Blunt trauma	14	7	3	24
<b>Total</b>	<b>28</b>	<b>18</b>	<b>4</b>	<b>50</b>

**DISCUSSION**

Injury to the eye represents a major threat to vision and this may happen to any individual at any age in any work place.<sup>4</sup> Ocular trauma often leads to traumatic cataract along with damage to other ocular structures. Electrophysiological and radio-imaging investigations are important tools for assessing comorbidities associated with an opaque cataractous lens. Factors affecting final visual outcome after traumatic cataract surgery would be useful for ophthalmologists in such cases. Traumatic cataract was managed with lens extraction and intraocular lens implantation. Our study showed that most cases (64%) of traumatic cataract were found in the younger age group (5-40 years) with male preponderance. One study reported in their study that most of the patients affected were young patients and half of them were children.<sup>5</sup> Another study found in their study that males are more affected.<sup>6</sup> In our study blunt trauma accounts for traumatic cataract in 48% and penetrating trauma in 52% of cases. Our results were consistent with the results

obtained by other authors that penetrating trauma accounts for traumatic cataract in 68.3%.<sup>7,8</sup> In our study wooden material like stick, thorn was the major cause of traumatic cataract which matches closely with other studies. In our study 67.5% had total cataract which matches with other studies which had 74% total cataract.<sup>9,10</sup> In our study, BCVA of 6/18-6/6 was seen in 56% cases after surgical treatment, 6/36-6/24 in 24% cases and 8% cases had BCVA equal to or less than 6/60. Some studies achieved visual acuity of >6/18 after surgery, and suggested that the initial visual acuity and patient age were predictors.<sup>11,12</sup>

## CONCLUSION

Traumatic cataract resulting from ocular trauma is a common cause of ocular morbidity, especially in young population. Most of the injuries occur by wooden particles like stick or thorn. Most injuries were related to agricultural and domestic activities. Almost all patients were safely rehabilitated with cataract extraction and IOL implantation and patient's age affects final visual outcome after surgical treatment of traumatic cataract but type of trauma (blunt/penetrating) had no significant effect on final visual outcome. Corneal tear was the most common associated ocular damage followed by uveitis, lens matter in anterior chamber. We recommend use of protective glasses while doing agricultural or industrial work.

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