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Original Research Article

Cataract Following Mechanical Trauma: A Single Centre Experience

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Abstract

Aim: To know the incidence, modes of presentation of traumatic cataract, its intraoperative and postoperative complications and visual outcome following management in a tertiary care centre.

Type of study: Prospective interventional case series.

Material & Methods: It's a prospective study of 87 eyes of 87 patients of all ages and both sex diagnosed with traumatic cataract following mechanical trauma who have attended the ophthalmology outdoor of a tertiary care hospital of Western Odisha from 1st December 2013 to 30th November 2015. The study involved: 1) Preoperative evaluation of the patients that includes complete ophthalmic examination, 2) Various modalities of treatment like Phacoemulsification, small incision cataract surgery (SICS), capsular tension ring (CTR), scleral fixated intraocular lens (SFIOL), Pars Plana Lensectomy (PPL), 3) Postoperative evaluation at the end of 1 week, 4 week, 6 week and 3 month.

Result: Incidence of traumatic cataract was 0.3% of total outdoor patients and 3.3% of all cataract cases. Male: Female ratio is 3.4:1. 69% of total cases belong to \leq 40 year age group. Penetrating type of injury was 46% and rest due to blunt trauma. Most common cause was injury by stick (34.5%) followed by stone (31%). 29.9% occurred at work place followed by violence (26.4%). 41.4% of patients presented within 48 hours of the injury. Cataract was total in 55.2% followed by cataract with ruptured lens capsule (35.6%). There were 13 cases (14.9%) with subluxated lens and 15 cases (17.2%) of dislocation. 80 out of 87 patients (92%) had vision less than 6/60 preoperatively. SICS with posterior chamber intraocular lens (PCIOL) was done in 20 patients (23%). Bandage contact lens (BCL) was given in 2 patients having small corneal perforation following penetrating trauma. The most common problem encountered intra operatively was undilated and distorted pupil due to posterior synechiae (25.3%) followed by posterior capsular tear (24.1%). Uveitis and Striate Keratitis were the common post operative complications within 1 week. Post operative best corrected visual acuity (BCVA) at the end of 3 months shows 27.7% of total patients had a good vision (6/12 — 6/9), while 55.2% had a moderate vision (6/60 — 6/18).

Conclusion: Traumatic cataract is a common cause of ocular morbidity, especially in younger individuals with higher incidence in males. Stone & stick are the common agents causing injury. Several different surgical techniques can be employed to restore vision. Postoperative astigmatism, Corneal Opacity, posterior capsular opacity (PCO) and pupillary capture etc are some of the major problems associated with management of this entity.

Keywords: Traumatic Cataract, Types of Cataract Surgery, Post-operative Complication After Cataract Surgery.

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Introduction

Trauma is a common etiological factor which affects almost all systems of the body, Visual system is no exception. Ocular injuries are widespread and it has the potential to reduce the vision of the affected eye to a varying extent. There are two basic types of trauma related lens abnormalities:- [1] Loss of transparency (cataract) & Loss of position (Subluxation /Dislocation).

Traumatic cataract is the most common cause of unilateral cataract in younger individuals and it is also one of the most frequent complications of any type of ocular injury leading to visual disability. The prognosis and ultimate visual recovery dependent upon several factors is including timely medical and surgical intervention, associated ocular injuries particularly posterior segment, meticulous preoperative investigations and evaluation, proper postoperative care and long term follow up. Removal of injured lens is often complicated by (1) Decreased visibility (corneal wound, hyphema, fibrin) (2) Injuries to adjacent structures (3) Zonular dehiscence with subluxation and dislocation of lens (4) Capsular rupture (5) Potential for or presence of vitreous prolapse (6) Attending surgeon's inexperience and lack of expertise in using vitrectomy instrumentation.1

In India, 14% of all cases of cataract in children are due to traumatic cataract. [2] It is the most common complication of penetrating ocular injury that results in loss of vision. Traumatic cataract is more likely to affect the younger individuals and is usually uniocular. 75% of patients are younger than 40 years of age with a male and female ratio of 9:1. [3] Hence it is imperative to study the clinical evaluation and management of traumatic cataract periodically to update our knowledge and also to devise ways and means of reducing its prevalence and improving its management.

