

Study of Clinical Profile and Prognostic Indicators in Open Globe Injury in A Tertiary Eye Care Centre

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Abstract:

Our study looked to identify the prevalent types of open globe injuries observed at our medical facility, assess the degree of visual impairment resulting from these injuries, and evaluate the visual prognosis following treatment. This study was a prospective investigation conducted within a hospital setting over a span of 2 years (March 2021 to April 2023). A cohort of 68 patients with ocular trauma were enrolled as participants in this study. All subjects underwent ophthalmologic assessment, which encompassed evaluation of visual acuity, examination of the anterior segment of the eye, assessment of extraocular movements, measurement of intraocular pressure, and examination of the fundus. Ophthalmic injuries were observed with higher frequency among individuals in the middle-aged adult population (32.25%). The prevailing mechanism of injury observed in this study was road traffic accidents (RTA), accounting for 35.29% of all reported cases. Road traffic accidents (RTAs) are the predominant aetiology of ocular trauma encountered at our institution, owing to its location in close proximity to a state highway. It is worth noting that such incidents are preventable, and the visual prognosis is contingent upon the precise location and dimensions of the injury, as well as the magnitude of the resulting ocular impairment.

Keywords: Best-corrected visual acuity, Ocular injury, Road traffic accidents, State highway, Tertiary care center, Visual outcome.

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Introduction

Ocular trauma is a significant aetiology of preventable visual impairment globally, accounting for 10-15% of all ophthalmological conditions [1, 2]. According to the programme for prevention of blindness by the World Health Organisation (WHO), it has been estimated that on a yearly basis, there are approximately 55 million individuals who experience ocular injuries necessitating a restriction in their daily activities for a duration exceeding 24 hours.

Out of this population, around 750,000 individuals require hospitalisation, with approximately 200,000 cases being diagnosed as open eye injuries. Due to ocular trauma, unilateral visual impairment has been diagnosed in approximately 19 million individuals, while bilateral blindness has been observed in 1.6 million cases worldwide [2]. In the Indian population, the prevalence of visual impairment is

estimated to exceed 50 million individuals, with an annual growth rate of approximately 3.8 million cases. Within the overall population of individuals with visual impairment, a notable proportion of 1.2% can be attributed to avoidable injuries, as indicated by scholarly sources [3].

The World Health Organisation (WHO) programme focused on the prevention of visual impairment has reported an estimated annual incidence of around 55 million ocular injuries, resulting in functional limitations lasting beyond a single day [4]. Ocular trauma can be classified into two categories: closed wounds and open eye injuries. Open eye injury refers to the occurrence of full-thickness damage to the cornea, sclera, or both [5, 6]. An open globe injury (OGI) is a critical condition in the field of ophthalmology that necessitates prompt identification and precise surgical intervention.

Lower baseline visual acuity, greater severity of posterior segment ocular damage, and presence of a positive afferent pupillary defect are associated with elevated rates of enduring visual impairment. The objective of this study is to ascertain the prevalent types of open globe injuries observed at our medical facility, evaluate the degree of visual impairment resulting from these injuries, and analyse the visual prognosis following treatment.

Methods

A prospective cross-sectional study was undertaken over a span of two years (March 2021 to April 2023) encompassing individuals with ocular injuries who sought medical attention at both the outpatient department and the emergency department of MKCG Medical College and Hospital. The study's sample population consisted of 68 individuals.

Inclusion criteria: Patients with open globe ocular injuries reported to our casualty and ophthalmology OPD were included in the study.

Exclusion criteria: The study excluded patients with closed globe injuries, birth injuries, war injuries, ultrasonic injuries, and radiation injuries. A

comprehensive evaluation of all patients was conducted, encompassing various diagnostic procedures such as slit-lamp biomicroscopy, direct and indirect ophthalmoscopy, measurement of intraocular pressure, assessment of colour vision, and examination of extraocular movements.

A B-scan ultrasonography was performed to assess the fundus and exclude the presence of a retained intraocular foreign body, in cases where the media of the eye hindered direct examination.

X-ray imaging of the orbit, and in some instances, computed tomography (CT) scanning of the orbit, were also performed.

Results

In our study, we found a higher incidence of ocular injuries in middle-aged patients (31–40 years) (32.25%) [Table 1].

Most common mode of injury was RTA (35.29%) followed by occupational injury (22.06%) [Table 2].

