·Clinical Research·

Traumatic visual loss of inpatients in Yazd, Iran from 2005 to 2006

Mohammad Reza Besharati, Mohammad Reza Shoja, Maryam Kheirandish, Leila Shirani, Ziba Parizi

Department of Ophthalmology, Shahid Sadoughi University of Medical Sciences and Health Services, Yazd, Iran
Correspondence to: Mohammad Reza Besharati. Razi Medical Building, Taleghani Boulevard, Yazd, Iran. mrbesharaty@yahoo.co.uk
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Abstract

• AIM: To investigate the conditions of traumatic visual loss of inpatients in Yazd, Iran from 2005 to 2006, and to explore the possible causes and preventive methods.

• METHODS: We retrospectively analyzed data on all patients with eye injuries (70 cases) hospitalized at Shahid Sadoughi Hospital between August 2005 and August 2006, including age, gender, causes, type of injury, time of initial treatment, visual acuity during admission and discharge, surgical procedures, and final outcome. Furthermore, standardized international classification of ocular trauma (Birmingham Eye Trauma Terminology) was used for eye injury categorization.

• RESULTS: A total of 70 inpatients with ocular injuries were selected by simple approach. The male/female ratio was 2.8 to 1. The most frequent causes of eye injury were metallic objects (34.3%) especially in age group of ≤10 and ≥30 years old, accidents (22.8%) and assaults (17.2%). Waiting time to initial treatment was 6-24 hours in most cases (51.4%). Trauma was blunt in 38.6% and penetrating in 61.4%. The most and the least final visual acuity in blunt and penetrating trauma was LP (51.8%, 41.8%) and HM (7.5%, 4.7%) respectively. Surgery outcome was globe saving with acceptable visual acuity in 72.9% and enucleation in 24.2%.

• CONCLUSION: With regard to the high incidence of ocular trauma and consequent severe visual loss, parents' attention, eye safety protection and early treatment should be considered as final preserving globe in most accidents.

• KEYWORDS: eye injuries; inpatients; outcome; metallic objects; traumatic visual loss

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INTRODUCTION

Ocular injuries have been identified as a major cause of visual impairment and blindness. In spite of the new microsurgical techniques, the prognosis of eye injuries in many cases is still quite poor and dependent mostly on the severity of the primary injury. Ocular trauma is a common, but preventable accident. Approximately one in five adults reports a history of ocular trauma in the lifetime, although in less than 2% the trauma is severe enough to warrant hospitalization [1]. There are approximately 1.6 million blind persons and additional 2.3 million bilateral low visions from ocular injuries in the world, and also 19 million have unilateral blindness or low vision [2]. Most ocular traumas occur in young people and could be prevented by safety eyewear.

Implementing known strategies for eye injury prevention would substantially reduce their incidence. The prevention approaches include certified eye protectors at workplaces and sports activities whenever possible, rather than making their use voluntary[3].

Standardized international classification of ocular trauma (Birmingham Eye Trauma Terminology, BETT) allows the surgeon to establish an early, objective, and accurate prognosis of the injury[4]. The injuries are classified as blunt or sharp forces, penetrating and perforating[4].

Optimizing outcome in ocular injury requires prompt diagnosis and treatment. The final outcome may be ambiguous because severe ocular trauma is often associated with a variety of devastating complications[5].

Based on high frequency of trauma and accidents, our study aimed to survey the inpatients with eye injury in Yazd, Iran. The final outcomes and consequences were evaluated.

MATERIALS AND METHODS

In this descriptive case series study we reviewed 70 patients with eye injuries hospitalized at department of ophthalmology of Shahid Sadoughi Hospital between August 2005 and August 2006. Variables like age, sex, date of injury, cause, type of injury, initial visual acuity, therapeutic procedures, and visual outcome at the final discharge time were recorded for each patient.

Cases with extraocular injuries including hematoma, eyelids, canalicular, orbital injuries and patients with incomplete data were excluded from the study.

To classify mechanical eye injuries, we used a system recommended by the Ocular Trauma Classification Group (OTCG). This classification is based on anatomic and physo-logic variables that have prognostic value for visual outcome in ocular injuries[6]. The type of injury was classified according to BETT as closed globe injury (contusion and lamellar laceration)or open globe injury (rupture and penetrating, intraocular foreign body or perforating laceration)[4].

Visual outcome was defined in terms of the best-corrected Snellen chart visual acuity (VA) in the injured eye at the final discharge time. Counting finger (CF), hand movement (HM), light perception (LP) and no light perception (NLP) are legal blindness that is defined as visual acuity≤20/200.

Data were analyzed by using SPSS 11.5 software (SPSS Inc., Chicago, IL, USA) and presented in the form of descriptive statistics like mean ± standard deviation (SD), median and range. Appropriate statistical tests such as chi-square test, Mann-Whitney U-test, and Pearson's correlation coefficient test were applied to evaluate the possible associations and differences. A significance level of $P<0.05$ was considered statistically significant.

RESULTS

A total of 70 patients with ocular injuries were hospitalized at department of ophthalmology of Shahid Sadoughi Hospital. The male to female ratio was 2.8 to 1.

