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Original Research Article

Predictive Value of Ocular Trauma Score in Cases of Mechanical Eye Injuries: a Retrospective Study

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Abstract

Aim: The aim of the present study was to evaluate the predictive value of ocular trauma score in cases of mechanical ocular trauma.

Methods: A retrospective study of 100 patients who presented to Department of Ophthalmology, Darbhanga Medical College and Hospital, Darbhanga, Bihar, India with mechanical eye

Results: Out of 100 patients mean age was 29.43 years, with majority between 21 to 50 years of age. Males were 80% and 20% were females. Most injuries were unintentional. The inflicting agents in 55% (55 cases) were metallic object, in 33% (33 cases) wood. In 12% (12 cases) road traffic accident was the aetiology while broken glass was responsible in 2% (2 cases). The initial visual acuity was no perception of light in 24% (24 cases) and two patients (2%) had vision between 1/200 to 19/200. Eight patients (8%) were presented with the vision between 20/200 and 20/50. Out of 100 eyes forty-three eyes affected with globe rupture (85%), three eyes with retinal detachment (6%), RAPD noted in (6%) and one patient showed signs of endophthalmitis (2%).

Conclusion: OTS helps treating ophthalmic team to assess evidence based prognosis of a traumatized eye in advance. With the guidance of OTS the patient and their family can be counselled for further management.

Keywords: Ocular trauma score (OTS), Eye trauma, Mechanical injuries, Ocular injuries

Introduction

Ocular trauma is a major cause of monocular blindness in developed countries. [1] Approximately 2.4 million cases of ocular trauma occur in the United States annually, of which 35% are in patients aged 17 and younger. [2,3] Eye trauma to pediatric patients results in specific challenges and amblyopia among children seven years of age or younger is commonly reported. [4-6] Birmingham Eye Trauma Terminology System (BETTS) defines globe injuries as closed globe injuries (CGI) and open globe injuries (OGI). [7,8]

Ocular Trauma Score (OTS) has been widely applied to predict visual outcome. [9] Two criteria in the OTS, can be challenging to ascertain in injured children, presenting visual acuity (VA) and relative afferent pupillary defect (RAPD). [10] Acar et al [11] developed Pediatric Ocular Trauma Score (POTS) which reduces the influence of presenting VA in its predictive model and removes RAPD. The prognoses for OGI's has improved tremendously in the last decades. [12]

International classification of ocular trauma is based on some of the variables affecting the final visual outcome. [13] Ocular trauma score (OTS) system suggested by Kuhn et al [9], is the current system to predict the vision outcome in patients with open globe injury. Kuhn et al [9], analyzed more than 2500 injuries from the United States and Hungarian eye injury registries to identify the predictors of final vision outcome after open globe injury. [9] The OTS is calculated by assigning certain numerical raw points to six variables: initial visual acuity, globe rupture, endophthalmitis, perforating injury, retinal detachment, and relative afferent papillary defect (RAPD). The scores are stratified into five categories that give the probabilities of attaining a range of visual acuities post-injury. There are very limited studies on validation of scoring system used by OTS. [14,15]

Based on literature review, the factors likely to predict outcome after open globe injury are mechanism or type of injury, preoperative visual acuity (VA), time lag between injury and surgery, relative afferent pupillary defect (RAPD), size and location of the wound. Besides the above listed variables, other parameters that can predict vision outcome are retinal detachment, uveal or retinal tissue prolapse, vitreous hemorrhage, lens damage,

hyphema and number of operative procedures. [16-20]

The aim of the present study was to evaluate the predictive value of ocular trauma score in cases of mechanical ocular trauma.

Materials and Methods

A retrospective study of 100 patients who presented to Department of Ophthalmology, Darbhanga Medical College and Hospital, Darbhanga, Bihar, India for one year with mechanical eye injuries. Patients willing to participate with proper follow up were included in this study.

Exclusion criteria were chemicals, electrical, thermal injuries, The findings about significant history and ophthalmic examination were recorded in pre-designed Proforma. The important variables for OTS visual acuity, globe rupture, endophthalmitis, perforating injury, retinal detachment, relative afferent pupillary defect (RAPD) were given special emphasis during initial examination. On first examination each eye was assigned an initial raw score based on the initial visual acuity (VA), anterior and posterior segment finding. Once the raw score sum has been calculated, from the relevant category the eye got corresponding OTS score. For each OTS score gives the estimated probability of each follow-up visual acuity category. Proper treatment was given to each patient. Initially they were closely followed weekly for 1st month, every forth night for next two months. Finally, they were called for final ocular examination to record vision at 6 months.

