A prospective study of prognostic predictors and visual outcome in post traumatic cataract patients

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INTRODUCTION

Ocular trauma is the leading cause of unilateral blindness all over the world. Traumatic cataract is common sequel of ocular injuries in adults and children. Though ocular trauma is common in rural areas mainly due to agricultural injuries, the incidence of ocular trauma in cities has been increasing due to rapid industrialization, vehicular accidents and violence.

The management of traumatic cataract is almost similar to senile cataract in form of removal of opaque lens with placement of IOL inside the capsular bag, but also depends on various factors like extent of associated anterior and posterior segment trauma, inflammation, presence of intraocular foreign body, intra ocular pressure etc. so the success rate may be lower than senile cataract.

Prevention and timely treatment of post traumatic cataracts is important as these injuries Mainly affect young and productive members of the society which might visually handicap them forever. Any strategy which aims towards prevention of ocular trauma requires knowledge of the cause of injury, which enables to target resources toward prevention. This study concludes the outcome of management of 65 patients of traumatic cataract considering age, sex, etiology, pre operative status, post operative complications and extent of associated anterior and posterior segment trauma were found to be prognostic predictors for the visual outcome of traumatic cataract.

MATERIALS AND METHODS

The study was conducted after the approval from Institutional research and ethics committee. Written and informed consents from all the participants were obtained. This prospective study was done on 65 eyes of 65 consecutive patients who presented to SSG hospital from June 2006 to August 2007. Detailed history included details of the injury and the medical as well as surgical treatment taken. Data of their initial visit and serial follow ups were collected using the standard format. Examination consisted of torch light examination, slit lamp biomicroscopy, ocular examination including visual acuity by Snellen’s chart and best corrected visual acuity in patients having visual acuity of more than 6/60.

ABSTRACT

BACKGROUND: Traumatic cataract is an important cause of reversible blindness following ocular trauma. This prospective study was aimed to evaluate the visual outcome following the management of 65 consecutive patients of post-traumatic cataract. MATERIALS AND METHODS: 65 eyes of 65 patients with traumatic cataract who presented to the SSG hospital were included in this study. Detailed ocular and systemic examination was followed by surgical management in form of lens extraction with IOL implantation whenever possible. Determinants of the visual acuity were compared between traumatic cataracts due to closed globe and open globe injuries. Incidence of post traumatic cataract with characteristics like age, sex, cause of injury, mode of injury, associated injuries, management, complications and visual outcome after management were studied and results were inferred.

RESULTS: Out of 65 patients, 44.6% patients had closed globe injury rest 55.4% had open globe injury. Overall number of patients gaining visual acuity of 6/12 or more was 35.4%, 21.6% patients gained acuity between 6/18-6/60 whereas rest 32.3% had visual acuity of less than 6/60.

CONCLUSION: In the present prospective study common causes for the poor visual outcome (less than 6/60) were aphakia, corneal scars causing corneal astigmatism and severe inflammation. Post traumatic lens position, posterior capsular integrity, post operative refractive status, post operative complications and extent of associated anterior and posterior segment trauma were found to be prognostic predictors for the visual outcome of traumatic cataract.

Key Words: Traumatic cataract, Visual outcome, Prognostic predictors
Prognostic predictors & visual outcome in post traumatic cataract

Traumatic cataracts were grouped according to their cause into open or closed globe injuries. Patients were also classified as per their age, sex, activity at the time of injury, object causing injury and mode of injury. Based on lenticular opacities the cataracts were classified into concussion or perforating cataract. Concussion included vossius ring, anterior polar cataract, rosette cataract, zonular cataract and diffuse cataract. Perforating cataract included localized stationary, rosette, total traumatic cataract, lacerated and membranous cataract. Position of the lens was examined for normal, subluxated or dislocated.

For the partially opaque lens, the posterior segment examination was carried out with indirect ophthalmoscope and 20 D lens. For a completely opaque lens the B scan ultrasound examination was done. To rule out the foreign body, fractures and other soft tissue injuries whenever required the x-ray, CT scan and MRI were advised. A-scan biometry was done to calculate the power of intraocular lens.

After review and control of other co-morbidities, patients underwent surgeries for management of their ocular trauma followed by traumatic cataract removal with IOL implantation whenever possible. Patients were followed up at one week and thereafter at every 15 days for minimum period of 3 months for evaluation of their post operative recovery and complications.

RESULTS

65 patients of this study were divided into two groups as per type of injury. 55.4% Patients had open globe injury. Patients with the close globe injury were 44.6%. Majority of the patients were males 74% and females were only 26% with male: female ratio of 3:1. Mean age of the patients was 36.84 years. Majority of the patients (53.9%) were in 2nd (32.3%) and 5th decades (21.6%). In female patients majority were in 4th decade (5%). Left eye was more commonly involved 55.4% compared to right eye 44.6%. Open globe injury was more common (55.4%) than closed globe injury (44.6%). Majority of the injuries were agricultural (38.5%), followed by domestic (27.7%) and industrial 16.9%. Other types of injuries were rare. In nearly half of the patients (49.3%) injury was caused by wooden stick, followed by iron (18.5%). 31% of patients came within 24 hours of injury and 63% of patients came within 1 week.