The most frequent objects causing injuries were metallic objects (34.3%) especially in age group of≤10 and ≥30 years old. Accidents (22.8%) and assaults (17.2%) were next frequent causes (Table 1, 2). Waiting time to initial treatment was 6-24 hours in most cases (51.4%) (Table 3). Trauma was blunt in 38.6% and penetrating in 61.4%. The most and the least final visual acuity were LP (51.8%) and HM (7.5%) in blunt trauma and LP (41.8%) and HM (4.7%) in penetrating trauma respectively (Table 4). As for surgery results, globe saving with acceptable visual acuity was achieved in 72.9% and enucleation occurred in 24.2% (Table 5).

Table 1 Frequency and percentage of causes

Causes of eye trauma	Frequency	Percent
metal	24	34.3
accidents	16	22.8
assaults	12	17.2
wood	8	11.4
others	10	14.3
total	70	100

Table 2 Frequency and percentage of causes according to age of patients

	<10		10-29		>30	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
metal	9	59.9	11	30.5	9	47.8
non-metal	4	26.7	10	27.8	2	10.3
accident	2	13.4	15	41.6	8	41.9
total	15	100	36	100	19	100

Table 3 Duration from the time of injury to the initial treatment

Duration between injury and initial treatment (hours)	Frequency	Percentage
1-6	25	35.2
6-24	36	51.4
24-72	7	10.1
>72	2	2.9

Table 4 Frequency and percentage of final visual acuity according to type of trauma

	Blunt		Penetrating		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
NLP	4	14.8	15	34.9	19	27.2
LP	14	51.8	18	41.8	32	45.7
HM	2	7.5	2	4.7	4	5.7
CF	7	25.9	8	18.6	15	21.4
total	27	100	43	100	70	100

Table 5 Frequency and percentage of final result of surgery

Final result of surgery	Frequency	Percentage
Globe saving & acceptable visual acuity	51	72.9
Globe saving to cosmetic effect	2	2.9
Enucleation	17	24.2

DISCUSSION

Ocular trauma is a considerable cause of visual impairment[7]. In our study, male patients predominated over female (male/female ratio was 2.8/1). Male predominance and also peak incidence of eye injuries (mostly with metal objects) in male population were reported in other studies[8-12]. It is probably the result of the nature of men's job and other activities. High prevalence of eye injuries in average age of 21.7 years old in our study is similar to some studies, for instance, the studies by Khatry *et al*[13] and Smith *et al*[14] with an average age of 28 and 29 years old respectively. It was supposed in our society because of crowd and activity of young population. High prevalence of penetrating trauma (61.4%) rather than blunt trauma (38.6%) in our study has been reported by the survey of Entezari *et al* [15] in a prospective study on 116 injured eyes during 2001-2004. Penetrating trauma caused by metal and sharp objects was the most common type of eye injuries in age group of<10 years old in our study. In the study of Cariello *et al* [16], the most frequent

cause for ocular injuries in children was external agents such as stone, iron and wood objects. This study shows that among children the mechanisms of injury are quite variable, and that inappropriate attention of parents can lead to visual loss threatening injuries in pediatric group.

Most patients were admitted to hospital 6-24 hours after eye injury in our study, while there was also an interval of longer than 3 hours (mean time) from injury to hospital admission in the study of Karaman *et al* [17]. This is important because immediate and appropriate intervention with modern microsurgical techniques in vision-threatening emergencies can reduce long-term visual loss, and functional vision salvage rate could be 60%-70% [18].

In our study all of patients required surgery and 24.2% of patients needed enucleation, which is similar to the result in the study of Smith *et al*[14] (28% enucleation) on 390 cases of penetrating eye injuries, whereas in a study in Greece just 42.5% of patients needed operation and only 1% required enucleation[19]. In the studies by Smith *et al* [20] and Kuhn *et al* [21], the enucleation rates were reported to be 12% and 14.1% respectively, whereas in the study of Karaman *et al*[17] there was not any eyes enucleated. This difference indicates types of case selection. We chose severe traumatic eye injuries and also severe eye injuries were common in our society, which may be due to the poor control of industrial use of protective eyewear. Light perception (LP) to 20/200 in 24% , 20/200 or better in 38% of 384 patients with penetrating eye injuries, and poor visual outcome associated with poor initial visual acuity and delayed presentation have also been shown in the study of Smith *et al*[14].

In our study the initial vision was a predictor of the final visual outcome. In the study by De Juan *et al* [5], they found that an initial visual acuity <0.025 remained the same or worsened in 72% of the patients, whereas an initial visual acuity >0.025 remained unchanged or improved in 96% of the patients. Poor initial visual acuity as an associated factor with visual impairment (visual acuity less than 6/18) has been concluded in a study on prognostic factors of ocular injuries in South India[22].

In conclusion, according to our results of investigation, ocular trauma remains an important cause of preventable, mostly monocular, visual impairment and blindness. To decide on the prognostic factors in ocular trauma, initial visual acuity is the most important factor associated with final visual acuity in patients with ocular injury.

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