Results

Table 1: Demographic distribution of patients

Demographical Distribution		Number of patients	Percentage
Age	5-20 years	40	40
	21-50 years	46	46
	51-70 years	14	14
Sex	Male	80	80
	Female	20	20
Source of injury	Metallic object (iron rod and nail)	55	55
	Wood, bamboo stick and thorn	33	33
	Road traffic accident	12	12
	Broken glass	2	2
	Lid laceration	14	14
	Hyphema	68	68
Associated factors Traumatic cataract		22	22
	Vitreous loss	25	25
	Intraocular foreign body	5	5

Out of 100 patients mean age was 29.43 years, with majority between 21 to 50 years of age. Males were 80% and 20% were females. Most injuries were unintentional. The inflicting agents in 55% (55 cases) were metallic object, in 33% (33 cases) wood. In 12% (12 cases) road traffic accident was the aetiology while broken glass was responsible in 2% (2 cases).

Table 2: Distribution of the variables of the OTS in our sample population

Variables A. Initial visual acuity	N	%
No PL	24	24%
PL or HM	66	66%
1/200 to 19/200	2	2%
20/200 to 20/50	8	8%
>/= 20/40	0	0
B. Globe rupture	85	85
C. Endophthalmitis	3	3
D. Perforating injury	0	0
E. Retinal detachment	6	6
F. Relative afferent pupillary defect	6	6

The initial visual acuity was no perception of light in 24% (24 cases) and two patients (2%) had vision between 1/200 to 19/200. Eight patients (8%) were presented with the vision between 20/200 and 20/50.

Out of 100 eyes forty-three eyes affected with globe rupture (85%), three eyes with retinal detachment (6%), RAPD noted in (6%) and one patient showed signs of endophthalmitis (2%).

Discussion

Ocular trauma has currently gained attention due to its serious impact on visual morbidity. [21] Ocular trauma is a major cause of monocular blindness and visual impairment throughout the world. [22,23] Ocular trauma score (OTS) was proposed to predict the visual outcome of patients after ocular trauma. In 2002 the ocular trauma score (OTS) was published, which estimates visual function (visual acuity) after 6 months of ocular trauma. This OTS scale is useful for guiding the treatment and rehabilitation of the patients with eye injury and to provide the valuable information and advice. According to this OTS scale, the traumatized eye may be placed into one of five categories (Globe rupture, Endophthalmitis, Perforating injury, Retinal Detachment and RAPD), each of which has a distinct probability of reaching a range of visual function.

Out of 100 patients mean age was 29.43 years, with majority between 21 to 50 years of age. Males were 80% and 20% were females. Most injuries were unintentional. The inflicting agents in 55% (55 cases) were metallic object, in 33% (33 cases) wood. In 12% (12 cases) road traffic accident was the aetiology while broken glass was responsible in 2% (2 cases). Schorkhuber MM et al [24] also founded statically difference of PL/HM ratio in category 2 (53% vs. 26%) and Unver et al [25] have also highlighted that final visual acuity for PL/HM in category 2 (55% vs. 26%). The younger the child at the time of visual deprivation, the more rapid the development of Amblyopia. [26,27] In addition, children may develop more extensive postoperative inflammation, scarring, and proliferative vitreoretinopathy than adults which may also affect the anatomic and functional outcomes. [28]

Based on mode of injury, blunt injury cases had poor final VA compared to penetrating trauma in our study. This can affect the internal structures of the eye by coup-countercoup mechanism resulting in more significant damage and similarly significant injury to optic nerve. With blunt injury, wound can get extended posterior to recti insertion resulting in poorer final vision outcome. The initial visual acuity was no perception of light in 24% (24 cases) and two patients (2%) had vision between 1/200 to 19/200. Eight patients (8%) were presented with the vision between 20/200 and 20/50. Out of 100 eyes forty-three eyes affected with globe rupture (85%), three eyes with retinal detachment (6%), RAPD noted in (6%) and one patient showed signs of endophthalmitis (2%). Visual outcome also depends on the age of patient, type or mechanism of injury, extent of wound and size of open globe injury, location of open globe wound, lens damage, hyphema, vitreous haemorrhage, presence and type of intraocular foreign body. These factors can be responsible for drastic differences in later visual outcome contrary to what is predicted by conventional OTS. As these factors are not mentioned in detail they should be considered in conditions when present. As far as the pre-existing scoring systems are concerned, its applicability is limited in open globe injuries in children. The OTS utilizes a limited number of variables and basic statistics to give the ophthalmologists a 77% chance of predicting the final visual outcome within (plus or minus) one visual category shortly after the eye injury. [29]

Conclusion

OTS helps treating ophthalmic team to assess evidence based prognosis of a traumatized eye in advance. With the guidance of OTS the patient and their family can be counselled for further management.

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