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Original Research Article

TITLE: TO STUDY THE VISUAL OUTCOME AND PROGNOSTIC FACTORS OF OPEN GLOBE INJURIES IN OCULAR TRAUMA

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Abstract

Background & Methods: The aim of the present study is to study the common causes, visual outcome and prognostic factors of open globe injuries in ocular trauma. After noting down the name, age, sex, occupation and address etc. Precise history was taken with special reference to the time interval between open globe injury and first treatment, onset of symptoms(sudden or delayed), course of events and treatment first received. Relevant past history of ocular disease or trauma was also noted.

Results: Significance of grade of injury as a prognostic factor (chi-sq. = 7.723) (P = 0.001). Significance of length of wound as a prognostic factor (Pearson's chi-square = 1.233) (P = 0.048), we found, maximum 53.3% in Anterior 5 mm from the limbus followed by Confined to cornea and limbus. We found, maximum injuries in 22% with pen, followed by 19% Needle & 18% Glass.

Conclusion: With the advent of a better understanding of the pathology of ocular trauma and advanced surgical techniques, the prognosis of open globe injury is improving. Standardization of the terminology and consensus for a system of classification of these injuries was accomplished only recently. Our study has prospectively evaluated some of the important prognostic factors of open globe injuries. In general, we found that factors describing the functional status of the eye were more important in predicting the final visual outcome when compared to those related to the anatomy of the injury.

Keywords: causes, open globe injuries & ocular trauma.

Study Design: Observational Study.

Introduction

Ocular trauma is one of the most important causes of avoidable vision loss all over the world, and constitutes 10–15% of all ophthalmologic diseases[1]. The World Health Organization (WHO) program for prevention of blindness estimated that annually there were 55 million people suffering from an eye injury requiring limitation in daily activities for more than 24 hours; 750000 of those were hospitalized, and 200000 cases had the diagnosis of open eye injuries. Owing to ocular trauma, unilateral visual loss has been diagnosed in approximately 19 million people, whereas bilateral blindness has occurred in 1.6 million cases globally[2].

The type of injury ideally refers to the circumstances of the injury. If the patient is unconscious or no witness to the injury is present typing will depend upon examination. If the

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presence or absence of intra ocular foreign body cannot be made on examination than ancillary testing is required.

The grade of injury is based on the visual acuity of the injured eye at the time of injury but it can only be done in cooperative patients. In intoxicated or comatose patients or in very young patients it is impossible to classify the ocular trauma based on this variable. The testing is done at a distance (on snellen acuity chart). Visual acuity should always be checked with patient's corrective lenses, with or without pinhole[3].

The presence of relative afferent pupillary defect is assessed with the swinging flash light test. If the pupil of traumatic eye is not visible or non-reactive either due to mechanical trauma or pharmacologically the consensual response of the fellow eye should be assessed.

The zone of the injury is defined as the most posterior part of the globe involved in the open globe injury. In the case of multiple corneoscleral lacerations, it is defined by the most posterior opening (this includes the exit wound of a perforating injury). In the case of a foreign body, it is defined by the point of entry of the foreign body[4].

Perforating injuries of the globe have been recognized as having a different prognosis and approach for management when compared to other open globe injuries. It was for this reason that this is a different type of injury while classifying open globe injuries. Such injuries are now classified as 'Type D' in the ISOT classification of open globe injuries. In a perforating (through-and-through) injury there would have to be two full thickness defects in the eye wall (entry wound and exit wound), both caused by the same object or foreign body. By this definition the object must not be within the globe at the time of examination (excluding all injuries with an intraocular foreign body). Previously, authors have referred to such injuries as "double-penetrating" injuries, which is anatomically incorrect[5].

