

# Visual Outcome and Causes of Decreased Vision in Traumatic Pediatric Cataracts

Causes of  
Decreased Vision  
in Traumatic  
Pediatric  
Cataracts

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## ABSTRACT

**Objective:** Pediatric Ocular trauma is a leading cause of vision loss and is avoidable. Hence, blindness can be prevented by awareness regarding causes and consequences of eye trauma in children by health education. Therefore, this study was intended to assess the visual outcome associated with cataract surgery in traumatic pediatric cataract.

**Study Design:** Quasi experimental study

**Place and Duration of Study:** This study was conducted at the Ophthalmology Department, Al Ibrahim Eye Hospital, Karachi from September 2021 till March 2022.

**Materials and Methods:** A total of 68 children aged 5 to 15 years with presenting history of trauma either open globe or closed globe with no associated retinal pathology and children with 3 months follow up were included in this study. Data analysis was done using SPSS V 23.0. Categorical variables like gender, mode and duration of trauma, surgical procedure, pre and post-operative visual acuity were documented as frequencies and percentages.

**Results:** The results showed that out of 68 children, 46(67.6%) were boys and 22(32.4%) were girls. With regard to mode of injury, blunt trauma was observed in 30(44.1%) children and penetrating trauma was observed in 38(55.9%) children. The most common causative agents were wooden stick 26(38.2%), followed by stones 10(4.7%). Postoperative complication revealed that 16(23.5%) children developed corneal opacity, amblyopia developed in 18(26.5%) children Postoperative uveitis developed in 20(29.4%) children whereas decentered IOL was reported in 18(26.5%) children.

**Conclusion:** This study concluded that boys were more expected to affect from traumatic cataract as compared to girls. The leading object causing injury was wooden stick. Most of the eyes had effective intra-ocular lens implantation in cataract surgical treatment while best corrected visual acuity enhanced in a moderate percentage of these patients. However, visual impairment was observed in few eyes owing to amblyopia and Uveitis.

**Key Words:** Traumatic pediatric cataract, Best corrected Visual acuity, intra-ocular lens implantation, amblyopia, Uveitis.

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## INTRODUCTION

Ocular trauma in children is one of the main causes of unilateral blindness<sup>1,2</sup> that is accounted for 29%-57% of cataract cases in children<sup>3</sup>. In the US, the prevalence of ocular trauma ranges from 8 to 13 per 1000 people<sup>4</sup>. While, the prevalence of ocular trauma is reported 20.53% in India and 12.9% in Pakistan<sup>5</sup>. It is observed that younger age group is most frequently affected by ocular injuries.

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Therefore, it has of great significance in public health in terms of health care, long-standing disability, loss of efficiency, rehabilitation facilities, and cost<sup>6</sup>. Cataract development is a frequent complication of penetrating or blunt visual trauma triggering a vision loss<sup>4,7</sup>.

Traumatic cataracts, a distinct kind of cataract, presents with ocular morbidity and are avoidable<sup>8</sup>. Generally, most common mode of ocular injuries is penetrating injuries<sup>9</sup>. According to past studies, the incidence of severe vision loss or blindness caused by penetrating ocular trauma in children range from 2% to 14%<sup>10</sup>.

Generally, traumatic cataracts give rise to numerous associated outcomes that depends on the type of trauma and its severity<sup>11</sup>. Therefore, it is challenging for medical and surgical ophthalmologists to manage these associated injuries to other ocular structures<sup>12</sup>. Management of traumatic cataracts depends on precise finding of Keratometry and axial-length dimensions, surgical timing, and correct implantation of the intraocular lens (IOL)<sup>13</sup>. Initially, the desired technique with a penetrating eye injury is to repair the corneal or scleral tears (if one happens) and then execute the

cataract extraction<sup>14</sup>. A better visibility during surgical procedure results in a low probability of postoperative complications<sup>15</sup>. Traumatic cataract surgery can be categorized into primary or secondary, where secondary cataract extraction is more valuable owing to low probability of postoperative complications<sup>16</sup>.

In spite of great innovations in investigative and treatment approaches, traumatic cataract leads to develop complications like lens luxation, corneal perforation, secondary glaucoma, endophthalmitis, and retinal detachment results vision loss permanently, even occupational disabilities, in many patients<sup>17,18</sup>. Therefore, awareness and preventive measures in order to avoid such critical traumatic conditions are of critical importance.

A number of population based researches revealed visual consequences of traumatic cataract in children<sup>19, 10</sup>. There is a paucity of researches on traumatic cataract in Pakistan. Therefore, this experimental study aims to explore the demographic characteristics, visual consequences, and complications of pediatric traumatic cataract at Isra Hospital, in Karachi.

## MATERIALS AND METHODS

This was a Quasi experimental study carried out at Al-Ibrahim Eye Hospital employing convenient sampling. Hospital's research ethical committee approved the study. 68 children, aged 5 to 15 years, presenting a history of trauma either open or closed globe with no associated retinal pathology and patients with 3 months' follow up were included in this study. Whereas, patients having a history of ocular surgery and associated ocular disease were excluded from the study.