Figure 1: Age and Sex Distribution.

In majority 73.8% patients cataract was total, 16.9% patients had rosette, 4% had membranous and 3% had localized cataract. Lens capsule was found intact in majority 73.8% patients, 23.1% patients had anterior capsular tear and 3.1% patients had posterior capsular tear. Position of the lens was normal in 76.9% patients, subluxated in 20% and dislocated in 3.1%.IOP was normal in 53.8% patients, 36.9% patients had low IOP and 9.2% patients were having it higher than normal.

Posterior chamber examination was not possible in majority of patients either because of hazy media which was due to total cataract, hyphema or corneal haze. USG B-scan was done in these patients when there was no contraindication, B-scan was normal in 28.9% patients, 28.9% had vitreous detachment, 21% had vitreous hemorrhage, 7.9% had IOFB, 7.9% had retinal detachment and 5.3% had choroidal detachment. Most common associated injury was in cornea (69.3%), pupil distortion was present in (33.8%), followed by hyphema and iris injury (18.5%) each.

4 patients were offered conservative management and called for frequent follow ups, rest were managed surgically. Other surgical procedures were sclera corneal laceration repair in 44.6% patients, intra-vitreal drugs administration in 9.2%, IOFB removal in 3.2% patients. Most common intraoperative complication was posterior capsular tear in 12.3% patients, followed by pigment dispersion and bleeding in 3.1% patients each.
Posterior capsular opacification was the most common post operative complication present in 43.1% patients, followed by fibrinous uveitis in 32.3% patients, keratitis in 18.5% and macular edema in 12.3% patients. Patients were treated conservatively or surgically for the complications or referred to the higher centers.

Table 1: Surgical management

<table>
<thead>
<tr>
<th>Surgical treatment</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cataract extraction + PCIOL</td>
<td>41</td>
<td>64.6</td>
</tr>
<tr>
<td>Cataract extraction + 2nd PCIOL</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Cataract extraction + ACIOL</td>
<td>2</td>
<td>3.1</td>
</tr>
<tr>
<td>Cataract extraction + 2nd ACIOL</td>
<td>2</td>
<td>3.1</td>
</tr>
<tr>
<td>Cataract extraction + anterior vitrectomy</td>
<td>13</td>
<td>21.4</td>
</tr>
<tr>
<td>CE + PCIOL + IOFB removal + anterior vitrectomy</td>
<td>2</td>
<td>3.2</td>
</tr>
<tr>
<td>Total</td>
<td>61</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 2: Post operative visual outcome

<table>
<thead>
<tr>
<th>Refractive status</th>
<th>Final visual acuity</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt;6/12</td>
<td>6/18-6/60</td>
</tr>
<tr>
<td>Pseudophakia with PCIOL</td>
<td>21</td>
<td>10</td>
</tr>
<tr>
<td>Pseudophakia with ACIOL</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Aphakia</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>13</td>
</tr>
</tbody>
</table>

Table 3: Visual acuity in group 1 and group 2 comparison

<table>
<thead>
<tr>
<th>Type of injury</th>
<th>Final visual acuity</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt;6/12</td>
<td>6/18-6/60</td>
</tr>
<tr>
<td>Closed globe</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>Open globe</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>14</td>
</tr>
</tbody>
</table>

Figure 2: Final visual acuity

4 patients were lost to follow up and 3 pediatric patients were not co-operative for visual acuity measurement. Visual outcome was excellent (>6/12) in 35.4%, good (6/18-6/60) in 21.6% and poor (<6/60) in 32.3% patients. Most common causes for poor final vision were aphakia and corneal scar (each, 47.6%), followed by vitreous hemorrhage (38%), fibrinous severe uveitis (33.3%) and endophthalmitis (19%) while rare causes were vitritis, choroidal detachment, retinal detachment, glaucoma, amblyopia, macular edema, wound infection and choroidal rupture.

Table 4: Comparison between pre-operative and post-operative visual acuity

<table>
<thead>
<tr>
<th>Pre-operative visual Acuity (number of patient)</th>
<th>Post-operative visual acuity (number of patient)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;6/12</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>6/18-6/60</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>&lt;6/60</td>
<td>17</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>14</td>
</tr>
</tbody>
</table>

DISCUSSION

Traumatic cataract commonly results from mechanical trauma 1,2,3 and is often associated with traumatic injury to cornea, iris and vitreous...
Hence their final visual outcome does not turn out to be as predictable and good as in senile cataract. Traumatic cataract has been topic of interest since many years, number of studies has been done in the field of ocular injuries and traumatic cataract. It is more common in males because they are more exposed to injuries at the place of work and outdoor activities and transport etc. Present study shows male: female ratio to be 3.1:1; which agrees with the ratio found by other authors: Valentine et al - 3.8:1\(^6\), Michael Eckstein et al - 3.7:1\(^7\).

