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RESEARCH ARTICLE

Visual outcome of traumatic cataract at a tertiary eye care center

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ABSTRACT

Background: Traumatic cataracts account for a large proportion of visual disability and blindness in the general population, especially in developing countries. It is associated with various ocular injuries. **Aim and Objective:** The aim of the study was to evaluate the visual outcome of patients with traumatic cataracts. Material and methods: A prospective study was done in the Department of Ophthalmology in Netaji Subhash Chandra Bose Medical College, Jabalpur (Madhya Pradesh). **Materials and Methods:** A total of 124 patients diagnosed as a case of traumatic cataract were subjected to a detailed history, systemic, and local examination with relevant investigations. Medical or surgical managements were done accordingly. Patients were subsequently followed up. **Results:** About 53.22% of patients sustained penetrating trauma while 41.93% got the blunt injury and 4.83% perforating injury. Out of total, 79.03% of patients were males, while 20.96% were females. The most common cause of blunt trauma was wooden stick (53.84%), whereas iron wire (31.81% patients) was the most common cause of penetrating injury. About 25% of patients had corneal opacity as associated ocular morbidity. About 54.83% of patients adopted small-incision cataract surgery with posterior chamber intraocular lens (IOL) procedure for traumatic cataract surgery. About 39.51% of patients had attained final best-corrected visual acuity (VA) of 6/9–6/18, and 32.25% patients of 6/24–6/60, while 28.22% of patients had vision <6/60. The interval between trauma and surgery was <1 month among 37.90% of patients. After 6 months of surgery, 33.8% of patients had VA of >6/18. **Conclusion:** Traumatic cataracts are frequently associated with ocular trauma. Information on the causes of these injuries and education, as well as early prevention measures, is of crucial importance. An IOL implantation in traumatic cataract enables most of the patients to achieve the satisfactory and useful vision.

KEY WORDS: Traumatic Cataract; Visual Outcome; Tertiary Care Unit

INTRODUCTION

The eye is protected from direct injury due to anatomical structure, the orbital rim, and functionally by reflex closure of eyelids.[1] In spite of this, the ocular trauma represents a measurable burden to the emergency department. They are mostly associated with the development of cataract changes in the lens. A cataract is defined as any opacity of the crystalline lens in the eye that affects a clear vision. If left untreated, cataracts can eventually progress to severe visual impairment or even blindness.[2,3]

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Ocular trauma can lead to traumatic cataract, which might damage the vision. Ocular trauma is one of the most important causes of blindness in developing countries.[4] It may occur secondary to blunt or penetrating trauma.[5] The visual morbidity caused by it has a significant psychological and economic burden to both the affected and the society as such. A traumatic cataract is one of the most frequent

morbidities caused by the ocular injury.[6] The initial vision and mechanism of injury were predictors of the final outcome.[7,8] Despite great advancements in diagnostic and treatment methods, traumatic cataract with injuries results in visual disability. The knowledge of the cause of ocular trauma is necessary for planning further strategies to take preventive measures against it.

Cataract surgery significantly aids in the improvement of visual acuity (VA) in these traumatic cataract cases. Surgery is cost effective and successful in restoring cataract related vision loss. Even with qualified first aid and surgical treatment, many patients with traumatic cataract end up with a permanent visual disability. Most of the patients can be safely rehabilitated after surgery and lens implantation.[9] A study from South India reported that patients of traumatic cataract developed posterior capsular opacification if primary posterior capsulotomy was not performed.[10] There are many treatment strategy of managing traumatic cataract such as lensectomy, extracapsular (Extracapsular cataract extraction [ECCE]), intracapsular extraction, manual small-incision cataract surgery (SICS), and phacoemulsification.[11] Primary cataract removal with intraocular lens (IOL) implantation is the most common procedure done in traumatic cataract patients.[12]

Serna-Ojeda *et al*. reported that 98.7% of traumatic cataract patients obtained the final VA of ≥20/40 after surgery.[13] Another study reported 31% cases achieving final VA of ≥20/40[14] and 35.6% achieving final VA of >20/60.[15]

However, in developing countries, barriers in access to appropriate preventive care and surgical treatments still exist, presenting an enormous social and economic burden to the society. Qualified ophthalmologists at our government institute provide low-cost eye services to the needy population in this area. However, there is a scarcity of literature about traumatic cataracts in this region. Keeping this in mind, we planned this study with the objective to evaluate the visual outcome of patients with a traumatic cataract along with the modes of trauma at the tertiary care hospital in Jabalpur district of Madhya Pradesh, India.