The present study will attempt to evaluate the magnitude of the problem in this part of the country, various diagnostic procedures and treatment modalities available in our institution.

Material and Methods

with Patients cataract following mechanical trauma attending the Ophthalmology Department of a tertiary care health centre in Western Odisha from December 2013 to November 2015 sufficient admission to merit were prospectively studied after taking the informed consent of the patients and permission from the Ethical Committee of the institution. A total number of 87 eyes of 87 patients of all ages and both sexes were studied and followed up for a period of 3 months after surgery.

The study involved: 1) Preoperative evaluation of the patients, 2) Various modalities of treatment, 3) Postoperative evaluation.

Detail history was taken. Complete ophthalmic examination including Visual status of the involved eye, Ocular motility was done. Slit lamp examination was done to evaluate the type of cataract and to examine the various associated ocular injuries. Gonioscopy was done to see angle recession, foreign body in angle and subtle lens dislocation. Whenever possible indirect fundus examination with performed. ophthalmoscopy was Intraocular tension was measured with applanation tonometer.

Various types of operative procedures were performed. Primary Repair was done in eyes with open globe injury. Eyes with

corneal laceration were first closed with 10-0 nylon or prolene and treated with systemic steroids and intravenous antibiotics. Bandage contact lens (BCL) was used in some cases with small corneal perforation. Postoperative management was provided with topical prednisolone (1%) eye drop 1 hourly, Ciprofloxacin eye drop (0.3%) 1 hourly and mydriaticcycloplegic like atropine (1%) three times a day. Systemic antibiotics and steroids were continued. The patients were followed up till the primary wound healed and the inflammation subsided. They were admitted later on for planned surgical procedure.

The patients were admitted in the hospital to be taken up for surgery. The power of IOL was calculated with the help of keratometry and A-scan using SRK T formula. Wherever A-Scan and keratometry was not possible in the injured eye, it was done in the other eye. The type of operation decided for different patients were small incision cataract surgery (SICS), Phacoemulsification, Anterior capsulotomy and lens aspiration with posterior chamber intraocular lens implantation, Lensectomy, Scleral Fixation IOL (SFIOL) implantation, Pars Plana Lensectomy + Pars Plana Vitrectomy + SFIOL, SICS + Capsular Tension Ring (CTR) + PCIOL, SICS + Anterior Vitrectomy + SFIOL.

Initially the patients were followed up every day for the first 3-4 days of hospital stay. Subsequently the patients were followed up at the end of 1 week, 4 week, 6 week and 3 month. At each visit Visual acuity of both eyes & Best corrected visual acuity was assessed, Detailed Slit lamp examination, Fundus examination was done and Ocular tension with applanation tonometer was measured.

Results

87 cases of traumatic cataract following mechanical trauma were studied between December 2013 to November 2015 and the results are tabulated as below:

To	otal	No. of	% of	Total no.	% of traumatic	% of traumatic
Ol	PD	cataract	cataract	traumatic	cataract (Total	cataract (Total OPD
cas	ses	patients	Pts.	cataract	cataract cases)	cases)
433	386	3818	8.8	126	3.3	0.3

 Table 1: Incidence of cataract and traumatic cataract in total OPD patients

Table no. 1 shows the incidence of traumatic cataract was 0.3% of total OPD patients and 3.3% of all cataract cases.

Out of 126 traumatic cataract cases 87 cases (69.1%) were due to mechanical

injury. which have been included in this study. In the present study out of total 87 patients, 67 (77%) were males and 20 (23%) were females. The male: female ratio is 3.4:1.



Graph 1: Age distribution

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Graph no. 1 shows out of 87 cases of traumatic cataract incidence in the ≤ 10 year age group was 25.3%, in the 11-20 years age group was 13.8% and in the 21-30 years age group was 18.4%, thus comprising 57.5% of total cases in the ≤ 30 year age group. 69% of total cases belong to ≤ 40 year age group.

Out of 87 cases, right and left eyes were involved in 43 (49.4%) and 44 (50.6%) cases respectively. Traumatic cataract caused due to penetrating type of injury was 46% (40 cases) and that due to blunt trauma was 54% (47 cases).



Figure 1: Penetrating injury with traumatic cataract, corneal laceration & iris prolapse in adult (re)

Figure no. 1 shows a patient with open globe injury due to penetrating trauma. He has corneal laceration, iris prolapse and traumatic cataract.