Material and Methods

Present study was conducted at GRMC, Gwalior, M.P. on 30 patients. At presentation, all patients underwent a detailed history and ophthalmic evaluation. . Precise history was taken with special reference to the time interval between injury and first treatment, onset of symptoms(sudden or delayed), course of events and treatment first received. Ophthalmic evaluation done, initial visual acuity, mechanism of injury (sharp, blunt, missile), wound length, wound location, presence of intraocular foreign body, type of ocular wound (perforating vs non-perforating), presence of intraocular foreign. A list of presence or absence of prognostic factors was also recorded prior to treatment.

Based on the Birmingham Eye Trauma Terminology, the mechanisms of injury were classified as rupture, penetration, IOFB, perforation, and mixed injury. In cases in which there was a high clinical suspicion of an IOFB that could not be confirmed by clinical examination or in which the media opacity prohibited any examination of intraocular structures, ancillary testing with X-rays, computed tomography, or echography were used to classify the injuries.

Patients were divided into groups according to the real size of the wound (in mm). The 4 classifications used included wounds that were smaller than 5 mm, 5–10 mm, 10–15 mm, and larger than 15 mm. Distance VA was tested using a Landolt C acuity chart. If the VA improved when using a pinhole, this was recorded as the VA at the initial examination. Details of the primary and subsequent treatments and final VAs were also collected. The initial VA was divided into the following 6 categories: acuity 20/40 or better, between 20/40

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to 20/400, between 20/400 to counting fingers (CF), hand movement (HM), light perception (LP), and no light perception (NLP).

INCLUSION CRITERIA-:

1. All patients with open globe injury

EXCLUSION CRITERIA:

1. Patients with previous ocular surgery
2. Patients with previous ocular trauma

Observation & Result

Table No. 1: Age

	6/18 or better		worse than 6/18	
AGE	NO. OF PTs	%	NO. OF PTs	%
Less than 15 years	03	25%	09	75%
More than 15 years	03	16.6%	15	83.3%

Significance of age as a prognostic factor (Pearson's chi-square = 2.313) (P = 0.876)

Table No. 2: Sex

	6/18 or better		worse than 6/18	
SEX	NO. OF PTs	**%**	NO. OF PTs	**%**
Male	06	26.1%	17	73.9%
Female	00	0%	07	100%

Significance of sex as a prognostic factor (Pearson's chi-square = 1.283) (P = 0.431)

Table No. 3: Grade

	6/18 or better		worse than 6/18	
Grade	NO. OF PTs	**%**	NO. OF PTs	**%**
1	03	100%	00	00%
2	01	100%	00	00%
3	02	28.5%	05	71.4%
4	00	0%	15	100%
5	00	%	04	100%

Significance of grade of injury as a prognostic factor (Extended Mantel-Haenszel test for trend: chi-sq. = 7.723) (P = 0.001)

Table No. 4: Length of wound

	6/18 or better		worse than 6/18	
Length of wound	NO. OF PTs	%	NO. OF PTs	%
10mm or less	05	33.3%	10	66.6%
More than 10mm	01	6.6%	14	93.3%

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Significance of length of wound as a prognostic factor (Pearson's chi-square = 1.233) (P = 0.048)

Table No. 5: Location of wound

		No.	%
Zone 1	Confined to cornea and limbus	11	36.7
Zone 2	Anterior 5 mm from the limbus	16	53.3
Zone 3	Extended to posterior >5 mm from limbus	03	10

In our study we found, maximum 53.3% in Anterior 5 mm from the limbus followed by Confined to cornea and limbus.

