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Visual Outcome in Open Globe Injury.

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ABSTRACT

Introduction: Ocular trauma is a major cause of monocular blindness and visual impairment throughout the world. It is estimated that more than 2 million people suffer from ocular trauma annually and 40,000 become visually handicapped permanently. The aim of this study was to evaluate the visual outcome in open globe injury patients.

Methods: This study was conducted in Nepal Eye Hospital. All the cases of admitted open globe injuries were examined and managed in the hospital were included in this study. The detail history of trauma and visual acuity was recorded. Clinical diagnosis was made after detail examination of anterior and posterior segment. Patient was treated according to the type of injury. Visual recovery and the cause of poor vision at the time of discharge was also noted. Data was analyzed using the SPSS 11 program. **Results:** Out of the 100 cases enrolled in the study work related injury was the most frequent injury, metal was the most common causative agent. Males of 20-50 years of age are more vulnerable to open globe injury. Vision improved in 48%, same vision in 39% and deteriorated vision in 13% cases was recorded. **Conclusions:** Present study reveals that open globe injury can present in varying severity and though the overall prognosis is grave, prompt surgical intervention can result in better visual outcome. The visual outcome in mild to moderate ocular injury was satisfactory but poor in severe injuries.

Keywords: open globe injury, penetrating injury, rupture of globe.

INTRODUCTION

The exact number of ocular trauma in Nepal is not known. However, national survey conducted by HMG, WHO/PBL in 1981 has shown blindness due to ocular trauma is 2.4%[1]. Nepal blindness survey (1981) estimated that 8.6 persons per thousand gave history of trauma of which 27% were unilaterally blind and 3% were bilaterally blind [2]. This national population based survey of blindness in Nepal (1981) found a blindness prevalence rate of 0.84%, with trauma responsible for 7.9% of monocular blindness [3].

Open globe injury is injury of the eye wall (corneoscleral) is a full- thickness wound. The open globe injury can be classified into different types: rupture, penetrating, intraorbital foreign bodies, perforating and mixed[4].

During the last several decades, the prognosis for patients with ocular injuries, especially those with open-globe injuries, has significantly improved. This has been attributed to the advent of enhanced microsurgical techniques and instrumentation, along with an improved understanding of pathophysiologic mechanisms of ocular trauma [5, 6]. The Aim of this study was to evaluate the visual outcome in open globe injury cases and also to estimate the incidence, mode of injury and various traumatic agents of open globe injury admitted in Nepal Eye Hospital (NEH).

METHODS

This prospective interventional study was carried out for a period of $1^1/_2$ year (from 1st of Jan 2006 to 30th June 2007) in Nepal Eye Hospital. All the cases of admitted open globe injuries were examined and managed at hospital were included in this study. The patients with close globe injuries and other non-mechanical injuries like chemical injuries; superficial corneal foreign bodies etc were excluded from the study.

Detailed history included, demographic profile (name, age, sex, address, and occupation of patient); nature and mode of trauma, causative agent; duration between trauma and primary intervention. Visual acuity was recorded with internally illuminated standard Snellen's chart or E-chart or by making them count fingers whichever was

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possible. ***Naked eye examination*:** To determine extent of injury, orbital margins, Light pupillary reflex, Direct and consensual on both sides, swinging flash light test to note presence or absence of relative afferent pupillary defect (RAPD). Detail anterior segment examination was performed on all patients using the slit lamp for the site, extent and type of lesion. Intraocular pressure of both eyes was measured digitally. Evaluation of the fundus was done under full mydriasis by using Direct Ophthalmoscope/ 90D or 78D/ Indirect Ophthalmoscope to see the condition of retina and optic nerve head, if the anterior segment lesion was not precluded such examination. X-ray orbit/skull (in different views) was done on routine basis. Ultrasonography of the orbit (B-scan) was done in patients when posterior segment evaluation could not be done clinically and also cases suspected with intraocular foreign bodies. Special investigations like CT scan and MRI of orbit and skull was done in cases whenever it was indicated. Once a clinical diagnosis was made, patient was put on supportive medical treatment and surgical treatment, which depend upon the type of injury. Visual recovery at the time of discharge was recorded. Cause of poor visual recovery at the time of discharge also was noted. Patient's demographic profile and clinical examination results was entered in the specially designed proforma and then in the computer. Data was analyzed using the SPSS 11.5.

RESULTS

The total numbers of cases included in this study were 100 eyes of 98 patients. All cases of open globe injuries in the age group 2-72 years were admitted in Nepal Eye Hospital. The incidence of ocular trauma in Nepal Eye Hospital in one year was 1.9%.

Table: 1. distribution of patients by their age and sex group

Age	Male		Female		Total	
	N	%	N	%	N	%
<10	8	11.1%	5	17.9%	13	13.0%
10-19	12	16.7%	7	25.0%	19	19.0%
20-29	20	27.8%	1	3.6%	21	21.0%
30-39	8	11.1%	2	7.1%	10	10.0%
40-49	12	16.7%	6	21.4%	18	18.0%
50-59	6	8.3%	3	10.7%	9	9.0%
60-69	4	5.6%	2	7.1%	6	6.0%
>70	2	2.8%	2	7.1%	4	4.0%
Total	72	100.0%	28	100.0%	100	100.0%

The male: female ratio was3:1. Among them the youngest age was 2 years and oldest of 72 years. Injury in men on right eye 47.2%, left eye 52.7% whereas in women on right and left eye accounted 50%.