Comprehensive history with visual acuity and ocular examination were performed for all patients. The children aged more than 5 years were inspected with the help of Snellen's chart and illiterate E chart. The ocular examination was done using direct ophthalmoscope, slit lamp and hand held slit lamp. Personal information and medical data were documented including age, gender, mechanism of injury, causative agent, and extent of the injury, interval between injury and first surgical intervention, and preoperative and postoperative visual acuity. Any comorbidity was also documented. General anesthesia is administered for all surgeries. Amblyopia was treated, if present. All patients were re-examined at the termination of their 3 months' postoperative duration. Data analysis was done using SPSS v23.0

## RESULTS

Of the 68 children included, 46(67.6%) were boys and 22(32.4%) were girls. Blunt trauma was observed in 30(44.1%) children and penetrating trauma in 38(55.9%). The most common causative agents were

wooden stick 26(38.2%), followed by stones 10(4.7%), knife 6(8.8%) and cricket ball 6(8.8%).

**Table No.1: Demographic characteristic, pre-operative Visual acuity and surgical intervention of study participants. (n=68)**

Variable		n	%
Gender	Male	46	67.6
	Female	22	32.4
Object Causing Trauma	Knife	6	8.8
	Stone	10	14.7
	Wooden Stick	26	38.2
	Matchstick	2	2.9
	Ball (cricket)	6	8.8
	Glass Piece	2	2.9
	Gun pellet	2	2.9
	Plastic Toy	2	2.9
	Needle	4	5.9
	Hand Pump	2	2.9
	Rubber	2	2.9
	Road Traffic Accident	2	2.9
Mode of Trauma	Penetrating	38	55.9
	Blunt	30	44.1
Duration of Trauma	1 Week	18	26.5
	1 Month	26	38.2
	>1 Month	24	35.3
Previous Intervention	Yes	16	23.5
	No	52	76.5
Type of Previous Intervention	Corneal Repair	38	55.9
	Corneal Scleral Repair	10	14.7
	Scleral Repair	12	17.6
	Lens Aspiration	8	11.8
Corneal Opacity	Yes	40	58.8
	No	28	41.2
If Yes, then	Central	24	35.3
	Para-Central	44	64.7
Pre-operative Visual Acuity	1/60	6	8.8
	2/60	2	2.9
	6/18	2	2.9
	6/24	2	2.9
	6/36	6	8.8
	6/60	6	8.8
	Hand motion (HM)	18	26.5
	Pl +ve	12	17.6
	Count finger 10 cm	2	2.9
	Count finger 1 feet	2	2.9
	Count finger 20cm	2	2.9
	Count finger at 50cm	2	2.9
	Perception of Light	4	5.9
	Count finger at 40cm	2	2.9

**Table No.2: Frequency of lens status, intraocular lens implantation, post-operative visual acuity and Associated Ocular Findings.**

Variable	n	%	
Status of The Lens	Phakic	48	70.6
	Aphakic	8	11.8
	Zonular Weakness	8	11.8
	Sub-Luxation	4	5.9
Intraocular lens Implantation	Primary	54	79.4
	Secondary	12	17.6
	Scleral Fixation	2	2.9
Post-operative Visual Acuity at 1 week	6/6	6	8.8
	6/9	6	8.8
	6/12	6	8.8
	6/18	16	23.5
	6/36	8	11.8
	6/60	14	20.6
	3/60	4	5.9
	Hand motion (HM)	2	2.9
	PI +ve	2	2.9
	Count finger 50cm	2	2.9
	Count finger 60cm	2	2.9
Post-operative Visual Acuity at 6 week	6/6	12	17.6
	6/9	16	23.5
	6/18	8	11.8
	6/36	10	14.7
	6/60	12	17.6
	Count finger	8	11.8
	PI +ve	2	2.9
Cause of Decreased Vision	Corneal Opacity	16	23.5
	Amblyopia	18	26.5
	Decentered Intraocular lens	14	20.6
	Uveitis	20	29.4

Time period from injury to surgery was 1 week in 18(26.5%) children, 1 month in 26(38.2%) children and >1 month in 24(35.3%) children.

Previous intervention was reported in 16(23.5%) children while 52(76.5%) had no history of any intervention. 38(55.9%) children had corneal repair followed by scleral repair that was reported in 12(17.6%) children and corneal scleral repair in 10(14.7%), while lens aspiration was reported in 8(11.8%) children. Corneal opacification was observed in 40(58.8%) cases. Corneal topography showed Para central corneal found in 44(64.7%) cases and central corneal seen in 24(35.3%) cases. The pre-operative visual acuity was perception of light in 4(5.9%) patients, counting finger at 10 cm, 40 cm, 1 feet, 20 cm and 50 cm in 2(2.9%) patients each and 6/24 in 2(2.9%), 6/36 in 6(8.8%) and 6/24 in 2(2.9%) patients each, as shown in Table I.