Graph 2: Mode of injury

Graph no. 2 shows the most common cause of traumatic cataract was injury by stick (34.5%) followed by that due to stone (31%) and metallic fragments (9.2%).

Table 2: Circumstance of injury				
Circumstance of Injury	No. of cases(n=87)	Percentage		
At work	26	29.9		
Sports activities	21	24.1		
Road traffic accident	17	19.6		
Violence	23	26.4		

Table 2:	Circumstance	of injury
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Table no. 2 shows that most injuries were caused at work (29.9%) followed by violence (26.4%). Stick was the common agent both at work as well as in the violence. Other causes of injuries were related to sports activities (24.1%).

Clinical findings	No. of cases (n=87)	Percentage
Lid laceration	25	28.7
Subconjunctival hemorrhage	58	66.7
Corneal laceration/perforation	43	49.4
Corneal scar	8	9.2
Corneal abrasion	9	10.4
Hyphema	21	24.1
Exudation	3	3.4
Chamber angle recession	3	3.4
Iris prolapse	12	13.8
Secondary glaucoma	10	11.5
Uveitis	40	46
Vossius ring	3	3.4
Distorted pupil (including traumatic mydriasis)	40	46
Squint	3	3.4

Table 3: Associated ocular findings

Note: More than one finding was present in some cases.

Table no. 3 shows the various associated ocular findings with traumatic cataract.



Figure 2: Adherent leucoma with traumatic cataract (re)

Figure no. 2 shows a patient with traumatic cataract and adherent leucoma.

	ing trauma and presen	tation.
Time Interval	No. of cases (n=87)	Percentage
Within 48 hrs	36	41.4
48hrs.—l week	28	32.2
>l wk to <l month<="" td=""><td>4</td><td>4.6</td></l>	4	4.6
1 month to 6 months	18	20.7
>6months	1	1.1

Table 4:	Interval	following	trauma and	presentation.
	inter var	Tomowing	ti auma anu	presentation.

Table no. 4 shows 41.4% of patients presented within 48 hours of the injury, while 32.2% presented between 2 days to 7 days. 20.7% presented at the interval of 1 month to 6 months and 1 patient presented more than 6 months after injury.

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Graph 3: Type of cataract

Graph no. 3 shows the most common type of cataract was total (55.2%) followed by cataract with ruptured lens capsule (35.6%). 5 cases (5.7%) showed typical rosette cataract and 3 cases (3.5%) had posterior subcapsular cataract.



Figure 3: Traumatic cataract with rupture of anterior capsule following blunt trauma (le)

Figure no. 3 shows traumatic cataract with rupture of anterior capsule.



Figure 4: Photograph showing rosette cataract

Figure no. 4 shows a case with rosette cataract.

Out of 87 patients lens was found to be in normal position in 59 cases (67.9%). There were 13 cases (14.9%) with subluxated lens and 15 cases (17.2%) of dislocation, out of which 2 were anteriorly dislocated. 5 out of the 13 cases of the series presented with subluxated lens had blunt trauma while rest of them had a perforating injury. 4 cases with dislocation had perforating injury with much distortion of anterior chamber.

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Visual Acuity	No. of Cases(n=87)	Percentage
PL+ inaccurate PR	2	2.3
PL+ PR accurate	44	50.6
Hand movements	15	17.2
CF at Close range to CF at 2m	12	13.8
3/60—6/60	11	12.6
>6/60—6/24	2	2.3
Couldn't be estimated	1	1.2

Table no. 5 shows the preoperative visual status of patients with traumatic cataract. 80 out of 87 patients (92%) had vision less than 6/60. As 1 patient was <1 year of age, his visual acuity couldn't be determined.

Tuble 0. Operative procedures periormed.						
Operative Proced	ures	No of Cases (n=87)	Percentage			
SICS+PCIOL		20	23			
Phaco+PCIOL		9	10.2			
SICS+CTR+PCIOI	- 	3	3.4			
SICS+PCIOL+PPV	7	1	1.1			
SICS+SFIOL		2	2.3			
SICS+AV+SFIOL		5	5.8			
Aspiration + IOL		11	12.7			
PPL+PPV+SFIOL		5	5.8			
Secondary IOL	(a) PCIOL	14	16.2			
implantation	(b) SFIOL	17	19.5			

Table 6: Operative procedures performed.