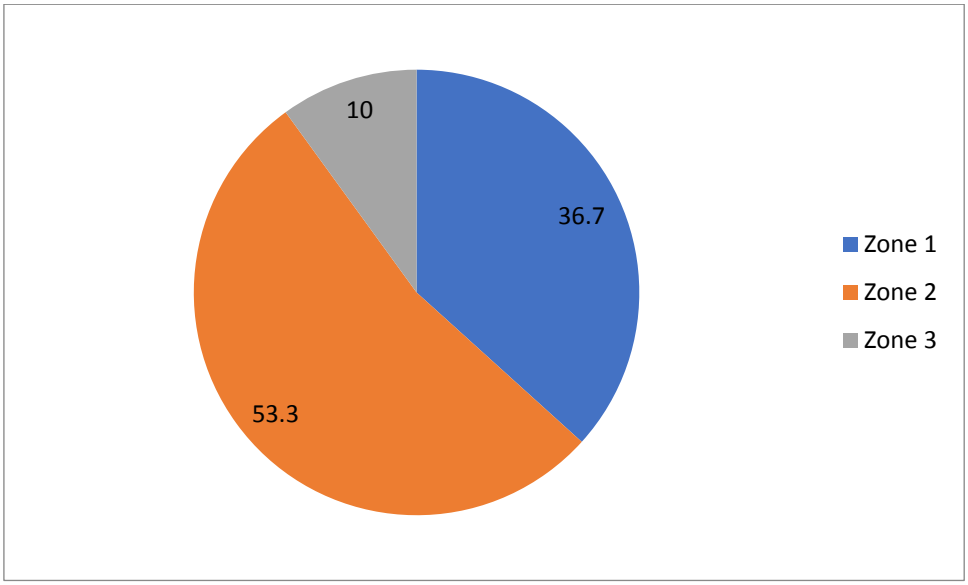

Table No. 6: Open Globe Injuries

S. No.	Injuries	No.	%
1	Knife	03	08
2	Needle	05	19
3	Pen	07	22
4	Glass	05	18
5	Wood	03	10
6	Bat/Ball	03	09
7	Arrow	04	14

In our study we found, maximum injuries in 22% with pen, followed by 19% Needle & 18% Glass.

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Discussion

Open globe injuries are estimated to occur with a worldwide annual incidence of 3.5/100000, and have been defined as preventable cause of permanent visual impairment1. While advances in ophthalmic surgery techniques, instrumentations, and postoperative visual rehabilitation programs provide decreased blindness risk, OGI still constitutes one of the major causes of visual morbidity, and burdens a significant socioeconomic impact over society. Although, statistics indicate that patients who have trauma in one eye are likely to have trauma in the fellow eye later in life, simultaneous trauma of both eyes is not so common. A study reported only 8 bilateral cases after reviewing the charts of 152 patients with closed globe injury and 146 patients with OGI.

Meng et al[6]. indicated that the rate of bilateral involvement had been 5.4% among their study patients with OGI. Patients referred to our clinic with bilateral OGI also composed only 1.6% of the entire study population.

Knyazer *et al*.[7] reported that 78% of OGI was caused by sharp objects in males, while blunt trauma with a frequency of 63.2% was most common among females. In our study OGI related to sharp objects was also found to be more frequent in males (55.7%), and OGI caused by a blunt ocular trauma was more common in females (46.7%). Concomitant intraocular foreign body (IOFB) was present in 22.2% of our study population. Body part, sport equipment, and work tool were reported as the most common etiologic factors for OGI-related visual impairment, and metal objects were found as the most frequent cause of OGI in several studies. The most frequent agents related with OGI were metal (41.8%), wood or thorn (20.7%), and glass (18.0%) in the present study[8]. Patients injured at work constituted approximately one third of our study population, so in high-risk works for an eye injury, eye protection ought to be an obligation that has to be encouraged by the government policies. Furthermore, most of the glass injuries occurred in road traffic accidents might be prevented by wearing seatbelts that would also be a vital advocacy issue[9-11].

Conclusion

With the advent of a better understanding of the pathology of ocular trauma and advanced surgical techniques, the prognosis of open globe injury is improving. Standardization of the terminology and consensus for a system of classification of these injuries was accomplished

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only recently. Our study has prospectively evaluated some of the important prognostic factors of open globe injuries. In general, we found that factors describing the functional status of the eye were more important in predicting the final visual outcome when compared to those related to the anatomy of the injury.

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