Mean age of the patients was 36.84 years, which is comparable with the study by Craig M. Greven\(^10\) et al -38 years and Lan Hsin Chuang et al\(^11\) - 33 years. This can also be attributed to the productive age and earning wages by working outdoors. In female patients of 4\(^{th}\) decade are most involved mainly in household activities.

Patients in the paediatric age group were 15.4 \% of patients which was higher compared to 7.2\% reported by Michael Eckstein et al\(^7\) and 5.8 \% by Lan Hsin Chuan et al\(^11\).

Agricultural injuries were most common (38.5\%) because most of the patients were from rural areas and poor socioeconomic classes sustaining injuries in farming. Next common injuries were domestic in which females and children were more involved. Most common object causing injury was wooden stick for the same reason, followed by iron and plastics. More involvement of left eye than right eye may be due to physiological reflexes by which right (mostly dominant eye) escapes injuries. In present study (RE 44.6\%, LE 55.4\%) results are comparable with the study by Manoj M. Thakkar et al\(^12\) (RE-46.43\%; LE-53.57\%) and Craig M Greven et al\(^10\) (RE-45\%; LE-55\%).

Majority of the patients came to hospital within 1 month (76.9\%) as compared to 58\% of such patients in study by Craig M Greven\(^10\) and 56.25\% in study by Rizwan et al\(^13\).Open globe injuries were more common (55.40\%) than closed globe injuries (44.60\%) in present study which is comparable with the study by other authors R.C. Gupta\(^14\) (52.77\% and 47.23\%) and Rizwan et al\(^13\) (62.50\% and 37.50\%). This is because in most of the patients it is by sharp or pointed objects and by considerable force.

Visual acuity on presentation was very low (<6/60) in 86\% of patients because loss of transparency of the lens by injury (total cataract in 73.8\% of patients) and other associated injury to cornea. Anterior capsular tear was present in 23.1\% of eyes (Valentine et al\(^6\) 12.5\%) and posterior capsular tear in 3.1\% (Ekstein et al\(^7\) 5.77\%; and V.P. Gupta\(^15\) 5.17\%).

Fundus examination was not possible in 81.5\% of eyes because of the media opacities. In rest of the patients in majority of the patients it was normal. In few patients there was presence of retinal hemorrhages, disc edema, vitreous opacities etc. B scan was either normal or showing vitreous detachment in 28.9\% each, vitreous hemorrhage in 21\% while 3.1\% patients showed IOFB and retinal and choroidal detachment each.

4 patients had minimal cataracts with good vision and were managed conservatively. Rest 61 patients were operated upon. Most common surgical procedure was cataract removal with posterior chamber IOL implantation (64.6\%) which resulted in good visual recovery. Visual outcome was excellent in 35\% of patients, good in 21.6\% and poor in 32.3\% of eyes. Similar figures in study by Rizwan et al\(^13\) were 50\%, 37.5\% and 12.5\% and in study by Craig M. Greven et al\(^10\) they were 55\%, 28\% and 17\%.

Higher figures of poor visual outcome in present study was due to injuries by wooden stick causing fungal infection, more severe injuries and associated injuries involving cornea, posterior segment, infection and inability to implant IOL.

Excellent visual outcome was more (50\%) in closed globe injuries than in open globe injuries (33.3\%) because of the less associated injuries to the eye. Excellent visual outcome was best when cataract was in normal position which was 45\%, while it was 25\% in subluxated cataracts and none in dislocated cataracts. Visual outcome was best in patients operated for cataract extraction with PCIOL (50\%), intermediate in 25\% patients with ACIOL and it was poor in patients kept aphakic which is comparable with study by Baklouti et al\(^16\).

**CONCLUSION**

Traumatic cataract was most commonly associated with agricultural injury and wooden stick being the most common object of injury. There was a slight preponderance of left eye as compared to the right eye and open globe injuries were more common than closed globe injuries. Final visual outcome was found to be
better in closed globe injuries. Majority of our patients attended hospital with in 1 week of injury. 

Commonest causes for the poor visual outcome (less than 6/60) were aphakia, corneal scars causing corneal astigmatism and severe inflammation. Commonest posterior segment abnormality for the poor visual outcome was vitreous hemorrhage followed by retinal detachment. From the present study post traumatic lens position, capsular integrity, extent of associated anterior and posterior segment trauma, post operative refractive status and post operative complications were found to be prognostic predictors for the visual recovery of traumatic cataract. 

The limitation of the study is short term follow up of 3 months only. A multicentric study with long term follow up would throw light on future course and complications in these patients. 

REFERENCES