Table no. 6 shows the various operative procedures performed in different patients. BCL was given in 2 patients having small corneal perforation following penetrating trauma (Figure no. 5). After healing of the corneal wound, cataract extraction with IOL implantation was done between 1 month to 2.5 month.



Figure 5: BCL was given in the patient with small corneal perforation with traumatic cataract (RE)

Position of lens	Operation done	No. of patients
	SICS+CTR+PCIOL	3
	ASP+AV+SFIOL	5
Subluxated (13)	SICS+AV+SFIOL	2
	PPL+PPV+SFIOL	3
Anteriorly dislocated(2)	SICS + SFIOL	2
Posterior dislocated(13)	PPL+PPV+SFIOL	13

Tab	le 7: O	perative	procedures	performed	in subluxate	d and disloc	ated lens

Table no. 7 shows various operative procedures performed in subluxated and dislocated lens.

Complication	No. of cases(n=87)	Percentage				
Posterior synechia	22	25.3				
Posterior Capsular tear	21	24.1				
Positive vitreous Pressure	18	20.7				
Increased Tendency for bleeding	8	9.2				

	Table 8:	operative	problems	encountered	during surg	erv.
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Note: More than one finding was present in some cases.

Table-8 enumerates the various intra-operative problems encountered. The most common problem encountered intraoperatively was undilated and distorted pupil due to posterior synechiae (25.3%) followed by posterior capsular tear (24.1%) and positive vitreous pressure (20.7%).

 Table 9: Incidence of immediate post-operative complications within 1 week

Complications	No. of Cases(n=87)	Percentage	
Striate Keratitis	19	21.8	
Corneal Edema	6	6.9	
Iris Pigment Deposits	11	12.6	
Uveitis	24	27.6	
Hyphema	3	3.4	
Secondary Glaucoma	3	3.4	

Note: More than one complication was seen in some cases.

Table no. 9 shows uveitis and striate keratitis are the common post operative complications within 1 week.

Table 10: incidence of delayed post-operative complications detected at end of 6 weeks

Nature of Complication	No. of Cases(n=87)	Percentage	
Pupillary Capture	5	5.7	
Posterior Capsular Opacification	8	9.2	
Membrane in the pupillary area	6	6.9	
Decentration of IOL	8	9.2	
Astigmatism	46	52.9	
No complications	39	44.8	

Table no. 10 shows the delayed post operative complications detected at end of 6 weeks.

Preoperati	Post Operative BCVA				
Visual acuity	No of cases	PL+PR+	<6/60	6/60 -6/18	6/12-6/9
PL + inaccurate PR	2	2	-	-	-
PL+PR+	44	5	4	22	13
HM	15	-	2	10	3
CF at CR - CF at 2m	12	-	1	9	2
3/60-6/60	11	-	-	5	6
6/36—6/24	2	-	-	2	-
Couldn't determined	1	-	-	-	-

 Table 11: Comparison of pre-operative and post-operative best corrected visual acuity (BCVA)

Table no. 11 enumerates the post operative BCVA at the end of 3 months. 27.7% of total patients had a good vision (6/12 - 6/9), while 55.2% of total patients had a moderate vision (6/60 - 6/18) and 16% had poor vision (< 6/60). Visual Acuity couldn't be determined in 1 case as his age was <1 year.



Graph 4: Causes of non-improvement of vision

Graph no. 4 enumerates various causes of non-improvement of vision even after surgery.

Discussion

Present study is in accordance with Johnsons (1971) [3], who in a five-year study concluded cataract is the most common complication of penetrating ocular injury that results in loss of vision. The present study is almost in agreement with the study of Dhende (2001) [4] and Bhatia et al (1982) [5]. They observed a male female ratio of 3:1. Mariya et al (2012) [6] also found male: female to be 3.1:1. Jagannath et al (2015) [7] found that

a large majority of the cases were aged less than 40 years (67.5%). The present study correlates well with Blum et al (1996) [8], who observed that 57.4% had blunt trauma and 42.5% had penetrating trauma in his series of 148 cases of traumatic cataract. Mariya et al (2012) [6] found commonest causative agent was trauma with wooden stick in 13 eyes (31.7%) and stone in 7 eyes (17.1%) in a series of 41 patients. Our study is in almost accordance with Dannenberg et al (1992) [9] who reported that 25% of traumatic cataract occurred in occupational setting. Murli K, 1997[10] (60.5%) & Blum et al, 1996[5] (61.9%), Kuldeep (2000) [11] had