MATERIALS AND METHODS

The study was conducted in the Department of Ophthalmology in Netaji Subhash Chandra Bose Medical College, Jabalpur Madhya Pradesh, from 2009 to 2012. This is an upgraded department who provides tertiary care to patients referred for treatment from the periphery of Jabalpur. It provides specialized care for patients with complicated ocular disease conditions. The center gives round the clock emergency ophthalmic services to treat all types of ocular injuries. Before the study, institutional ethics committee permission was taken.

Inclusion Criteria

- All the patients of ocular injury due to blunt and penetrating trauma admitted at indoor either from outpatient department or from casualty and have developed a traumatic cataract.
- Patients who gave consent and were cooperative and willing for the surgery were included in the study.

Exclusion Criteria

The following criteria were excluded from the study:

- All the cases of traumatic cataract having posterior segment involvement such as retinal detachment optic atrophy, vitreous hemorrhage, and macular hole.
- Patients of traumatic cataract due to a retained intraocular foreign body, electric shock, and radiation (X-rays).
- Patient not willing for surgery.

A pro forma was filled, which included detailed demographic information such as name, age, sex, occupation, and address. History of presenting complaint- mode of injury and causative agents, type of trauma –blunt injury or penetrating injury was taken in detail. History taking was followed by a general examination. After the general examination was done a detailed local examination was performed to assess the extent of the injury and to estimate the risk of infection which included the following points-

1. VA-aided and unaided with pinhole, dilated refraction if required
2. Best-corrected VA, distant, and near both
3. Diffuse torchlight illumination and detailed slit lamp examination of the anterior segment [Picture 1]
4. Posterior segment examination by direct and indirect ophthalmoscopy.

After establishing the general condition of the patients, all traumatic cataract patients [Picture 2] were managed by the following surgical procedures:

Picture 1: Slit lamp examination of patient following trauma

ECCE, SICS without primary posterior chamber IOL (PCIOL) implantation, SICS with PCIOL, and SICS with anterior vitrectomy.

Follow-up was done at 1 month, 3 months, and 6 months.

VA at the initial presentation and VA, at the final follow-up was done.

RESULTS

Patient Demographic Data

A total of 124 of traumatic cataract patients were included in the study. Out of total, 79.03% of patients were males and 20.96% of patients were females [Table 1].

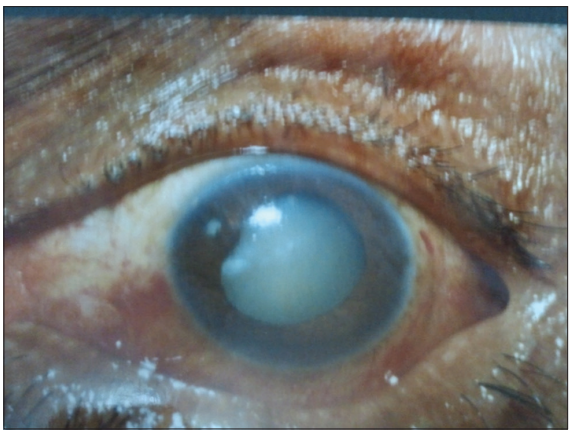
Type and Cause of Injury

About 41.93% of patients sustained blunt trauma, 53.22% of patients had penetrating injury, and 4.83% of patients had perforating injury [Table 2]. Table 3 enumerates the list of objects responsible for causing blunt and penetrating trauma to the patients.