Table 1: Sex distribution

Sex	Frequency
Male	52
Female	16
Age	Frequency
1-10	2
11-20	6
21-30	18
31-40	22
41-50	13
51-60	5
>60	2

Table 2: Type and location of injury

Injury types	Frequency
Penetrating	25
Perforating	19
Rupture	18
IOFB	6
Injury Location	Frequency
Grade 1	17
Grade 2	24
Grade 3	15
Grade 4	12

Table 3: Relationship causes of injury and gender

	Male	Female
Occupational injury	15	3
Domestic injury	12	4
Road traffic accident	18	6
Assault	4	1
Others	3	2

Table 4: Table of injury presentation

Time	Frequency
<24hr	34
24-48hrs	20
48-96hrs	9
>96hrs	5

Table 5: Initial visual acuity

VA >6/12	3
6/15-6/60	11
6/60-CF	30
HM-PL	20
NPL	4

Discussion

Ocular trauma is a significant aetiology of visual impairment and ocular morbidity. The existing body of literature pertaining to the characteristics and predictive factors associated with ocular trauma predominantly originates from more advanced nations, wherein there is widespread accessibility to contemporary resources for the management of ocular trauma [5].

There is a paucity of studies on the profile of ocular trauma from the less developed countries[6]. Hence, we conducted this study.

The common injuries encountered in our study were as follows:

There was a heightened prevalence of ocular traumas observed among individuals in the middle-aged adult population, with a notable predominance of males accounting for 70% of the cases. This study was closely associated with the research conducted by Ilsar et al. [7], Niiranen [8], and Jain et al. [9]. The observed male preponderance can be attributed to a higher frequency of outdoor occupational exposure in males as compared to females. This finding was found to be consistent with the research conducted by Balaghafari et al. [10] and Sharma et al. [11]. Ocular trauma ranks alongside cataract and strabismus as a prominent factor contributing to hospital admissions [12]. The predominant aetiology of ocular trauma observed in our medical facility is attributed to road traffic accidents (RTAs), accounting for 40% of cases. This prevalence can be attributed to the hospital's strategic location along a state highway. Enock et al. [13] and Mowatt et al. [4] reported that motorcycle-related road traffic accidents (RTAs) were identified as the predominant aetiology for ocular injuries.

In our research, it was observed that middle-aged males exhibited a higher frequency of engagement in vehicular operation due to the prevalence of males within this demographic. Ocular trauma resulting from road traffic accidents is a preventable condition. This assertion is supported by a study conducted in Northern Ireland in 1986, wherein a

correlation was established between the implementation of seat belt legislation and a significant reduction (60%) in perforating eye injuries [14]. In our research, we observed that road traffic accidents may be attributed to vehicular congestion, resulting in reduced traffic velocity and subsequently mitigating the severity of collisions. This was in correlation with the study conducted by Vasu et al., which revealed that 38.10% of the cases involved open globe injuries [15].

The patients were diagnosed with a corneal laceration accompanied by or without uveal tissue prolapse, traumatic cataract, corneoscleral laceration, foreign body lodged in the anterior chamber, vitreous haemorrhage, retinal detachment, and intraocular foreign body.

The variables linked to the ultimate visual outcome encompassed the initial visual acuity, the nature, location, and dimensions of the injury, as well as the magnitude of ocular impairment. In our research, it was observed that a limited proportion of individuals adhere to safety protocols during vehicular operation. In the study conducted by Panagiotidis et al., it was observed that a mere 5.2% of automobile drivers adhered to the practise of utilising seat belts.

Additionally, it was noted that none of the individuals involved in two-wheeler accidents had employed helmets for protection [16]. Schrader et al. (2019) conducted a study wherein they made an observation that, despite the implementation of mandatory seat belt legislation in Germany, a significant proportion of the participants in their study cohort did not utilise seat belts during the occurrence of the accident [14]. According to the study conducted by Schrader et al. [14], it was observed that 50% of the cases involved individuals who were under the influence of alcohol at the time of the accident. It is plausible that a greater proportion of instances involving alcohol intoxication would have been identified within our research investigation, had breath analysis tests or assessments of blood alcohol concentrations been conducted. In our research, a significant proportion of patients with low socioeconomic status exhibited

limited knowledge regarding the utilisation of ocular protective equipment. This finding is consistent with the research conducted by Mishra et al, which reported a prevalence of 5% in the utilisation of ocular safeguarding measures [17].

Conclusion

Ocular trauma represents a prevalent aetiology for monocular blindness, frequently encountered in clinical practise. Ocular injuries exhibit a higher prevalence among individuals in the middle-aged adult population, with a greater frequency observed among males. Road traffic accidents (RTAs) are widely recognised as the predominant aetiology of injuries in the general population. A primary preventive strategy is imperative in mitigating the occurrence of road traffic accidents (RTAs) and the subsequent ocular morbidity. This approach entails the promotion of safe riding practises, as well as the rigorous enforcement of traffic regulations. These measures include adhering to safe speed limits, utilising seatbelts and helmets for head protection, and refraining from consuming alcohol prior to driving.

By implementing these preventive measures, the incidence of RTAs and the associated ocular morbidity can be effectively reduced. Highlighting the imperative nature of implementing ocular safeguarding protocols among individuals employed in various industrial sectors and those involved in the handling and production of pyrotechnic devices, with the primary objective of averting potential ocular traumas and injuries. The implications of ocular trauma in relation to medical intervention, financial implications, and the expenses associated with rehabilitation services undeniably underscore the significance of preventive measures.

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