Phakic lens was most commonly reported in 48(70.6%) cases and Aphakic lens was observed in 8(11.8%) cases. Zonular weakness was seen in 8(11.8%) children whereas subluxation is uncommon but found in 4(5.9%). Primary IOL Implantation was reported in 54(79.8%) and secondary IOL insertion was found in 12(17.6%) cases whereas intraocular lens directly fixated to sclera had reported in 2(2.9%) children. The postoperative VA at one week was 6/6 in 6(8.8%) patients, 6/9 in 6(8.8%) patients, 6/12 in 6(8.8%) patients, and 6/18 in 16(23.5%) patients. About 14(20.6%) children achieved a VA of 6/60. Furthermore, postoperative VA 6/6 at six weeks was improved in 12(17.6%) patients, 6/9 in 16(23.5%) patients, 6/18 in 8(11.8%) patients. Postoperative complication revealed that 16(23.5%) children developed corneal opacity, amblyopia developed in 18(26.5%) children, postoperative uveitis developed in 20(29.4%) children whereas decentered IOL was reported in 18(26.5%). None of the cases developed secondary glaucoma or posterior segment complications, as shown in Table 2.

## DISCUSSION

Pediatric ocular trauma is one of the most frequent injuries that can create substantial vision loss and emotional distress in children, in addition to their caretakers, and develop remarkable monetary encumbrance in emerging nations<sup>20</sup>. Despite skilled emergency treatment, most of the children with traumatic cataract leads to visual impairment permanently depending on severity of the injury<sup>21</sup>. In traumatic cataract, prevention is always superior to management. Therefore, adult observation can reduce ocular injuries<sup>22</sup>. In this study, we aimed to demonstrate the postoperative visual outcome and decreased vision caused by traumatic pediatric cataracts in Pakistani children.

An Indian research reported thorns and stones to be the most common objects causing ocular trauma<sup>23</sup>. Likewise, a Malaysian study revealed that organic extraneous bodies were the most common cause of ocular trauma among children<sup>24</sup>. Similarly, another research demonstrated that sharp metal objects, toys, wooden sticks and predominantly scissors cause ocular injuries in children<sup>25</sup>. The present study reinforced that most common object causing ocular trauma was wooden stick 26(38.2%) followed by stone and knife 10(4.7%) and 6(8.8%) respectively.

It is reported in research that different causative agents are responsible for pediatric traumatic cataract<sup>26</sup>. One of the researches revealed that the most common cause of traumatic cataract is wooden stick subsequently stones, toys, and other sharp objects such as knives and scissors<sup>9</sup>.

As far as the affected age of children with traumatic cataract is concerned, one of the studies examined

children with ocular trauma < 18 years of age. It was also observed that predominantly boys are more injured by ocular trauma in almost all of the age groups<sup>25</sup>. The present study endorsed the above cited researches and indicated that frequency of traumatic cataract was greater in boys 46(67.6%) as compared to girls 22(32.4%) reflecting 2:1 ratio, which could be attributed to the violent activities and more association of boys in outside and athletic activities.

Owing to distinctive aspects of ocular trauma, penetrating injuries in children be likely to more noticeable deterioration in visual acuity<sup>27</sup>, make it easy for guardians to notice the penetrating injury and timely approach to the hospital. The present study was in agreement with the above researches and revealed that most of the cases were attributed to penetrating injuries 38(55.9%) than blunt injuries 30(44.1%). Therefore, timely recognition by the parents and appropriate surgical intervention leads to diminish the probability of decreased vision in traumatic pediatric cataract with better prognosis.

Amblyopia is a well-recognized complication of traumatic cataract in children in younger age group. One study reported that incidence of mostly ocular injuries happened after the age of 5 years (85.3%), however, the frequency of amblyopia 6% was comparatively low<sup>9</sup>. The present study was not corroborated with the above research and revealed that incidence of amblyopia was higher 18(26.5%) comparative to above research and uveitis was observed in 20(29.4%) children.

In summary, it was observed that there was better visual outcome in a substantial percentage of the children that was attributed to improved surgical procedures and optical restoration with implantation of intra-ocular lenses. Nonetheless, few eyes had remaining vision loss that may be caused by amblyopia from late management and other related eye injuries. This study has few limitations as it used small study sample so it is needed to collect data from larger sample to explore more outcomes of disease. Therefore, further researches on larger sample size with probability sampling technique are needed to discover more causes of eye injuries with accompanied consequences of its management to prevent ocular injury in order to decrease the chances of blindness in children.

## CONCLUSION

This study concluded that boys were more expected to affect from traumatic cataract as compared to girls. The leading object causing injury was wooden stick. Most of the eyes had effective intra-ocular lens implantation in cataract surgical treatment while best corrected visual acuity enhanced in a moderate percentage of these patients. However, visual impairment was observed in few eyes owing to amblyopia and uveitis. Hence, quick and timely management is associated with

encouraging visual effects in eyes without associated posterior segment injuries or amblyopia.

### Author's Contribution:

Concept & Design of Study: Faiza Rameez  
 Drafting: Sadia Bukhari  
 Data Analysis: Israr Bhutto, Atia Zehra  
 Revisiting Critically: Faiza Rameez, Sadia Bukhari  
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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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