Table 4 enlists the associated ocular morbidities and pre-operative ocular status in the patients. Table 5 represents the pre-operative visual status of the patients.

Surgical Management

The duration of trauma and cataract surgery is tabulated in Table 6. The different surgical procedure adopted for cataract surgery is shown in Table 7.



Picture 2: Traumatic cataract following blunt injury

Visual Outcome

The final visual outcome is depicted in Table 8. Patients were followed up, and their visual status is shown in Table 9.

DISCUSSION

A total number of 124 cases of traumatic cataract patients of age 0–60 years were included in the study. Our study concluded that a traumatic cataract occurred predominantly in males (79.03%) [Table 1]. In this study, it was found that penetrating trauma (58.06%) was more common as compared to blunt trauma (41.93%) [Table 2]. The most common object causing blunt injury was wooden stick. It caused both penetrating and blunt type of trauma. This is because of people working in agricultural fields. Iron wire (31.81% patients) was the most common cause of penetrating injury. In our study, the associated ocular morbidities were corneal opacity (25%), posterior synechiae (21.77%), corneal tear (non-sealed) 12.90%, anterior capsular tear (9.67%), anterior synechiae (7.25%), glaucoma (6.45%), PC rent (Scleral fixation lens in aphakia) and iris injury (4.03%), and corneal edema, hyphema, subluxated lens, and papillary membrane (1.61%) [Table 4]. We found that the duration of trauma and cataract surgery was <1 month in 37.90% patients, 1–12-month duration in 54.03% patients, and 1 year – 20-year duration in 8.06% patients [Table 6]. The duration between trauma and cataract surgery did not much effect the visual outcome of traumatic cataract patients. In our series of 124 cases with the traumatic cataract of various etiologies who underwent cataract extraction surgeries, SICS with PCIOL implantation was performed in 54.83% of patients, ECCE procedure was done in 12.09% patients, SICS without PCIOL in 16.12%, and SICS with anterior vitrectomy in 16.93% patients [Table 7]. We obtained good visual outcomes after managing traumatic cataract patients. Out of total, 39.51% of patients achieved the final visual status of 6/6–6/18, 32.25% patients of 6/24–6/60, and 28.22% had <6/60 [Table 8]. Our study revealed a satisfactory visual outcome. In our study, the patients were followed at 1 month, 3 months, and 6 months. Out of total, 33.87% patients had VA 6/6–6/18, 37.90% patients had VA 6/24–6/60, and 28.22% patients had VA <6/60 on follow-up of 6 months [Table 9].

Male preponderance was consistent with the previous studies from other developing countries.[16,17] Reason being by gender males are more involved in outdoor activities, sports, and playing with dangerous objects such as sticks, scissors, and

Table 1: Demographic profile of the patients

Age group	Number of patients	Percentage (%)	Gender	Number of patients	Percentage
<5 years	12	9.67	Males	98	79.03
6–15 years	32	25.80	Females	26	20.96
16–60	80	64.51	Total	124	100.00
Total	124	100.00			

Table 2: Type of injury sustained by the patients

Type of injury	Number of patients	Percentage
Blunt injury	52	41.94
Penetrating injury	66	53.22
Perforating injury	6	4.84
Total	124	100.00

Table 3: Cause of injury

Cause of injury	Objects	Number of cases	Percentage
Objects causing Blunt Trauma	Wooden stick	28	53.84
	Gulli (wooden)	7	13.46
	Metallic rod	3	5.77
	Fire cracker	4	7.69
	Stone	5	9.61
	Fist	5	9.61
	Total	52	
Objects causing Penetrating trauma	Wooden stick	18	27.27
	Glass piece	13	19.69
	thorn	5	7.57
	Iron wire	21	31.81
	Tin sheet	9	13.63
	Total	66	