observed corneal damage in 70.8% in his series of 60 cases, which is slightly higher than present study. Features of uveitis was also a common finding in the study by Murli K[10] (49.6%). Kuldeep (2000)11 observed in his series of 60 patients, that various intervals of presentation following trauma ranged from 1 day to 5 years (mean 5.36 months). The findings correlates well with Murli K [10] who found total cataract were 53.28% followed by ruptured lens (21.89%) and rosette cataract (11.5%). Blum et al [5] found (35.2%) patients with subluxated or dislocated lens in their series of 85 cases of traumatic cataract. Present study correlates well with Murli K (1997)10, who observed that 98.50% patients had vision less than 6/60 in his series of 134 patients. Dhende (2001)4 also observed that most patients had vision reduced to positive PL and PR (76%). Ibrahim et al (2012) [12] in a series of 16 patients with traumatic cataract and loss of performed zonular support phacoemulsification with implantation of a foldable IOL and a 1- or 2-eyelet modified CTR. Chuang et al (2005) [13] in a series of 30 eyes with traumatic cataract in which all patients received cataract extraction with primary repair of the penetrating wound, 18 eyes (60%) underwent pars plana vitrectomy with lensectomy and 12 eyes (40%) underwent lens aspiration or extracapsular cataract extraction. In the present study in 2 cases with small corneal perforation, Bandage Contact Lens (BCL) was given and SICS with PCIOL was done after an interval of 6 weeks after healing of corneal wound. Visual Acuity was markedly increased in these patients as no suture related complication was found. Astigmatism was found to be less. Hugkulstone (1992) [14] managed 4 cases of perforating corneal injuries as a result of work-related injuries with a bandage contact lens and avoided surgical intervention. Malik KPS (2000) [15] reported in a series of 108 patients of traumatic cataract. an incidence of posterior synechiae in 33.3%, posterior

capsular tear in 28.3% and vitreous up thrust in 36.6%. Present study is slightly in lower side than this study. 24 patients (27.6%) had showed the sign of uveitis and they were managed, with local steroids antibiotic and mydriatic drops in the present study. The incidence is comparable to that of Nitin Verma et al (1991) [16], who reported an incidence of 24% and Pasricha (1990) [17] who reported an incidence of 25%. Dada et al (1990) [18] reported an incidence of pupillary capture in 14% cases, Ashish Deb (1990) [19] reported an incidence of 12.5% and Satish Gupta et al (1997) [20] reported in 1.5% cases. Grover et al (1992) [21] reported the incidence of astigmatism in 50% cases and David Hues (1984) [22] found it to be 58%. 8 patients (9.2%) had posterior capsular opacification in the present study. This was the second commonest complication seen. Its incidence is lower than the incidence reported by Nitin Verma et al, 1991[16] (48%), Kuldeep, 200011 (29%), Dhende, 2001 [4] (30%). Present study is comparable to Bansal (1994) [23], who achieved 6/12 or better in 36% cases. Dhende (2001) [4] found 6/12 or better vision in 40% cases. Dhende (2001) [4] found amblyopia (16.6%). irregular astigmatism (13.3%), posterior capsular opacification (6.6%), corneal opacification (9.9%) and posterior segment pathology (6.6%) to be the significant cause of non-improvement of vision. [24]

Conclusion

Traumatic cataract is a common cause of ocular morbidity, especially in younger individuals with higher incidence in males. Stone & stick are the common agents causing injury. The trauma occurs at normal place of work, during violent attacks, sports as well as traffic accidents. Management depends on the integrity of the posterior capsule and zonular apparatus and associated injuries. Several different surgical techniques can be employed to restore vision. Postoperative astigmatism, Corneal Opacity, P.C.O. and pupillary capture etc are some of the major problems associated with management of this entity.

Adequate safety measures, health education, personal awareness have a profound effect in preventing the ocular injuries and prompt, adequate medical and surgical management will definitely help in improving the visual prognosis in traumatic cataract patients and reducing ocular morbidity.

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