Regarding the mode of trauma, maximum numbers of injury related to profession, accounted 32% eyes followed by injury related to domestic work (18%), sport (13%) fall down (12%), physical assault (4%), RTA (2%) and unspecified injury accounted 19%.

Table 2. Causative agent of open globe injury

Causative Agent	Number	Percent
Wooden piece	18	18.0
Metallic	37	37.0
Stone	19	19.0
Glass	6	6.0
Plastic	2	2.0
Miscellaneous	17	17.0
Unknown	1	1.0
Total	100	100.0

The most common causative agent was metal which accounted 37%. In miscellaneous group accounted 17 % of injury, which included horn of cattle, beak of hen, edge of cemented wall, finger of children, fist, maize stem, nylon rope, zipper of clothes, playing marble etc.

The most common place for injury was work places (32 %) followed by home, play ground, road, field and in 1 case patient was alcoholic, and he did not know where and how the incident happened.

Table 3. Unaided visual acuity

Visual Acuty	at presentation		on discharge	
	Frequency	%	Frequency	%
NPL	17	17.0	16	16.0
PL+PR(inaccurate)	26	26.0	15	15.0
PL+PR(accurate)	21	21.0	12	12.0
HM close to face	5	5.0	13	13.0
Finger count close to face	5	5.0	9	9.0
1/60-3/60	12	12.0	6	6.0
4/60-6/60	2	2.0	7	7.0
6/36-6/18	8	8.0	18	18.0
6/12-6/9	4	4.0	3	3.0
6/6	0	0.0	1	1.0

NPL: No Perception of Light; PL: Perception of Light; PR: Projection of Rays; HM: Hand Movement

According to WHO definition of blindness, 86% eyes were blind at the time of presentation. Results of examination of an RAPD were recorded at the time of admission in 92/100 (92%). In 72/92 (78.2%), an RAPD was absent, but present in the remaining 20/92 (21.7%).

Table 4. Cause of poor visual outcome

Causes	Frequency	Percent
Anterior segment cause	59	60.20
Posterior segment cause	8	8.16
Anterior + Posterior segment cause	16	16.32
Others	15	15.30
Total	98	100.0

The causes for poor vision at the time of discharge included 60.20% cases of only anterior segment cause, similarly that of only posterior segment accounted 8.16% cases. 16.32% cases had poor vision due to anterior and posterior segment cause and due to others cause for poor vision in 15.30% cases.

Among the types of injuries, better visual outcome in penetration type of injury in compare to initial vision, whereas the almost same vision in case of IOFB type of mode of injury.

DISCUSSION

Ocular trauma is now regarded as a major cause of visual morbidity, around the world half a million blinding eye injuries occur every year, there are approximately 1.6 million people blind from eye injuries, 2.3 million bilaterally visually impaired and 19 million with unilateral visual loss; this being the commonest cause of unilateral blindness today. Maximum incidence is found in young adults and elderly [7, 8] and is much more common in males[9,10].

In this study the most commonly affected age group due to trauma was between 20-29 years (21%) and least (4% eyes) in >70 years (Table 1). This comprises the economically productive age group and visual morbidity due to trauma in this age group results in great deal of economic loss. Male preponderance is seen in ocular trauma[9-16]. In the present study also, 72% were males. The male predominance of injuries may be a result of being engaged in different activities with different degree of risk of ocular injury[17].

In our study the involvement of both the eyes were almost similar in contrast to similar studies where right eye is injured more frequently than the left eye [7, 9, 13, 14, 16, 18-20]. Our study injury related to profession, accounted 32%, followed by related to domestic work (18%), sport related injury (13%), fall (12%). profession related to frequent eye injury included stone hammering (12%), nails hammering (9%) and rest 11% cases related to other industrial works. Unspecified group (19% cases) include injury while feeding cattle, pecked by hen while playing, taking out nail from wall, taking off the mosquito net, knotting the nylon rope, bunch of key passed by friend, finger of children, while zippering the clothes, blast while firing on wedding ceremony, while looking out of window and alcohol consumption.

The most frequent causative agent was metal which accounted 37 cases, then stone and wooden piece were almost equal in numbers i.e. 19 and 18 respectively. Lam SR et al [14] found that the injury to the eye with a sharp object accounted for 66% cases and blunt mechanisms for 28% cases in their series. They found that the injury by sharp object was among the most common mechanism of injury. All the patient underwent surgical repair initially. After appropriate surgery in 48% had improved vision on discharge, 39% had same vision and vision deteriorated in 13% at the time of discharge(Table 3).

Prognostic factors for visual outcome include presenting visual acuity, relative afferent pupillary defect, wound location, lens injury, retinal detachment and endophthalmitis[21]. Cataract was the most common anterior segment cause of poor vision at the time of discharge (32%), followed by corneal opacity/ scar/FB (19%), hyphema (13%), anterior chamber reaction (11%) and aphakia in 13% cases. The posterior segment causes of poor vision included vitreous hemorrhage 15%, retinal detachment accounted 5% and followed by other posterior segment lesions like PVR, choroidal detachment, Berlin's edema, macular edema, retinal fold etc accounted about 10%. In indicator of poor prognosis identified in our study were similar to those identified by other studies, comprising length of wound>11mm, mixed corneoscleral would location, and involvement of the lens and posterior segment.

CONCLUSIONS

Work related injury (32%) was the most common mode for open globe injury. Open globe injury can present in varying severity and though the overall prognosis is grave, prompt surgical intervention can result in better visual outcome. The visual outcome in mild to moderate ocular injury was satisfactory but in severe injuries, it was poor despite of all possible treatment available in our center.

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