Table 4: Associated ocular morbidities in the patients

Associated ocular damage	Number of cases	Percentage
Corneal tear (non-sealed)	16	12.90
Corneal opacity	31	25.00
Corneal edema	2	1.61
Lens mater in AC	3	2.41
Hyphema	2	1.61
Glaucoma	8	6.45
Anterior synechiae	9	7.25
Posterior synechiae	27	21.77
Iris injury	5	4.03
Anterior capsular tear	12	9.67
Subluxated lens	2	1.61
Pupillary membrane	2	1.61
PC rent (SLF in aphakia)	5	4.03
Total	124	100.00

SLF: Scleral fixation lens

of penetrating trauma were also observed made in other studies also which is tabulated in Table 10.[18-20] Krishnamachary and Rathi also found that most of the injuries (54.7%) were caused by wooden stick.[21] Many other studies also reported the same findings.[15,22]

Corneal involvement was the most common associated ocular morbidity. These findings paralleled those of earlier studies who concluded corneal damage as the most common

Table 5: Pre-operative visual status

VA with the best correction	Total	Percentage
PL	20	16.12
HM	65	52.41
CF ctf	10	8.06
CF 1ft-CF 3 ft	15	12.09
6/60	14	11.29

Table 6: Duration of trauma and cataract surgery

Duration of cataract	Number of cases	Percentage
In days 0–30	47	37.90
In months 1–12	67	54.03
In years 1–20	10	8.06

Table 7: Surgical procedure adopted for cataract surgery

Surgery	Number of cases	Percentage
ECCE	15	12.09
SICS with PCIOL	68	54.83
SICS without PCIOL	20	16.12
SICS with anterior vitrectomy	21	16.93
Total	124	100

SICS: Small-incision cataract surgery, PCIOL: Posterior chamber intraocular lens, ECCE: Extracapsular cataract extraction

Table 8: Final visual outcome

VA	Number of cases	Percentage
6/6–6/18	49	39.51
6/24–6/60	40	32.25
<6/60	35	28.22
Total	124	100.00

VA: Visual acuity

associated injury.[16,23] Memon *et al*., 2012 reported that the duration between injury and cataract surgery did not affect the final visual outcome of the traumatic cataract patients, and these patients, if managed properly have a good visual outcome.[24] Jagannath *et al*. had concluded that the duration between the trauma and corrective surgery was <1 month in 52% patients and it was more than 6 months in 12.5% patients.[25] In other researches, about 80% of patients accepted IOL implantation.[26] Many other studies have reported similar findings of achieving a VA of > 6/18.[14,24,27,28] A VA of > 6/18 was obtained after surgery in 43.7% of patients in a study done in North India.[20] Loncar and Petric have also shown a better visual outcome on follow-up of patients with traumatic cataract surgeries.[29] Another study have shown an excellent VA at 4 weeks after cataract surgery in traumatic cataract patients.[30]

An extensive study on 124 traumatic cataract patients with an emphasis on visual recovery has been conducted here;

Table 9: Follow-up visual status of the patients

VA	1 month		3 months		6 months	
	Number of patients	Percentage	Number of patients	Percentage	Number of patients	Percentage
6/6–6/18	42	33.87	42	33.87	42	33.87
6/24–6/60	47	37.90	47	37.90	47	37.90
<6/60	35	28.22	35	28.22	35	28.22
Total	124	100.00	124	100.00	124	100.00

VA: Visual acuity

Table 10: Comparison of other studies with respect to type of trauma

Type of trauma	Synder *et al*.[18] (*n*=41)	Mangane *et al*.[19] (*n*=50)	Sharma *et al*.[20] (*n*=48)	Present Study (*n*=124)
Penetrating	33	31	26	72
Blunt	9	19	22	52

however, more information about these cases can be gathered by ocular computed tomography techniques in further studies.

CONCLUSION

Traumatic cataracts cause significant visual impairment and psychological stress and a significant economic burden in developing countries such as India. A better understanding of these injuries is essential to prevent the loss of vision in traumatic cataract cases. There is a need for adequate health awareness education as well as early prevention among the population. An early intervention by IOL implantation in a traumatic cataract enables most of the patients to achieve the satisfactory and useful vision.

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